

An overview of ongoing Research Projects in Jamia Millia Islamia



February, 2015

Jamia Millia Islamia

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Jamia Nagar, New Delhi-110025, India

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An overview of ongoing Research Projects in Jamia Millia Islamia

February, 2015

by

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Ongoing Research Projects in Jamia Millia Islamia

<i>Contents</i>	Page nos.
• Faculty of Social Science	01
• Department of Economics	01
• Prof Shahid Ahmad	01
• Department of Psychology	02
• Prof. Waheeda Khan	02
• Prof. Waheeda Khan	04
• Prof. Naved Iqbal	06
• Department of Social Work	07
• Dr. Virendra. B. Shahare	07
• Prof N. U Khan / Prof Anjali Gandhi	09
• Prof N. U khan / Dr. Neelam Sukhramani	10
• Dr. Ushvinder Kaur Popli	12
• Prof. Gurumurthy Ramachandran / Dr. Sigamani P	15
• Dr. Habeebul Rahiman.VM	17
• Department of Sociology	19
• Dr. Arvindar A. Ansari	19
• Centre for Management Studies	20
• Dr. Amirul Hasan Ansari	20
• Dr. P.K Gupta	21
• Faculty of Law	22
• Dr. Nuzhat Parveen	22
• Faculty of Natural Sciences	23
• Department of Physics	23
• Dr. Arun Singh	23
• Dr. Arun Singh	26
• Prof. M. Husain / Prof Mohd. Zulfequar	29
• Dr. Azher M. Siddiqui	30

• Dr. Mohammed Ahsanul Hoda	33
• Prof. M. Hussain	34
• Department of Bioscience	35
• Dr. Jawaid Ahmad Khan	35
• Dr. Seemi Farhat Basir / Dr. Luqman A. Khan	37
• Dr. Mohamad Aman Jairajpuri / Prof. Renu Saxena	39
• Dr. Mohammad Abid	41
• Dr. Mohammad Abid	43
• Dr. Moshahid Alam Rizvi	45
• Prof. Arif Ali	46
• Dr. Darakshanda Neelam	47
• Dr. Mohd Asad Khan	48
• Department of Biotechnology	49
• Dr. Mohammad Husain / Dr. Suresh Kumar	49
• Dr. Mohammad Husain / Dr. Sayeed Ahmad	50
• Dr. Syed Akhtar Husain / Dr. Subhash Medhi	51
• Dr. Syed Akhtar Husain / Dr. Purabi Deka Base	52
• Dr. Syed Akhtar Husain / Dr. Sayeed Ahmad	53
• Dr. Syed Akhtar Husain / Dr. Sayeed Ahmad	54
• Dr. Sadiq Umar	55
• Dr. Sadaf Fatima	56
• Dr. Sadaf Fatima	57
• Dr. Md Irfan Qureshi	58
• Dr. Abur Rub	59
• Dr. Abur Rub	60
• Department of Chemistry	61
• Dr. Tokeer Ahmad	61
• Dr. Ufana Riaz	66
• Dr. Ufana Riaz	70
• Dr. Rahisuddin	71

• Prof. Amir Azam	73
• Prof. Khalid Iftikhar	74
• Dr. Saiqa Ikram	75
• Dr. Fehmeeda Khatoon	76
• Prof. Imran Ali	77
• Department of Computer Science	79
• Khalid Raza	79
• Khalid Raza	81
• Department of Geography	83
• Dr. Madan Mohan	83
• Prof. Soe Myint / Karen Seto	86
• Prof. Narendra K Arora / Dr. Atiqur Rahman	88
• Prof. Masood Ahsan S. / Dr. Haroon S., Dr. Lubna S., Dr. Mansaf A.	90
• Dr Lubna Siddiqui / Prof. Masood Ahsan S / Dr. Haroon S	91
• Department of Mathematics	92
• Dr. Mohd Hasan shahid	92
• Centre for Theoretical Physics	93
• Dr. Sanjay Jhingan	93
• Dr. Anjan Ananda Sen	95
• Faculty of Humanities & Languages	96
• Department of History & Culture	96
• Prof. Sunita Zaidi	96
• Prof. Amiya Sen	98
• Department of Islamic Studies	99
• Prof. Akhtarul Wasey	99
• Department of Arabic	100
• Dr. Mohammad Ayub	100
• Department of English	101
• Prof. M Asaduddin	101
• Faculty of Education	103

• Department of Educational Studies	103
• Prof. Anita Rastogi	103
• Prof. Farida Abdullah Khan	107
• Department of Teacher Training & Non formal Education	108
• Dr. Fauzia Khan	108
• Faculty of Engineering and Technology	109
• Department of Electrical Engineering	109
• Dr. Ahteshamul Haque	109
• Dr. Ikbali Ali	110
• Dr. Ikbali Ali	114
• Dr. Ikbali Ali	117
• Dr. Shabana Mehfuz	119
• Prof. Mini S. Thomas	122
• Prof. Mini S. Thomas / Prof Zahiruddin	123
• Dr. Tarikul Islam	124
• Dr. Tarikul Islam	126
• Dr. Munna Khan	128
• Dr. Munna Khan	129
• Prof. Ibrahim / Dr. Arunesh Kumar Singh	130
• Dr. Zainul Abidin Jaffery	131
• Dr. Naimul Hassan	133
• Department of Applied Science & Humanities	134
• Prof. S. S. Islam (Two projects)	134
• Dr. Fehmida Khatoon	137
• Dr. Zeeshan H. Khan	144
• Dr. Weqar Ahmad Siddiqui	145
• Department of Electronics & Communication	146
• Dr Sajad A Loan	146
• Department of Mechanical Engineering	147
• Prof. Zahid Akhtar Khan / Dr. Arshad Noor Siddique	147

• Prof. Abid Haleem	149
• Department of Civil Engineering	150
• Prof Gauhar Mehmood	150
• Prof Gauhar Mehmood	152
• Prof Gauhar Mehmood	154
• Prof. Sirajuddin Ahmed	156
• Prof. Sirajuddin Ahmed	158
• Prof. Sirajuddin Ahmed	160
• MMAJ Academy of International Studies	162
• Prof Sunanda Sen	162
• Director MMAJ Academy	164
• Director MMAJ Academy	165
• Dr. Bijay Ketan Pratihari	166
• Dr. Kuldeep Kumar	168
• India Arab Cultural Centre	169
• Dr. Sameena Hameed	169
• Dr. K. R. Narayanan Centre for Dalit & Minorities St.	171
• Prof. Mutaba Khan	171
• AJK Mass Communication Research Centre	172
• Director AJK-Mass Communication	172
• FTK-Centre for Information Technology	173
• Dr. S.K Naqvi	173
• Dr. S.K Naqvi & Zahid Hussain	175
• Centre for Early Childhood Development and Research (CECDR)	177
• Prof. Zubair Meenai / Prof. Rekha Sharma Sen	177
• Prof. Zubair Meenai / Prof. Rekha Sharma Sen	179
• Prof. Zubair Meenai	181
• Prof. Zubair Meenai / Dr. Saba Firdos / Ms. Seema Naaz	183
• Prof. Rekha Sharma Sen	184
• Dr. Neelima Chopra	186

• Dr.Prachi Vashishtha	187
• Dr. Nimisha Kumar	189
• Dr. Nimisha Kumar / Ms Sufia Azmat	191
• Dr. Neelima chopra	193
• Centre for Culture, Media & Governance	194
• Prof. Biswajit Das / Mr. Vibhodh Parthasarthi	194
• Dr. Saima Saeed / Dr. Athikho Kaisii	196
• Prof. Biswajit Das / Mr. Vibhodh Parthasarthi	198
• Prof. Biswajit Das / Dr. Athikho Kaisii/ Mr. Vibhodh Parthasarthi	201
• Prof. Daniel Drache / Dr. Teberez A. Neyazi	203
• Prof. Holli A. Semetko / Dr. Teberez A. Neyazi / Dr. Anup Kumar	205
• Mr. Vibhodh Parthasarthi / Mr. Adhrian Athique	208
• Prof. Biswajit Das / Mr. Vibhodh Parthasarthi	210
• Centre for Interdisciplinary Research in Basic Sciences (CIRBS)	212
• Dr. Fareeda Athar	212
• Prof. Faizan Ahmad	214
• Prof. Faizan Ahmad	216
• Prof. Zubaida A Ansari / Prof. Shafeeque Ahmad Ansari	218
• Prof. Shafeeque Ahmad Ansari / Prof Zubaida Ansari	220
• Dr. Rajan Patel / Dr. Prashant	223
• Dr. Rajan Patel	226
• Dr. Imtaiyaz Hassan / Prof Faizan Ahmad	228
• Dr. Imtaiyaz Hassan / Prof Faizan Ahmad	230
• Dr. Imtaiyaz Hassan / Prof Faizan Ahmad	232
• Dr. Syed Naqui Kazim	324
• Dr. Shama Parveen / Prof Shobha Broor	236
• Dr. Shama Parveen / Dr. Asimul Islam	238
• Dr. Asimul Islam	240
• Dr. Asimul Islam	243
• Prof Faizan Ahmad	246

• Prof Zubaida Ansari	247
• Dr. Abul Bashar Khan	248
• Dr. Sonu Chand Thakur	249

**Faculty of Social Sciences
Department of Economics**

1. **Name of the department:** Department of Economics
2. **Project Title:** DRS-I to DRS-II (DRS Programme)
3. **Coordinator:** Prof Shahid Ahmad



4. **Deputy Coordinator:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 60,00,000.
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** April-2013 to March-2018

Faculty of Social Sciences Department of Psychology

1. **Name of the department:** Department of Psychology
2. **Project Title:** Intergroup Contact and Collective Action in Educational Settings in India under UGC-UKIERI Thematic Partnership-2013
3. **PI:** Prof Waheeda Khan



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 8,10,500
7. **Duration of the project:** Two years
8. **Starting date of the Project:** 2013
9. **Project objectives:**

The main aim is to investigate how intergroup contact and collective action tendencies interact in multiple group settings where individuals share a multiplicity of social identities. Prof. John Dixon of the Open University is the UK partner. The project is jointly funded by UGC (Rs. 16, 21,000) and British Council (29,000 pound). The grant has been released by respective agencies and the lead researchers have initiated the first phase of research work as per the time lines.

10. **A brief overview of the project:**

This research is one of the first studies to consider the relational aspect of intergroup relations in real life situations, context and individual behaviour simultaneously. The project will also contribute significantly to the understanding of complex interactions between intergroup encounters, the structural elements and the context where diverse social, ethnic and linguistic groups exist in their natural settings. This collaboration, interdisciplinary in nature will provide the involved parties with the opportunity to extend their international and interdisciplinary networks and enable them to broaden their disciplinary expertise and enrich their understanding of problems of social relevance from a wider perspective. The collaborators will have access opportunities to develop research infrastructure in their home institutions, extend their international networks, and improve their research skills.

11. [Infrastructure created from the project](#): in process

12. [Project outcomes](#):

The published work will emerge after the completion of the research award.

13. [Benefit from the project to the society](#):

The project will enable transfer of knowledge enabling local expertise and research to be combined for cutting edge social psychological research in under-researched areas

Faculty of Social Sciences Department of Psychology

1. **Name of the department:** Department of Psychology
2. **Project Title:** Intergroup Contact and Collective Action in Educational Settings in India under UGC- UKIERI Thematic Partnership -2014
3. **PI (Indian Team):** Prof. Waheeda Khan, Department of Psychology, JMI, Delhi
Co-Investigator (Indian Team): Dr. Meena Osmany, Department of Psychology, JMI



4. **PI (British Team):** Dr. John Dixon, The Open University, Milton Keynes, UK
Co –Investigator (British Team): Dr. Huseyin Cakal, Exeter University, Exeter, UK
5. **Funding Agency:** UGC and British Council
6. **Amount funded:** Total Rs. 45, 21,000; UGC grant (Rs. 16, 21,000) and British Council grant (29,000 pound)
7. **Duration of the project:** April 2014 - March 2016
8. **Starting date of the Project:** April 2014
9. **Project objectives:** The main aim is to investigate how intergroup contact and collective action tendencies interact in multiple group settings where individuals share a multiplicity of social identities.
10. **A brief overview of the project:** This research is one of the first studies to consider the relational aspect of intergroup relations in real life situations, context and individual behaviour simultaneously. The project will also contribute significantly to the understanding of complex interactions between intergroup encounters, the structural elements and the context where diverse social, ethnic and linguistic groups exist in their natural settings. This collaboration, interdisciplinary in nature will provide the involved parties with the opportunity to extend their international networks and enable them to broaden their disciplinary expertise and enrich their understanding of problems of social relevance from a wider perspective. The collaborators will have

access to opportunities to develop research infrastructure in their home institutions, extend their international networks, and improve their research skills.

11. Project outcomes

- 1) Examination of inter-minority and minority-majority contact and how it is perceived by members of each group
- 2) Existing research in the area of inter group contact has focused almost entirely on simple measures of prejudice, whereas this project would focus on broader political attitudes and behaviors, including collective action orientation.
- 3) It would allow to build a new theoretical approach to the role of contact in social change, an approach that integrates work on the contact hypothesis collective action and mobilization.
- 4) Encourage work on the so-called sedative effects of contact on political attitudes beyond critique and qualification and towards a positive applied agenda.

12. Project work so far:

The project involves a series of exchange trips between Open University, United Kingdom and Jamia Millia Islamia, India. At this stage, the first trip by Indian team to the United Kingdom has been completed. This trip involved several research meetings in Milton Keynes, a meeting at the University of Exeter and a workshop held with a wider network such as Shelley McKeown, Bristol University; Nick Hopkins, University of Dundee; Steve Reicher, University of St Andrews; Clifford Stevenson, Queens University Belfast; Manuela Thomae, University of Winchester, and Rachel Manning of The Open University. The return visit by the UK research team (John Dixon & Huseyin Cakal) is scheduled to be in February/March 2015, and will involve further research meetings, preliminary data analysis, keynote talks and an advanced methodology and statistics workshop to staff and students. Pilot data will be collected at the beginning of 2015 followed by the main phase of data collection and analysis.

13. Benefits from the project to society:

To begin with, there is very little work on the role of contact between different minority groups, which is essential for a deeper understanding of intergroup relations in India. The findings from the study can be used to provide directions and possible solutions at the country level to enhance cross community understanding and eventually lead to more friendly relations between Hindus and Muslims in India. The findings with cross cultural data will provide a rich picture on intergroup relations and collective action in a global context. At the level of research, the University will benefit from the mutual exchange of skills and knowledge between JMI professors and students and the visiting UK staff. Related Link: ukiercontactproject.wordpress.com

**Faculty of Social Sciences
Department of Psychology**

1. **Name of the department:** Department of Psychology
2. **Project Title:** Upgradation from DRS-I to DRS phase-II for a period of 5yr
3. **Coordinator:** Prof Naved Iqbal



4. **Deputy Coordinator:** M.G Shahnwaz
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 43,50,000
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** 2013 to 2018.

**Faculty of Social Science
Department of Social Work**

1. **Name of the Department:** Social Work
2. **Project Title:** Role of NGOs for Empowerment of Dalits: A Study of Selected NGOs in Nagpur
3. **Project Investigator:** Dr. Virendra. B. Shahare, Assistant Professor



4. **Co-Investigator:** None
5. **Funding Agency:** University Grant Commission
6. **Amount Funded:** INR 7,34,600.
7. **Duration of the Project:** Two Years
8. **Starting Date of the Project:** April, 2013 to March, 2015
9. **Project Objectives:**
 - (a) To study the socio-economic, educational, cultural and political empowerment of the Dalits.
 - (b) To inquire into the nature and social composition vis-à-vis social structure of the NGOs working for development of the Dalits.
 - (c) To study the nature of activities/programmes being undertaken by the NGOs for the empowerment of Dalits.
 - (d) To understand the present status of working of the NGOs for development of Dalits.
 - (e) To evaluate the impacts of the various activities/programmes undertaken by the NGOs for the empowerment of Dalits in the rural areas.

10. **A brief overview of the project:**

The proposed study has ample importance in the field of academic and research especially in the era of globalization because so far no such study has been done either by the government institutions or any research organizations. Some evaluation study has been done by the NGOs for knowing the progress of their work but their study purpose was limited. It is an important aspect to evaluate NGOs contribution with regard to development vis-à-vis empowerment of Dalits in the light of "Welfare State" and also see the role of state with regards to Dalit development and why state is failure to take care of people basic needs while giving all major responsibilities towards NGOs sector. It also gives the real picture of NGOs role in terms of whether NGOs is an alternative for Dalit empowerment or state. NGOs strategies, methods or policy are

more applicable rather than state. The finding of the study will help for academic purpose both NGOs, civil society and government. The study will help to formulate policies/programmes for improvement of the conditions of Dalits.

11. **Infrastructure Created from the Project:** Computer, Printer and UPS.

12. **Project Outcomes:** Two research articles and one book

13. **Benefit from the project to the Society:** -

This study will be of great help to the NGOs, civil society, academic and government. So that they formulate policies/ programmes for improving the conditions of Dalits. The project findings will give real picture of their work, strategies and approaches which they adapted for upliftment of the beneficiaries. Society will become aware about schemes meant for them and they will effectively participate.

**Faculty of Social Science
Department of Social Work**

1. **Name of the department:** Department of Social Work
2. **Project Title:** Continuation from DSA III to CAS-I, Centre for Advance Studies
3. **PI:** Prof. N.U khan



4. **Co-PI:** Prof Anjali Gandhi
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 72,50,000
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** April 2010 to March 2015

Faculty of Social Science Department of Social Work

1. **Name of the department:** Department of Social Work
2. **Project Title:** GFATM Round 7 to fight AIDS, TB and Malaria
3. **PI:** Prof N. U Khan



4. **Co-PI:** Dr. Neelam Sukhramani
5. **Funding Agency:** Global Fund
6. **Amount funded:** INR. 1, 66,89,838.00
7. **Duration of the Project:** 6yr
8. **Starting date of the Project:** Sept. 2008, End date March-2015
9. **Project objectives:**

The objective of Saksham is to strengthen human and institutional capacities of the national health system in the field of HIV counseling to achieve and meet the long term goals of the National AIDS Control Programme for HIV prevention, care and treatment.
10. **A brief overview:**

Saksham lead by TISS Principal Recipient (PR) is a partnership of 38 institutions of higher learning and Department of Social Work, Jamia Millia Islamia (JMI) is one of the Sub Recipients (SRs) of Global Fund Round 7 (GFATM r-7)¹. In North India JMI is covering 5 states of Delhi, Haryana, Chandigarh, Punjab and Jammu & Kashmir in partnership with 5 Sub-Sub Recipients (SSRs) Institutes². These SSRs under GFATM r-7 are identified institutions under National AIDS Control Program (NACP) to build the capacities of counselors through training and Supportive Supervision in the field of HIV/AIDS and related areas.
11. **Infrastructure created from the project:** Upgrading of Training Hall, Guest house and established resource centre where more than 500 books on HIV, Gender, sexuality, training etc are available.
12. **Project outcomes:**

Some of the major Milestones of SAKSHAM-JMI includes:

 - Conducted 31 Trainings of counselors³, Master Trainers (MTs) and Supportive Supervisors
 - Compiled the training methodologies, energizers, brainstorming activities etc
 - Compilation of Case studies and ice breaking exercises used during trainings

- Compilation of referral and linkages guide at State level
 - Develop manual for the Supportive Supervision for the STI and ART counselors. Also contributed chapters on “Behavior change” and “Counseling practice “ in the Advance and Integrated Induction and Refresher Module for National AIDS Control Program (NACO).
 - Conducted operational research on “Gender Identity and Health Care Services Utilization by PLHA “and developed a monograph of the same.
 - Competency Mapping of Master Trainers and developed criteria for the reallocation of counseling supervisors
 - Conducted SR and SSR wise assessment to showcase the strengths to partners like NACO and State AIDS Control Society/s (SACS)
 - Implemented and monitored Supportive Supervision in Northern States of India through SSRs
 - Conducted “INTERFACE *with Partners* “to enhance the quality of counselling supervision
 - Conducted one day training for NRHM functionaries with support from Delhi SACS
13. **Benefits from the project to the society:**
 Built state specific human & structural capacities of academic institutions and counselors to ensure the effective delivery of counseling services in HIV, STI/RTI, TB, ART etc. to support NACP which aims to build Nation with zero new infection, stigma and discrimination.

Faculty of Social Science Department of Social Work

1. **Name of the department:** Department of Social Work
2. **Project Title:** Problem of the Elderly: A study of the old age Pensioners in Delhi
3. **PI:** Dr. Ushvinder Kaur Popli, Associate Professor



4. **Co-PI:** Nil
5. **Funding Agency:** ICSSR, Ministry of Human Resource Development, GOI.
6. **Amount funded:** INR. 7,12,725
7. **Durartion of the Project:** 2yr
8. **Starting date of the Project:** 15 January 2013.
9. **Project Objectives:**

The present study aims to understand the problems of the beneficiaries of Old Age Pension scheme. With specific objectives critically looking into the demographic, socio-economic and cultural and characteristics of the beneficiaries of the Old Age Pension scheme in the National Capital Territory of Delhi; ascertaining various health, economic and social problems faced by the OAP beneficiaries; analysing the problems and difficulties the OAP beneficiaries face in availing of the OAP scheme (procedures, mode and regularity of payment, etc.); and examining the methods adopted by the elderly to adjust to their present life-situation within the OAP amount they receive.

10. **A Brief Overview of the Project:**

While on one hand, the traditional welfare institutions are deteriorating and, on the other side, the population of the aged is going up, there is a big gap between the problems of the aged and the availability of resources. Initiatives by the government and non-governmental organizations hardly match with the needs of the elderly. Governments everywhere in the world have come forward to provide old age security. India's record in providing cash benefits to the aged and disabled is quite dismal as compared with other major Asian countries. Often social assistance programmes have not been able to reach the targeted population. Very often the potential recipients are not aware of

such programmes. There are high transaction costs and obstacles in the application. In other cases, payment delays in these programmes vary from state to state and ranged from one month to one year.

Over the years several studies have attempted to shed light on various geriatric issues. Yet there are many aspects which remain unexplored, prominent among is the problems faced by the recipients of old age pension (OAP). The proposed study attempts to bridge this information gap and study the adjustment problems faced by the elderly with special reference to the old age pension recipients.

The present study aims to understand the problems of the beneficiaries of Old Age Pension scheme. With specific objectives critically looking into the demographic, socio-economic and cultural and characteristics of the beneficiaries of the Old Age Pension scheme in the National Capital Territory of Delhi; ascertaining various health, economic and social problems faced by the OAP beneficiaries; analysing the problems and difficulties the OAP beneficiaries face in availing of the OAP scheme (procedures, mode and regularity of payment, etc.); and examining the methods adopted by the elderly to adjust to their present life-situation within the OAP amount they receive.

To realise its enunciated objectives, the proposed study will be descriptive-diagnostic in nature, and will be based on both field and documentary sources. Information will be gathered from beneficiaries of Old Age Pension scheme, the authorities concerned with the administration / implementation of the scheme and significant others. Hopefully the study will bring out dependable information on the problems of elderly receiving OAP and adjustments made by them in an environment denoted by rapid socioeconomic changes. The universe of the present study will be the NCT of Delhi. Targeted sample size is 510. The Unit of observation is the OAP-beneficiaries in the NCT of Delhi. The overall sample of the proposed study is: District Welfare Officers - 5, Officials from Gender Resource Cell -5, Total officials-10. Towards the fulfilment of the research objectives tools of data collections used are Observation sheet to collect information on the household situation of the elderly, their living condition, and their relationship in the family. Structured interview schedule has been designed for collecting information from the OAP-beneficiaries. And an Interview guide formulated to collect information from officials and significant others in implementing the OAP scheme to understand the difficulties and bottlenecks that come in the way of the implementation of the scheme and to suggest measures for making the scheme more effective. Performa has been designed to collect information from secondary sources. 10 case studies would be compiled to have an in depth knowledge of the problems of the Old people. The collected data is being collated, checked for consistency and processed using data processing software like the SPSS and word Excel. Subsequently, frequency and cross-

tables will be generated and interpreted. On the basis of all this information and their analyses, a report will be documented.

11. Infrastructure created from the project:

The contingency grant was mainly for books, stationery and equipment. So, besides purchasing some books, major part of the grant has been spent in photocopying, getting stationery etc. By way of equipment, I have purchased one printer and computer accessories required for working from office such as pen drive .

12. Project outcomes:

Since this is a research award for individual scholar, there is no provision for holding seminars or workshops. Yet Tangible outcome of the project would be publication of one research paper in a peer reviewed journal, a policy brief, one annotated bibliography. The most important impact of this project will be an identification of the problems faced by the pensioners and suggest ways to the policy makers for effective implementation of the NOAP scheme.

13. Benefit from the project to the society:

The study would be useful to the policy makers as the number of elderly is gradually increasing in the general population. Further, the traditional family support is reportedly getting eroded. There is high probability that the number of elderly facing problems and adjustment issues in the changing scenario would go up. A large number would be facing economic insecurities and would be dependent upon public support, thus making the schemes like OLD AGE PENSION a significant one. The study is expected to provide dependable information on the socioeconomic and cultural aspects of the elderly, in general, and of the OAP recipients, in particular. It would highlight the difficulties and bottlenecks that come in the way of effective implementation of the NOAP scheme. Further, it would provide incisive information on the overall effectiveness of the NOAP scheme. This study would be beneficial the students and functionaries working for the elderly , I order to equip them to work with the elderly by understanding their problems and also the lacunae's in the implementation of NOAP scheme in order to make it more effective. Finally, the information thus gathered and suggestions that emerge out of the study are expected to provide important feedback and thus help policy-makers to further streamline the scheme and improve its effective implementation.

Faculty of Social Science Department of Social Work

1. **Name of the department:** Department of Social Work
2. **Project Title:** Assessing and Prioritizing Needs for the Occupational Health Infrastructure in India
3. **PI:** Prof Gurusurthy Ramachandran (School of Public Health, University of Minnesota, USA)
4. **Co-PI:** Dr Sigamani P (Department of Social Work, Jamia Millia Islamia, New Delhi)



Other investigators: Dr. Anu Ramaswami, Humphrey School of Public Affairs, University of Minnesota; Dr. Matteo Convertino, Assistant Professor, Division of Environmental Health Sciences, School of Public Health, University of Minnesota; and Dr. Sunita Reddy, Assistant Professor, Centre of Social Medicine and Community Health, Jawaharlal Nehru University, New Delhi, India.

5. **Funding Agency:** University of Minnesota, (Twin cities campus) USA.
6. **Amount funded:** INR. 60,00,000
7. **Duration of the project:** 18 months.
8. **Starting date of the Project:** 1st July 2014 To 31st December 2015
9. **Project objectives:** The analysis will identify the needs for the OH infrastructure in India and the priority areas for investment of government and industry resources that will have a significant public health impact.
10. **A brief overview of the project:** The rapid industrialization and urbanization of India has severely strained the existing occupational health and urban infrastructures resulting significant public health impacts and economic costs. We will analyze current attributes and outcomes of the OH infrastructure in India and their dynamic and complex interactions within themselves and with the urban infrastructure. The proposed research is a novel combination of mathematical systems modelling based on extensive, spatially-resolved governmental data, engagement of a broad cross-section of stakeholders and policy-makers in the project, elicitation of expert opinions in a probabilistic framework, and empirical field work. The proposed multi-pathway work with a trans-disciplinary research team and a working group composed of scholars and policy makers will impact public policy and inform scholarly studies in public health. The results of this work will be shared with the key stakeholders, but especially with policy makers in government. An international conference is planned for the end of the study for wider dissemination of results. We are also concurrently seeking funds from the Government of India for a more

substantive capacity building project. We expect that this work will place the University of Minnesota in a position to help in capacity building in India by training OH professionals at the Master's and doctoral levels and training young faculty in OH.

11. **Infrastructure created from the project:**

Purchased laptop, Printer and UPS.

12. **Project outcomes:**

Tangible outcome of the project:

1. To train one postdoctoral fellow in the field of occupational health.
2. Publication of a policy paper summarizing the recommendations from this work in a reputed peer reviewed journal.
3. Publication of one research paper in a peer reviewed journal.
4. Publication of one policy brief.
5. Publication of one commentary in a peer reviewed journal.
6. Publication of one annotated bibliography.
7. To organize three days joint international conference on "Public Health Infrastructure in Transition: Challenges and a Way Forward" in collaboration with School of Public Health, University of Minnesota (Twin Cities Campus), Minneapolis, USA.
8. To organize two days international summer school on "research methodology in public health" in collaboration with school of public health, university of Minnesota (twin cities campus), Minneapolis, USA.
9. One edited book based on the outcome of the international conference will be published.
10. The most important impact of this project will be an identification of the needs for the OH infrastructure in India and the priority areas for investment of government and industry resources which will have a significant public health impact. We expect that the outcomes of this work will inform public policy options. We also expect that this work will place JMI in a position to help in capacity building in India by training OH professionals at the Master's and doctoral levels and training young faculty in OH.

13. **Benefit from the project to the society:**

The most important impact of this work will be an identification of the needs for the OH infrastructure in India and the priority areas for investment of government and industry resources which will have a significant public health impact. We expect that the outcomes of this work will inform public policy options. We also expect that this work will place the University of Minnesota in a position to help in capacity building in India by training OH professionals at the Master's and doctoral levels and training young faculty in OH.

**Faculty of Social Science
Department of Social Work**

1. **Name of the Department:** Department of Social Work
2. **Project Title:** “Exploring Innovations in Rural Development; A Study of Selected Model Village Experiments in India”
3. **Project Investigator:** Dr. Habeebul Rahiman. V.M., Assistant Professor, Social Work



4. **Co- Investigator:** None
5. **Funding Agency:** UGC
6. **Amount funded:** INR 1,36,000/-
7. **Duration of the project:** 18 months
8. **Starting date of the Project:** Oct, 2012
9. **Project objectives:**
 - To understand the vision behind model village experiments.
 - To study the strategy adopted by the visionaries to materialize their vision.
 - To identify the peculiarities and strength of the projects that has a potential of replication in other parts of the country.
 - To analyze the hindrances on the way and the possible strategies to overcome the same, and to prepare a conceptual note on model village based on the field experiences and review of secondary data.
10. **A brief overview of the project:**

There have been several attempts in the pre and post independent India to visualize an ideal village and dare to fight against the odds so as to realize their dreams. Experiments like Sriniketan Project of Rabindra Nath Tagore and Seva Gram Project of Mahatma Gandhi had left many lessons for the predecessors to learn and follow.

Following their footpaths, there are some noble initiatives still in progress at different parts of the country, with or without the support of government agencies. The Hivre Bazar model village in Ahmad Nagar, Maharashtra, Ralegan Sidhi model Village of Anna Hazare in Maharashtra, Model Village Projects initiated by VISION 2016 of Human Welfare Foundation, Pradhan Mantri Adarsh Gram Yojana initiated, are some among them.

As the demographic profile and deprivation levels are widely different across the length and breadth of India, there cannot obviously have a common and non-flexible

strategy for developing it as a Model Village. The picture of an ideal village, its priorities and strategies varies according to the underlying factors which constitutes its composition. And the results of these attempts vary, based on various factors like clarity of vision, level of commitment, resource base, consistency of interest, relative peace and harmony among villagers and many more to add.

There is a serious need to study the ongoing model village experiments to identify their strength and weakness, and come out with feasible recommendations to help them realize the vision of father of nation to see India as a collection of self dependent and prosperous village republics. The study proposed is an attempt in this regard.

11. **Infrastructure created from the project:**

A printer and subject-related books from contingency grant.

12. **Project outcomes:**

A published book on the topic and recommendations with policy implications will be the result of the project.

13. **Benefit from the project to the society:**

The study will have great significance in terms of guidance to the rural development functionaries and policy makers.

**Faculty of Social Science
Department of Sociology**

1. **Name of the department:** Department of the Sociology
2. **Project Title:** Globalization and Indian Handloom Industry: A Study of Weavers of Varanasi District of Uttar Pradesh
3. **PI:** Dr. Arvinder Ansari



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 8,94,600
7. **Duration of the Project:** 2yr

Centre for Management Studies

1. **Name of the Centre:** Centre for Management Studies
2. **Project Title:** Knowledge Management & Organisational Culture: A Study of Media Industry in India
3. **PI:** Dr. Amirul Hasan Ansari



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 5,90,000

Centre for Management Studies

1. **Name of the department:** Centre for Management Studies.
2. **Project Title:** Regime Switching and Artificial Neural Network Forecasting of A&P CNX Nifty Returns
3. **PI:** Dr. P. K Gupta
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funding:** INR. 8,26,200

Faculty of Law

1. **Name of the department:** Faculty of Law
2. **Project Title:** Discriminative and Derogatory practices against Women by Khap Panchayats, Kangaroo Courts and Shalishi Adalats in India
3. **PI:** Dr. Nuzhat Parveen



4. **Co-PI:** Nil
5. **Funding Agency:** National Commission for Women
6. **Amount funded:** INR. 5,44,425

**Faculty of Natural Science
Department of Physics**

1. **Name of the Department:** Department of Physics
2. **Project Title:** Fabrication of piezoelectric and pyroelectric ceramics and thin films for transducers application
3. **Project Investigator:** Dr. Arun Singh, Assistant Professor



4. **Co- Investigator:** None
5. **Funding Agency:** Department of Science and Technology, Govt. of India
6. **Amount Funded:** INR 19, 44,000
7. **Duration of the Project:** 3 year
8. **Starting Date of the Project:** September, 2009
9. **Project Objectives:** The main objectives of the present proposal are
 - a) Development of modified piezoelectric ceramics compositions namely modified Lead Titanate and Lithium Tantalate (LiTaO_3) using sol-gel derived powders and solid state mixing method (based on optimised compositions of ingredients as reported in literature).
 - b) Development of piezoelectric and pyroelectric thin films of doped lead titanate and using sol-gel deposition and pulsed laser deposition (PLD).
 - c) Structural, spectroscopic and electrical (dielectric, conductivity) characterization of films and ceramics developed in (i) and (ii)
 - d) Optimization of ceramic and thin film composition for desired piezoelectric properties.
 - e) Study on the pyroelectric properties of prepared samples for sensor application.
 - f) Fabrication of piezoelectric transducer utilizing suitable composition developed under optimized condition

10. **A Brief Overview of the Project:**

In light of research developments, suitable compositions of lead based and lead-free piezoelectric and pyroelectric ceramics and thin films are proposed to be developed in the present proposal for transducer applications. Piezoelectric transducers based on suitable ceramic compositions will be fabricated using sol-gel derived powder and their functional properties will be studied. Thin films of these compositions will be deposited by pulsed laser deposition and sol-gel technique, and processing conditions will be optimized for good piezoelectric properties. The proposal assumes greater significance for developing an indigeneous technology for the fabrication of both the lead based compositions and lead free piezoelectric materials exhibiting good functional properties for transducer applications.

Over the years piezoelectric devices have found applications in all aspects of our life. For instance, ceramic phonograph cartridges have simplified player design and made record players cheaper to maintain and easier to build. The development of the ultrasonic transducer allowed for easy measurement of viscosity and elasticity in fluids and solids, resulting in huge advances in materials research. Ultrasonic time-domain reflectometers (which send an ultrasonic pulse through a material and measure reflections from discontinuities) could find flaws inside cast metal and stone objects, improving structural safety. Other piezoelectric devices include piezoceramic filters, used in radios and televisions, piezo buzzers and audio transducers that could be connected directly into electronic circuits, and the piezoelectric igniter which generates sparks for small engine ignition systems (and gas-grill lighters) by compressing a ceramic disc.

11. **Infrastructure Created from the Project:**

Sol-gel Spin Coating Setup, High Temp. Programmable PID Control Muffle Furnace, Glove Box (Moisture Sensitive) Rotary Vacuum Evaporator Oven

12. **Project Outcomes:** Research Articles given below:

- a) "Development and study of the structural and optical properties of hexagonal ZnO nanocrystals", Ziaul Raza Khan, Mohd. Arif and Arun Singh, Khan et al. International Nano Letters 2012, 2:22, International Nano Letters-Springer Journals
- b) "Preparation and Structural characterization of Pb(Zr_{0.52}Ti_{0.48})O₃ ceramics from solid state reaction method" International Refereed Journal of Engineering and Science (IRJES) Volume 2, Issue 10 (October 2013), PP. 48-50
- c) "Effect of Annealing Temperature on Structural and Optical Properties of ZnO Thin Films by Sol-gel Processing ", 2013 (In press) International Journal of Advanced Scientific and Technical Research (IJAST) Mohd. Arif, Siddhartha, Arun Singh and Vinay Gupta.

Conference papers

- a) "Sustainable and Renewable Energy from DSSC - A Facile Method and Cost Effective Materials" Mohanpal, Arun Singh, K.K. Saini, WCMANU- 2011, Gurukula Kangri Vishwavidyalaya, Haridwar.
- b) "Nanostructured Lead Sulphide assembled Titanium Dioxide thin films: Preparation and Characterization" Mohan Pal, Arun Singh, Sameer S. D. Mishra Chanderkant and K. K. Saini, in National Conference on Material Science, JMI, Delhi, India-Feb.2012
- c) Studies of photovoltaic properties of nanocrystalline thin films, Arun Singh, Mohd. Arif, Ziaul Raza Khan, Siddhartha, a Sonia Bansal, workshop on Nanotechnology and Embedded system (WNTES) YMCA, Faridabad held on July 23 to Aug. 3, 2012
- d) Growth and Characterization of ZnO Nanocrystalline thin film, Mohd. Arif, Ziaul Raza Khan, Siddhartha and Arun Singh, presented in National Symposium on Nanotechnology: Interdisciplinary Aspects, at YMCA University of Science and technology, Faridabad, held on Dec. 12, 2012.
- e) Ferroelectric and piezoelectric studies of Ni modified Lead Zirconate Titanate ceramic near MPB, Nitu Kumari, Jagdhar Mandal, Arun Singh, Vinay Gupta, R.S. Katiyar, Communicated to Materials Chemistry and Physics.

- f) Properties of Ni modified Lead Zirconate Titanate ($\text{Pb}_{1-x}\text{Ni}_x(\text{Zr}_{0.52}\text{Ti}_{0.48})\text{O}_3$ (PNZT) solid solutions, Nitu Kumari, Arun Singh, Jagdhar Mandal, P.M. Vilarinho, R. S. Katiyar, Vinay Gupta, accepted in MRS Fall Meeting 2012, Boston, USA

13. **Benefit from the project to the Society:**

Contemporary research across the world is focussed on developing materials that are free from toxic ingredients and are not hazardous. Lead based piezo-ceramics are efficient materials for use in numerous functional applications. However, due to environmental concerns and toxicity nature of lead, legislations have banned the use of lead based compounds globally. In this project we aim at developing lead free piezo-crystals exhibiting functional properties comparable to lead based compounds. The development of suitable material compositions for the fabrication of piezoelectric transducer and pyroelectric detectors are the main focus of the present project.

**Faculty of Natural Science
Department of Physics**

1. **Name of the Department:** Department of Physics
2. **Project Title:** Development and characterization of ferroelectric thin films and ceramics for device applications
3. **Project Investigator:** Dr. Arun Singh, Assistant Professor



4. **Co-Investigator:** None
5. **Funding Agency:** University Grants Commission MHRD, Govt. of India
6. **Amount Funded:** INR12, 00,400
7. **Duration of the Project:** 3 year
8. **Starting Date of the Project:** September, 2009
9. **Project objectives:** The major objectives of this proposal comprises are
 - a) To fabricate modified ferroelectric films and ceramics compositions modified Lead Titanate using sol-gel derived powders and solid state mixing method (based on optimised compositions of ingredients as reported in literature).
 - b) Development of ferroelectric thin films of doped lead titanate and lithium tantalate using sol-gel deposition, pulsed laser deposition (PLD) techniques and magnetron sputtering.
 - c) Structural, spectroscopic and electrical (dielectric, conductivity) characterization of films and ceramics as developed in (i) and (ii)
 - d) Optimization of ceramic and thin film composition for ferroelectric, magneto electric properties
 - e) Study on the ferroelectric properties of prepared samples for capacitors and sensor applications. Fabrication of piezoelectric and IR transducer
10. **A brief overview of the project:**

The broad area of the present research proposal involves the work of experimental physicists. However, in true sense it involves an interdisciplinary approach to the problem. For instance, since most of the ferroelectric materials involve chemical precursors and solvents that are used in the synthesis of powder (and processing ceramics out of powder) using a chemical route such as sol-gel process it requires the expertise of a chemist. Secondly the spectroscopic analysis of powder and ceramics again involves the work of persons from chemistry background. The end use of the ferroelectric materials is in devices like sensors and actuators; hence it involves the works of the professionals from electronics background. In such a backdrop, the present research programme has an interdisciplinary relevance.

Contemporary research across the world is focussed on developing materials that are free from toxic ingredients and which are not hazardous towards the environment. Lead based piezo-ceramics are efficient materials for use in numerous functional applications. However, due to environmental concerns and toxicity nature of lead, legislations have banned the use of lead based compounds globally. The present project aims at developing lead free piezo-crystals exhibiting functional properties comparable to lead based compounds. The research on the development of suitable material compositions for the fabrication of piezoelectric transducer and pyroelectric detectors will definitely be a boost in the direction of technology advancement.

11. **Infrastructure created from the project:** Keithley Electrometer (I-V) to be purchased

12. **Project outcomes:** Research papers and articles

- a) "Influence of thickness on optical and structural properties of BiFeO₃ thin films: PLD grown" Arun Singh, Ziaul Raza Khan, Paula Vilmanharo, Vinay Gupta, R S Katiyar, Materials Research Bulletin, 49 (2014) 531–536
- b) "Lead Zirconate Titanate Piezoelectric Ceramics with Nickel Oxide Additions" International Refereed Journal of Engineering and Science (IRJES) Volume 2, Issue 10 (October 2013), PP. 51-55
- c) Influence of substrates temperature on Structural and optical properties of thermally evaporated CdS Nanocrystalline thin films, Mohd. Arif, Siddhartha, Ziaul Raza Khan, Vinay Gupta, Arun Singh, communicated to Indian Journal of Pure & Applied Physics (IJPAP)

Conference papers

- a) Highly Sensitive Nanostructured Dodecylbenzene Sulphonic Acid Doped Polyaniline based Ammonia Sensor, Jitender Kumar, Arun Singh, V. Gupta, presented in International Conference on Nanomaterials and Nanotechnology, ICNANO, New Delhi India-18-21 Dec.2011.
- b) "Nanostructured Dodecylbenzene Sulphonic Acid Doped PANI based Ammonia Sensor", Jitender Kumar, Arun Singh, V. Gupta, presented in National Conference on Material Science, JMI, Delhi, India-Feb.2012
- c) Ferroelectric and piezoelectric studies of Ni modified Lead Zirconate Titanate solid solution, Nitu Kumari, Jagdhar Mandal, Arun Singh, Vinay Gupta, R.S. Katiyar, presented in National Symposium on Nanotechnology: Interdisciplinary Aspects, at YMCA University of Science and technology, Faridabad, held on Dec. 12, 2012.
- d) Study of structural, thermal and magnetic properties of doped barium hexaferrite, Riti Sethi, Arun Singh, presented in National Symposium on Nanotechnology: Interdisciplinary Aspects, at YMCA University of Science and technology, Faridabad, held on Dec. 12, 2012.
- e) Optical properties of highly oriented BiFeO₃ thin films grown by PLD Method, Arun Singh, Riti Sethi, Jagdhar Mandal, P.M. Vilarinho, R. S. Katiyar, Vinay Gupta, accepted in MRS Fall Meeting 2012, Boston, USA.

13. **Benefit from the project to the society:**

The combined properties of memory, piezoelectricity and pyroelectricity make ferroelectric capacitors very useful, e.g. for sensor applications. Ferroelectric capacitors are used in medical ultrasound machines (the capacitors generate and then

listen for the ultrasound ping used to image the internal organs of a body), high quality infrared cameras (the infrared image is projected onto a two dimensional array of ferroelectric capacitors capable of detecting temperature differences as small as millionths of a degree Celsius), fire sensors, sonar, vibration sensors, and even fuel injectors on diesel engines. As well, the electro-optic modulators that form the backbone of the Internet are made with ferroelectric materials.

Faculty of Natural Science Department of Physics

1. **Name of the Department:** Department of Physics
2. **Project Title:** Growth of Single Walled Carbon Nanotubes for semiconducting Applications
3. **Project Investigator:** Prof. M. Husain



4. **Co-Investigator:** Prof. Mohd. Zulfequar



5. **Funding Agency:** Department of Electronics and Information Technology, New Delhi
6. **Amount Funded:** INR 380, 76,100
7. **Duration of the Project:** 04 years
8. **Starting date of the Project:** April 23, 2010

9. **Project Objectives:**

“To synthesize and characterize single wall carbon nanotubes (SWNTs) using Plasma Enhanced Chemical Vapor Deposition (PECVD) technique and to study their characteristics for semiconducting applications”

10. **Overview of the Project:**

The aim of the project is to synthesize and characterize single wall carbon nanotube (SWNTs) using Plasma Enhanced Chemical Vapor Deposition (PECVD) technique and to study their characteristics for semiconducting applications. Recently, we have installed PECVD (Black Magic 2” System, from M/S AIXTRON, UK) for the growth of SWCNTs. We have grown SWCNTs ranging from 1 nm to 3 nm using Iron as a catalyst. The work is in progress. We will also study the transport properties of as grown single wall carbon nanotubes. The I-V characteristics of single wall carbon nanotubes will be studied for various device applications. We are interested to study the I-V measurements of these as grown SWNTs for device applications. The transport properties of as grown single wall carbon nanotubes (SWNTs) will also be studied. These nanotubes will also be studied for sensor applications. Effect of atmospheric pollutants on the I-V measurements will also be a part of proposed project for sensor applications.

11. **Infrastructure created from the project:** Nanotechnology Lab at Department of Physics

12. **Project Outcomes:**

- (i) Growth of Single wall carbon nanotubes in mat as well as in bulk form.
- (ii) Data base of I-V measurements result for device applications.
- (iii) Effect of atmospheric pollutants on I-V measurements for Sensor applications.

Faculty of Natural Science
Department of Physics

1. **Name of the Department:** Department of Physics
2. **Project Title:** Synthesis and Characterization of Transition Metal Doped Spinel Compounds
3. **Project Investigator:** Dr. Azher M. Siddiqui



4. **Co-Investigator:** None
5. **Funding Agency:** University Grant Commission (UGC)
6. **Amount funded:** INR. 9, 80,800
7. **Duration of the project:** 3 Years
8. **Starting date of the Project:** Starting date: February 21, 2011
9. **Project objectives:**

The objective of this project is to synthesize spinels compound by simple and Cost-effective synthesizing techniques (Sol-gel and Solid State Reaction Techniques). To start-with, spinel compounds $Mg_{2-x}Ti_{1-x}M_{2x}O_4$, ($x = 0.....0.5.....1.0$), where $M = Ni, Zn, Cu...$ etc., oxides will be synthesized by different growth techniques at different temperatures to achieve single phase compounds. We are also trying to develop a new spinels oxide that has not been published yet, and also working on spinels nano-particle.

10. **A brief overview of the project:**

Spinel are hard, variously colored minerals, having octahedral crystals and occurring in igneous and carbonate rocks. A and B can be divalent, trivalent or quadrivalent cations. The name spinel minerals that have so far been recorded in nature are oxides that occur as a matrix of A^{2+} versus B^{3+} cations with the general formulation $A^{2+}B_2^{3+}O_4^{2-}$. Spinel are of two types: normal spinel structures and inverse spinel structures.

So far we have synthesized spinel compounds Sol-gel and Solid State Reaction Techniques as well. To start-with, spinel compounds $Mg_{2-x}Ti_{1-x}M_{2x}O_4$, ($x = 0.....0.5.....1.0$), where $M = Ni, Zn, Cu...$ etc., oxides will be synthesized by different growth techniques at different temperatures to achieve single phase compounds. For the value of $x= 0$ and 1 , we obtain the inverse spinel Mg_2TiO_4 and normal spinel $MgNi_2O_4$ respectively. We have characterized the samples such as structural (XRD), morphological (SEM) and Electrical (Dc Conductivity).

- From structural analysis we found the single phase spinel compounds with cubic structure.
- In the morphological structure first time we have seen the spiral cubic like features emanated by screw dislocation.
- First time DC conduction mechanism has been described in terms of Mott's Hopping variable range as per best of our knowledge in spinel compounds.

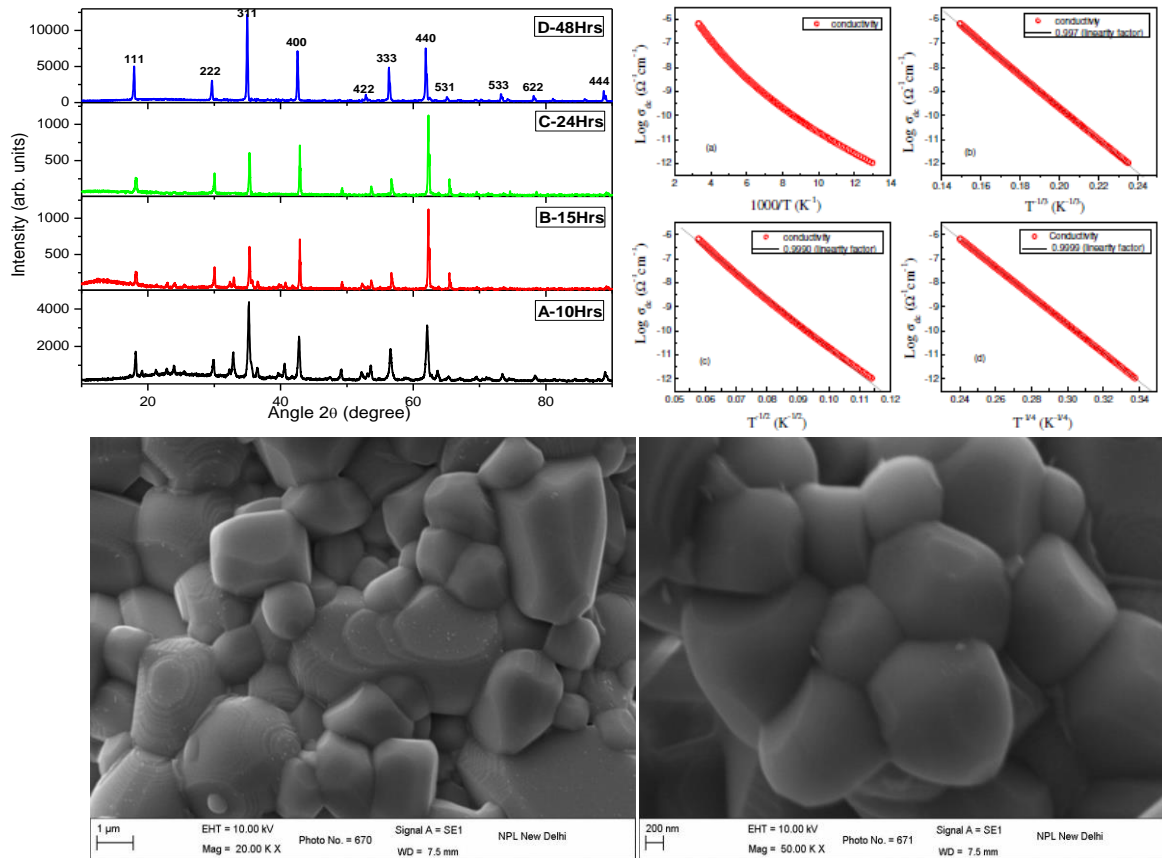


Fig. X-ray diffraction pattern, Variation in Dc conductivity, SEM images of spinel compounds

11. Infrastructure created from the project:

We have purchased an Electrometer from Keithley, for which the grant has been sanctioned by UGC.

Electrometer Specifications:

Electrometer with V, I, R and Q measurements, 6514/E Model

Shielded RS 232 Cable for 6514/E

GPIB to USB adapter

Detailed Description of End Use:

Low current /High resistance measurement in materials research lab of our Department

12. Project outcomes:

List of Publications in tabular form:

S. No	Name of Journal/ Paper in Conference Proceeding	Title of the paper
1.	International Journal of Advanced Research in Science and Technology (IJARST)	Study of curious spiral like features in inverse spinel compound (Mg ₂ TiO ₄)
2.	International Journal of Advanced Research in Science and Technology (IJARST)	Synthesis, Microstructural and Thermal analysis of inverse spinel compound (Mg ₂ TiO ₄)

3.	International Journal of Engineering Research and Technology (IJERST)	Synthesis, Characterization and Dc conduction mechanism in inverse spinel compound(Mg_2TiO_4)..... <u>communicated</u>
4.	AIP Conference Proceeding	Synthesis and Structural Analysis of Al-doped Qandilite (Mg_2TiO_4)

Conference Attended:

S. No	Conference/Seminar	Poster/Oral presentation
1.	National seminar on "Condensed Matter, Nuclear & High Energy Physics" February 18-19, 2011. Department of Physics, Jamia Millia Islamia, New Delhi, India.	Attended
2.	"International Conference On Advances In Condensed & Nano Materials, ICACNM- 2011" February 22, 23-26, 2011. Department of Physics, Punjab University, Chandigarh, India.	Poster Presentation
3.	National seminar on "Condensed Matter, Nuclear & High Energy Physics" February 3, 2012. Department of Physics, Jamia Millia Islamia, New Delhi, India.	Poster Presentation
4.	"International Conference and workshop on Nanostructured Ceramics and Other Nanomaterials, ICWNCN- 2012" March 13-16, 2012. Department of Physics & Astrophysics, University of Delhi, New Delhi, India.	Poster Presentation

**Faculty of Natural Science
Department of Physics**

1. **Name of the Department:** Department of Physics
2. **Project Title:** Understanding the role of correlation in high temperature cuprate superconductors: An extended dynamical mean-field study on model Hamiltonians.
3. **Principal Investigator:** Dr Mohammed Ahsanul Hoda Ahsan, Assistant Professor
4. **Co-Investigator:** None
5. **Funding Agency:** University Grants Commission
6. **Amount funded:** INR 12, 45,800.
7. **Duration of the project:** 3 years.
8. **Starting date of the project:** July, 2012.
9. **Project objective:**

The aim of the proposed work is to understand the role of correlation in understanding the physics of high temperature cuprate superconductors in normal, pseudogap and superconducting phases using dynamical mean-field theory and its variants.
10. **A brief overview of the project:**

The non-Fermi-liquid transport and magnetic properties of the high-temperature cuprate superconductors in their normal state have been attributed to the strong electron-electron repulsion. The same repulsive interaction is now believed to give an electronic mechanism for the observed high-temperature superconductivity with d-wave symmetry. These strongly correlated systems have been viewed as doped Mott insulators, and described by a one-band Hubbard Hamiltonian or by that J model in the large U limit. Thus, the hole-doped oxide-based cuprate superconductors, with two-dimensional CuO₂ planes, a three-band Hubbard model considered by many workers, has been reduced to a simple $t \square J$ model in two dimensions to describe the low-energy physics of high temperature cuprate superconductors.
11. **Infrastructure created from the project:**

A high-end Workstation for CPU intensive computation is in the process of being procured.
12. **Project outcomes:**

A manuscript entitled "Layered antiferromagnetic J₁ - J₂ Heisenberg spin model: role of interlayer coupling J_⊥" is under preparation.
13. **Benefits from the project to the society:**

It is primarily an intellectual pursuit which may have benefits to the society in the long run.

**Faculty of Natural Science
Department of Physics**

1. **Name of the department:** Department of Physics
2. **Project Title:** DRS-I to DRS-II Special Assistance Programme
3. **Coordinator:** Prof M. Hussain



4. **Deputy Coordinator:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 96,00,000.
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** April -2013 to March -2018

Faculty of Natural Science Department of Bioscience

1. **Name of Department:** Department of Bioscience
2. **Project Title:** DST-FIST Program
3. **Project Coordinator:** Dr. Jawaid Ahmad Khan, Head & Professor, Dept. of Biosciences.



4. **Co-Investigator:** None
5. **Funding Agency:** DST
6. **Amount Funded:** INR 66.00 Lakh
7. **Duration of the Project:** 2010-2015 (5 years)
8. **Starting Date of the Project:** May 06, 2010
9. **Project Objectives:**
To strengthen post-graduate teaching and research facilities in the department.

10. **A brief overview of the project:**

Universities are cradles of innovation and knowledge creation. Research in universities has three-tier effects concerned with quality of under-graduate & postgraduate education and value of research. They are the source of generating high calibre manpower and repositories of national intellectual wealth in Science & Technology (S&T) sector, which if channelized properly, may lead to socioeconomic development. In the emerging global scenario, India can be an ideal destination due to its cost effectiveness and availability of knowledge base. Considering the present status of the S&T sector in the universities and related academic institutions who are in dire need for strengthening the existing S&T infrastructure support with adequate funding and associated flexibility, Government of India in the year 2000 announced a major new initiative titled "Fund for Improvement of S&T infrastructure in universities & higher educational institutions (FIST)" to rebuild the Science & Technology infrastructure in the country.

11. **Infrastructure created from the Project:**

- A. Instruments obtained
 - a) Fluorescence Microscope
 - b) PCR
 - c) Deep Freezer (-86°C)
 - d) Refrigerated Table-Top Centrifuge
 - e) Incubator Shaker
 - f) Refrigerated Water Bath
 - g) Agarose Gel Apparatus
 - h) Protein Gel Apparatus
 - i) Deep freezer (-20°C)
 - j) Fume hood

- k) Autoclave
- l) Orbital Shaker
- m) Laminar flow
- n) Gel Doc System

B. About 40 good books purchased under DST-FIST program

C. Tissue culture Lab

In Department of Biosciences, Jamia Millia Islamia, Tissue Culture Lab was renovated under the DST-FIST programme. It includes tissue culture growth racks, tray trolley and minor dedicated equipments microclimatic temperature controller, programmable photoperiodic control, sequential timer, air curtain and handheld lux metre.

D. Networking

Ten numbers of computers and one server in the computer lab have been installed under DST-FIST program in the Department of Biosciences, Jamia Millia Islamia. All the computers are connected with high speed internet. The PG and Ph.D. students regularly use internet facility for searching literature, preparing their seminars and project presentations etc. They have internet access to get valuable and latest updates on their respective subjects. The major topics, they cover, include Bioinformatics such as Protein folding, 3D structure prediction, protein annotation, docking, miRNA prediction, miRNA target prediction and genome annotation etc., Apart from these, they search for recent protocols employed in the modern areas of Biological sciences. The students get useful information about relevant topics of their syllabi and prepare notes accordingly. Ph.D. students access internet for downloading latest research reviews, papers, journals in their respective areas. They prepare monthly progress report of research work carried out by them. In addition, emails, online discussion forums and other personal communication facilities provide direct access to experts and other individuals with relevant interests and knowledge.

12. **Project Outcomes:**

Research paper	Conferences	Training
2	3	17

13. **Benefit from the project to the society:**

The equipments procured and establishment of tissue culture lab from the DST-FIST programme is greatly helping the students of M.Sc. and Ph.D. courses in their research work.

Faculty of Natural Science
Department of Bioscience

1. **Name of Department:** Department of Bioscience.
2. **Project Title :** (DRS-I level) Cardiovascular cell signalling and environmental pollution
3. **Coordinator:** Dr. Seemi Farhat Basir, Professor, Dept. Of Biosciences



4. **Deputy Coordinator:** Dr. Luqman A. Khan



5. **Funding Agency:** University Grants Commission-SAP
6. **Amount funded:** INR. 42, 80, 000
7. **Duration of the project :** 5 years (2011-2016)
8. **Starting and completion date of the Project:** March, 2011
9. **Project objectives:**

The primary objectives of this research project is to support research that will better elucidate the mechanisms by which air pollutants affect the cardiovascular system, resulting in increased morbidity and mortality, and to define factors which lead to differential susceptibility for certain groups and individuals. The research uses animal system to study about the alteration in cardiovascular system by environmental pollution. Organ bath successfully measures the contraction changes and other parameter in vitro exposed tissue.

10. **A brief overview of the project:**

Project entitled “Cardiovascular cell signalling and environmental pollution” encourages research to address the mechanisms by which air pollutants, especially heavy metals, contribute to the development, progression, or exacerbation of cardiovascular disease. The major purposes of this initiative are to support innovative, multidisciplinary in vitro research, in rats. It investigates the specific physiologic mechanisms by which air pollutants mediate adverse cardiovascular effects. The mechanisms by which air pollutants cause these toxic effects are not adequately understood, and it is likely that different mechanisms are responsible for acute and chronic effects. This encourages collaboration between cardiovascular researchers and environmental health researchers in the application of the state-of-the-art tools and models to the problem of environmentally r cardiovascular disease.

11. **Infrastructure created from the project:**

This project has helped in facilitating the lab with instrument like Organ bath, spectrophotometer etc. An immense work has been done using Organ bath to study the toxic effects of pollutants on cardiovascular system.

12. Project outcomes:

- i) Two papers are under review with journals.
- ii) Two poster presentation at 3rd Annual Meeting of Indian Academy of Biomedical Sciences & Symposium of Modern Trends in Human Diseases, Aligarh. Won First prize.

13. Benefit from the project to the society:

This project focuses on toxic effect of environmental pollution on cardiovascular system. Environmental pollution is one of the most serious problems in the world. Alterations in cardiovascular system and its amelioration by natural compounds have been studied.

S. No.	Name of Candidate	Name of Supervisor/Cosupervisor	Title	Year
1.	Prerna Chaudhary	Prof Seemi Farhat Basir/ Prof N B Sareen, Prof Bhatnagar	<i>Brassica juncea</i> expressing mutated adenylate cyclase gene for the development of vaccine against anthrax	2014
2.	Asaia Taha	Prof Seemi Farhat Basir/ Prof N Z Baquer	Role of Vanadium and Trigonella foecum graecum in the reversal of antioxidant status in experimental diabetes	2007
3.	Jata Shankar	Prof Seemi Farhat Basir / Dr Taruna Madan	Identification and molecular characterization of functionally important genes in <i>Aspergillus fumigates</i>	2006
4.	Azmi Naqvi	Prof Seemi Farhat Basir/ Dr P Nahar	Immobilisation of biomolecules on photolinker activated polymer surface and their application	2006
5.	Md. Khalid Pares Khalid	Prof Seemi Farhat Basir/ Prof S K Sarin	Gene expression and replication of hepatitis B virus (HBV): In vitro model for antiviral drug therapy	2006
6.	Syed Mudasir Ahmad	Prof Seemi Farhat Basir	Molecular and Biochemical studies in <i>Tinospora</i> species in India	2006
7.	Harish Chandra	Prof Seemi Farhat Basir	--	--
8.	Sanjay Singh Negi	Prof Seemi Farhat Basir	--	--

Faculty of Natural Science Department of Bioscience

1. **Name of Department:** Department of Bioscience.
2. **Project Title:** Analysis of structural and mechanistic basis of novel Antithrombin variants in Indian families with thrombosis.
3. **Project Investigator:** Mohammad Aman Jairajpuri, Professor, Dept. of Biosciences



4. **Co-Investigator:** Prof. Renu Saxena and Prof M. Mahapatra, Department of Hematology, AIIMS, New-Delhi.
5. **Funding Agency:** Indian Council of Medical Research (ICMR)
6. **Amount Funded:** INR 23 lakhs
7. **Duration of Project:** 3 years
8. **Starting date of the Project:** March 29, 2011-March 29, 2014
9. **Project Objective:**

Identification, purification and sequencing of antithrombin Variant from Indian families with history of thrombosis. Comprehensive characterization of Purified antithrombin variants to assess the structural and functional basis of the defects.

10. **A brief overview of the project:**

We have analysed close to 1950 patients with Deep Vein thrombosis and identified that most of the patients showed signs of post-operative and pregnancy based thrombosis. About 10% patients were shown to have DVT because of low levels of Protein C and 8.7% (170) had low protein S levels. An antithrombin based testing identified 1.38% (27) patients with low antithrombin III levels. Normal plasma antithrombin level in adult patients is in the range of 80-120%. Patients with inherited AT deficiency typically have levels in the 40%-60 % range. In family 1 (with type I antithrombin deficiency) no mutation was found at exonic level of SERPINC1 gene. A single change in the whole gene was observed in promoter region. The existence of S allele in this region is a probable indication that the expression of SERPINC1 gene might be compromised. To assess the same the frequency of S allele in Indian control population and DVT patients with low AT levels should be evaluated and reverse transcriptase PCR should be performed to check the expression levels. Further the existence of polymorphism at position 6609 (A>T) will also be checked for its effect on expression level. In family 2 (with type II antithrombin deficiency) a single change observed at position 13363 resulted in low heparin binding of the protein. The protein eluted in low ionic strength salt was found to be present in an inactive polymeric form. MALDI-TOFF analysis of protein in this low concentration is under process to gain complete insight into its identity. The presence of PstI polymorphism in DVT patients with no additional mutation in exons is a strong indication that this polymorphism might be associated with increased risk of DVT and should be evaluated further.

11. **Infrastructure created from the project:**

- a. Table Top Centrifuge
- b. Humidifier/Incubator

12. **Project outcome:**

Research paper	Conferences	Training
2	4	2

13. **Benefit of the project to the society:**

Identifying first Antithrombin III based familial hereditary trait that is linked to Indian population and provides a basis for appropriate diagnosis and intervention in these families. This type of study contributes to the overall understanding of the physiological role of heparin and ATIII. Blood clotting problems kill thousands of people yearly. Any data that illuminate the function and mechanism of molecules that regulate blood clotting could be clinically valuable in the long run. This type of study contributes to the design and development of safer, cheaper, and more effective treatments and prophylactic options for blood clotting conditions such as deep vein thrombosis and pulmonary embolism.

This will be the first study which looks at the molecular characterization of the ATIII mutations in Indian families with thrombosis.

Faculty of Natural Science
Department of Bioscience

1. **Name of Department:** Department of Bioscience.
2. **Project Title:** Design & synthesis of novel peptidomimetic antibacterial agents.
3. **Project Investigator:** Dr. Mohammad Abid, Assistant Prof., Department of Biosciences.



4. **Co-Investigator:** None
5. **Funding Agency:** SERB
6. **Amount Funded:** INR 18.50 Lakhs
7. **Duration of the Project:** 3 years (2012-2015)
8. **Starting and completion date of the Project:** May 01, 2012 to April 30, 2015
9. **Project Objectives:**
 - a) Synthesis of diketo acids and their alanine conjugates.
 - b) Synthesis of amide, oxadiazoles, hydrazones and hydroxamic acids derivatives of diketo acids.
 - c) Synthesis of peptides on solid as well as in the solution phase.
 - d) Coupling of diketo acids with peptides.
 - e) Assessment of in vitro antibacterial activity on bacterial enzymes PDF and MAP
 - f) The compounds found active in vitro, their cytotoxicity assay and in vivo studies
10. **A brief overview of the project:**

The emergence of resistance to major classes of antibiotics in Gram-positive and Gram-negative organisms has raised great fears that existing treatments for infectious diseases may become ineffective, leading to an increase in mortality rate. Clearly, there is an urgent medical need for new antibacterial agent with novel modes of action and improved profile against these pathogens. One of the new targets currently receiving widespread interest from both academic and industrial research groups is peptide deformylase (PDF). Peptide deformylase is an iron-containing metalloenzyme responsible for the removal of the N-formyl group from the terminal methionine residue in bacterial protein synthesis. As deformylation is necessary before further processing of the newly synthesized protein can occur, PDF is essential for bacterial growth. This coupled with the observation that the gene encoding PDF (def) is present in all sequenced pathogenic bacterial genomes, has made PDF an attractive target for antibacterial chemotherapy. Another new target is methionine aminopeptidases (MAPs) as a unique class of cobalt-containing metalloproteinases that facilitate the removal of the N-terminal initiator methionine from nascent polypeptides in a nonprocessive manner. Therefore, the MAP enzymes present good targets for new antibiotic drug discovery, and inhibitors against MAPs offer hope for a new treatment of bacterial and fungal infections.



Inhibitor of MAP1

Spacer

Inhibitor of PDF

11. Infrastructure created from the Project: Instruments obtained

- a) Rotary Evaporator (Heidolph, Germany)
- b) Melting Point Apparatus (Buchii, Switzerland)
- c) High Precision Balance (Sartorius, Germany)
- d) Magnetic stirrer (IKA, Germany)
- e) Nitrogen Chamber (Indigenous)
- f) Oven (Indigenous)

12. Project Outcomes: (research papers, conferences, training)

Research paper	Conferences	Training
2 (under communication)	4	3

13. Benefit from the project to the society:

The outcome of the proposed project may lead to better prototypic molecules and related analogues which can be examined in order to discern structure-activity relationships and the shapes of such molecules, their stabilities, and reactivities as well as possible toxicities. From the information generated, lead compounds may be identified for subsequent development.

Faculty of Natural Science
Department of Bioscience

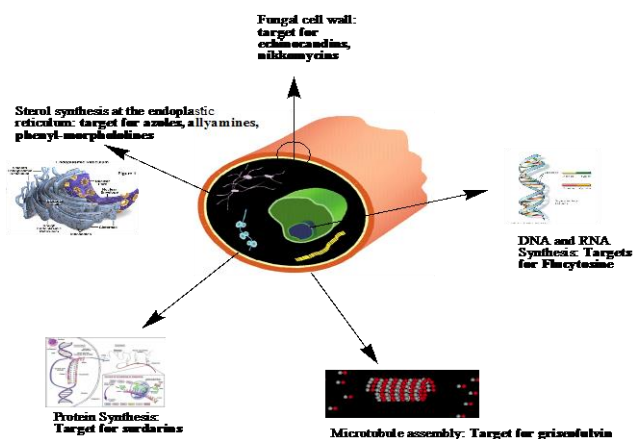
1. **Name of Department:** Department of Bioscience.
2. **Project Title:** Synthesis & pharmacodynamic studies in the efficacy of new triazole and diketo acid based antifungal agents.
3. **Project Investigator:** Dr. Mohammad Abid, Assistant Prof., Department of Biosciences



4. **Co-Investigator:** None
5. **Funding Agency:** UGC
6. **Amount Funded:** INR 10.38 Lakhs
7. **Duration of the Project:** 3 years (2012-2015)
8. **Starting and completion date of the Project:** July 01, 2012 to June 30, 2015
9. **Project Objectives:**
 - a) Synthesis of some diketo esters and their corresponding acids.
 - b) Synthesis of *N*-2-aryl-substituted-1, 2, 3-triazole derivatives.
 - c) Synthesis of peptido-triazoles.
 - d) Synthesis of 1, 3, 5-tri substituted pyrrolidine sulphonamide based triazoles.
 - e) Assessment of *in vitro* antifungal activity.
 - f) The compounds found active *in vitro*, their cytotoxicity assay and *in vivo* studies will be performed.

10. **A brief overview of the project:**

Fungal infections have emerged as a growing threat to human health. Two important reasons for this are the number of HIV infected patients and the increasing number of patients treated with cancer chemotherapy drugs. This has formed an ever-expanding number of immuno-compromised individuals at risk for opportunistic infections. As a result several companies have searched for novel molecular targets for new antifungal drugs, by using modern genomic approaches. The antifungal market is steadily growing and fungal infections are today the third most common hospital-acquired infection. The global market is estimated to be worth more than \$3 billion USD for the pharmaceutical companies engaged in developing novel antifungal drugs.



11. **Infrastructure created from the Project:** Instruments obtained

- a) Thermostatic Water bath for low temp. rxn. (Polyscience, USA)
- b) High vacuum pump (Indigenous)
- c) High Precision Balance (Sartorius, Germany)

12. **Project Outcomes:**

Research paper	Conferences	Training
1	3	4

13. **Benefit from the project to the society:**

The outcome of the proposed project may lead to better prototypic molecules and related analogues which can be examined in order to discern structure-activity relationships and the shapes of such molecules, their stabilities, and reactivities as well as possible toxicities. From the information generated, lead compounds may be identified for subsequent development.

**Faculty of Natural Science
Department of Bioscience**

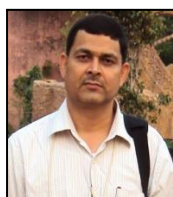
1. **Name of the department:** Department of Bioscience
2. **Project Title:** Molecular evaluation of Parkin Gene in Indian Cervical Cancer Patients
3. **PI:** Dr. Mushahid Alam Rizwi



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** 9,70,000.

Faculty of Natural Science Department of Bioscience

1. **Name of the department:** Department of Bioscience
2. **Project Title:** Identification and analysis of genes associated with nitrogen use efficiency (NUE) in *Oryza sativa* L.
3. **Project Investigator:** Prof. Arif Ali., Department of Biosciences, Jamia Millia Islamia.
4. **Co-Investigator:** Prof. Qazi Mohd. Rizwanul Haq., Department of Biosciences, Jamia Millia Islamia.



5. **Funding Agency:** UGC
6. **Amount Funded:** INR 13,08,600/-
7. **Duration of the Project:** Three Years
8. **Starting and completion date of the Project:** Project Recommended for funding (Sanction letter awaited)
9. **Project Objectives:**
 - a) Unravelling the Nitrogen Use Efficiency (NUE) present naturally in rice.
 - b) Identification of genes associated with NUE mechanism.
 - c) Functional analysis of the identified genes and their cloning and characterization.
10. **A brief overview of the project:**
11. **Infrastructure created from the Project:**
12. **Project Outcomes:** (research papers, conferences, training)
13. **Benefit from the project to the society:**

**Faculty of Natural Science
Department of Bioscience**

1. **Name of the department:** Department of Bioscience
2. **Project Title:** Cytotoxic activity of some selected medicinal plants against human cancer cell lines
3. **PI:** Dr. Darakshanda Neelam
4. **Co-PI:** Nil
5. **Funding Agency:** SERB
6. **Amount funded:** INR, 23,70,000.
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** 2014 to 2017

**Faculty of Natural Science
Department of Bioscience**

1. **Name of the department:** Department of Bioscience
2. **Project Title:** In vitro evaluation of some potential molecules from bioresources for their anticancer efficacies against cancer of uterine cervix
3. **PI:** Dr. Mohd Asad Khan
4. **Co-PI:** Nil
5. **Funding Agency:** SERB
6. **Amount funded:** INR, 25,00,000.
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** June-2014 to June-2017

Faculty of Natural Science Department of Biotechnology

1. **Name of the department:** Department of Biotechnology, Jamia Millia Islamia
2. **Project Title:** Molecular characterization of reverse transcriptase and integrase genes of HIV-1 from patients non responsive to anti-retroviral therapy (ART)
3. **Principal Investigator:** Dr. Mohammad Husain



4. **Co-Investigator:** Dr. Suresh Kumar, Maulana Azad Medical College, New Delhi
5. **Funding agency:** CSIR
6. **Amount Funded:** INR 20.65 lakhs
7. **Duration of the Project:** 3 years
8. **Starting date of the Project:** November 1, 2010
9. **Project Objectives:**
 - a) Clinical evaluation of HIV-1 infected patients non-responsive and responsive to ART
 - b) Analysis of reverse transcriptase and integrase genes from HIV-1 patients not responding to ART
 - c) Analysis of reverse transcriptase and integrase genes from HIV-naïve patients
10. **A brief overview of the Project:**

Since major target of anti-retroviral drugs is reverse transcriptase and now includes integrase too, therefore, we planned to characterise reverse transcriptase and integrase genes to find mutations in subtype C and other subtypes present in Indian patients who are receiving anti-retroviral therapy but are non responsive to anti-retroviral treatment.
11. **Infrastructure created:**

A laboratory to carry out research on molecular biology and HIV was designed and some key equipment such as centrifuge, pipettes, and weighing balance were purchased to create working conditions for research scholars and Ph.D. students.
12. **Project outcomes:**

The study will provide the molecular basis of drug resistance in HIV patients and characteristic features of the HIV-1 Nef gene in clade C, which is predominant subtype found in India.
13. **Benefits from the project:**

The study will help clinicians to formulate better HIV regimen for treatment of HIV patients.

Faculty of Natural Science Department of Biotechnology

1. **Name of the Department:** Department of Biotechnology, Jamia Millis Islamia
2. **Project Title:** Investigation of Anti-HIV potential of some herbal plants Adhatota vasica, Boerhaavia difussa, Cephlandra indica and Nardostachys jatamanshi from Indian subcontinent
3. **Principal Investigator:** Dr. Mohammad Husain



4. **Co-Investigator:** Dr. Sayeed Ahmad, Jamia Hamdard
5. **Funding agency:** CCRUM
6. **Amount Funded:** INR 26.0 lakhs
7. **Duration of the Project:** 3 years
8. **Starting date of the Project:** June 15, 2010
9. **Project Objectives:**
 - a) Collection, identification and preparation of extracts from medicinal plants
 - b) Screening of plant extracts for anti-HIV activities
 - c) Standardization and quality control of active plant extracts
 - d) Determination of the safety of the identified of extracts for normal cells
10. **A brief overview of the Project:**

The medicinal properties of Indian medicinal plants are being explored for various diseases in humans, therefore, focus and attention is also required to investigate medicinal value of Indian medicinal plants for HIV treatment. Since HIV infection is increasingly affecting urban population in India, the study will address if plants can be useful to treat HIV patients. To achieve this goal, it is prerequisite to explore anti HIV activity of Indian medicinal plants.
11. **Infrastructure created:**

A laboratory to carry out work on molecular biology and HIV was designed and some key equipments such as biosafety hood, deep freezers, and some small instruments were purchased to create working conditions for research scholars and Ph.D. students to conduct the study.
12. **Project outcomes:**

The study will help to formulate plant based treatment if some plants found to have anti-HIV activity.
13. **Benefits from the project:**

The study will create a basis to explore more and more plants for their anti-HIV activity and then to design alternate therapies for HIV patients

Faculty of Natural Science Department of Biotechnology

1. **Name of the Department:** Department of Biotechnology, Jamia Millia Islamia
2. **Project Title:** Twining project: Study the associative role of alteration(s) in cell cycle controller EZH2, tumour suppressor RUNX3, DNA repair gene MGMT and local food habits with the predisposition and severity of oesophageal cancer
3. **Principal Investigator:** Dr. Syed Akhtar Husain, Professor



4. **Co-Investigator:** Dr. Subhash Medhi Assistant Professor, Department of Biological Sciences Gauhati University, Gopinath Bardolai NagarJalukbari, Gawahati-781014.
5. **Funding agency:** Department of Biotechnology, Government of India
6. **Amount funded:** INR 116.88 Lakhs,
Jamia share INR 47.80 Lakh.
7. **Duration of the project:** 3 years
8. **Starting date of the project:** April 1, 2013
9. **Project objectives:**
 - a) To investigate methylation status of RUNX3 in oesophageal cancer.
 - b) To investigate the mechanism of role of EZH2 plays in cancer cell proliferation in oesophageal cancer.
 - c) To investigate the role of EZH2 and RUNX3 in the development of oesophageal cancer and susceptibility whether EZH2 mediated changes are responsible for RUNX3 gene silencing.
 - d) Study of methylation status of DNA repair gene O6-methylguanine, DNA methyltransferase (MGMT), SNPs of rs 7087131 and its expression profile.
 - e) To estimate the level of Nitrosamine and PAH (Poly Aromatic Hydrocarbons) in local food of Northeast India and Northern India.
10. **A brief overview of the project:** N/A
11. **Infrastructure created from the project:**
 - a) Real time PCR.
 - b) -20 degree deep freezer,
 - c) Gel rocker,
 - d) Pipette set,
 - e) Microfuge small,
 - f) Stabilizer.
 - g) UPS
12. **Project outcomes:** In process
13. **Benefits from the project to the society:**

Result outcome will be used for the prognostic purpose for the treatment of oesophageal cancer patients in India.

**Faculty of Natural Science
Department of Biotechnology**

1. **Name of the Department:** Department of Biotechnology.
2. **Project Title:** Twinning project: Screening of genetic and Immunological factors in Human Papilloma virus infection induced cervical cancer: a north East India based study.
3. **Principal Investigator:** Dr. Syed Akhtar Husain, Professor



4. **Co-Investigator:** Dr. Purabi Deka Base Assistant Professor, Department of Biotechnology PANDU College, Gauhati UniversityGawahati-781112ASSAM
5. **Funding agency:** Department of Biotechnology, Government of India
6. **Amount funded:** INR 81.63 lakhs
Jamia share INR 28.18 lakh.
7. **Duration of the project:** 3 years
8. **Starting date of the project:** February 20, 2014
9. **Project objectives:**
 - a) Screening of HPV infection by PCR in cervical cancer patients followed by genotyping of HPV to detect the high risk HPV types by type specific PCR.
 - b) Differential mRNA and protein expression in profile analysis of key regulatory gene p53 and hTERT in cervical tissue with carcinoma vis-a-vis
 - c) Differential Th1 and Th2 cytokines expression analysis in cervical cancer and control
 - d) Co-relate the above parameter to elucidate if there is any role of altered host gene and differential cytokines expression profile in the development and progression of cervical cancer.
10. **A brief overview of the project:**

Screening of genetic and Immunological factors in Human Papilloma virus infection induced cervical cancer. This is a North East part of the India based study. This may help humanity in future and help in developing the facility...
11. **Infrastructure created from the project under process:**
 - a) -80 deep freezer
 - b) Gradient PCR 96 well.

Faculty of Natural Science Department of Biotechnology

1. **Name of the Department:** Department of Biotechnology.
2. **Project Title:** Screening of Anticancer potential of Indian Medicinal Plants.
3. **Principal Investigator:** Dr. Syed Akhtar Husain



4. **Co-Investigator:** Dr. Sayeed Ahmad, Assistant Professor, Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy Jamia Hamdard University
5. **Funding agency:** Department of Biotechnology, Government of India, New Delhi
6. **Amount funded:** INR 30 lakhs
7. **Duration of the project:** 3 years
8. **Starting date of the project:** September, 2010, but still project is running due to non-release the next instalment by the agency.
9. **Project objectives:**
 - a) Collection of Plant material, its identification and authentication.
 - b) Preparation of successive and individual extract of different parts of plant material.
 - c) Screening of plant extracts for anticancer activity/ies.
 - d) Standardization and quality control of active plant extracts.
 - e) Bioactivity guided fractionation of active plant extract.
 - f) Screening for anticancer activities bioactivity guided fraction
 - g) Determine the safety of the identified compound for normal cell.
10. **A brief overview of the project:**

This is to take up the screening of anticancer potential of Indian Medicinal Plants.
11. **Infrastructure created from the project:**
 - a) CO₂ incubator with accessories
 - b) Inverted trinocular microscope with photographic facilities.
 - c) Desktop with colour printer.

**Faculty of Natural Sciences
Department of Biotechnology**

1. **Name of the department:** Department of Biotechnology
2. **Project Title:** Screening of Anticancer Potential of Indian Medicinal Plants
3. **PI:** Prof Syed Akhtar Hussain



4. **Co-PI:** Dr. Sayeed Ahmad, Assistant Professor, Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy, Jamia Hamdard (Hamdard University) New Delhi-110062
5. **Funding Agency:** Department of Biotechnology, Government of India, New Delhi
6. **Amount funded:** INR. 30,00,000
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** September 2010
But still project is running due to non release the next instalment by the agency
9. **Project objective:**
 1. Collection of Plant material, its identification and authentication.
 2. Preparation of successive and individual extract of different parts of plant material.
 3. Screening of plant extracts for anticancer activity/ies.
 4. Standardization and quality control of active plant extracts.
 5. Bioactivity guided fractionation of active plant extract.
 6. Screening for anticancer activities bioactivity guided fraction
 7. Determine the safety of the identified compound for normal cell.
10. **A brief overview:** NA
11. **Infrastructure created from the project:**
 1. Co2 incubator with accessories
 2. Inverted trinocular microscope with photographic facilities.
 3. Desktop with colour printer.
12. **Project Outcome:** NA
13. **Benefit from the Project to the Society:** NA

**Faculty of Natural Science
Department of Biotechnology**

1. **Name of the department:** Department of Biotechnology
2. **Project Title:** Druggability of Colchicum Luteum Baker for rheumatoid arthritis An in vitro and vivo approach
3. **PI:** Dr. Sadiq Umar
4. **Co-PI:** Nil
5. **Funding Agency:** DST SERB
6. **Amount funded:** INR. 23,50,000

Faculty of Natural Science
Department of Biotechnology

1. **Name of the department:** Department of Biotechnology
2. **Project Title:** Purification, characterization and Crystallization of Protein Protease inhibitor form Leguminosae family
3. **PI:** Dr. Sadaf Fatima
4. **Co-PI:** Nil
5. **Funding Agency:** SERB
6. **Amount funded:** INR. 22,30,000

**Faculty of Natural Sciences
Department of Biotechnology**

1. **Name of the department:** Department of Biotechnology
2. **Project Title:** Approval Cum Sanction Letter for UGC-BSR Research start-up-grant for newly recruited faculty at Assistant Prof. level in Science Departments of various Universities
3. **PI:** Dr. Sadaf Fatima
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 6,00,000

**Faculty of Natural Science
Department of Biotechnology**

1. **Name of the department:** Department of Biotechnology
2. **Project Title:** Mapping the stress induced protein of Arabidopsis thaliana using 2-D electrophoresis and MLODI-TOF-MS
3. **PI:** Dr. Muhammad Irfan Qureshi



4. **Co-PI:** Nil
5. **Funding Agency:** DST-SERB
6. **Amount funded:** INR. 39,20,000
7. **Duration of the Project:** 3yr
8. **Starting date of the project:** 2012 to 2015

Faculty of Natural Sciences
Department of Biotechnology

1. **Name of the Department:** Department of Biotechnology
2. **Project Title:** Approval Cum Sanction Letter for UGC-BSR Research start-up-grant for newly recruited faculty at Assistant Prof. level in Science Departments of various Universities
3. **PI:** Dr. Abdur Rub
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 6,00,000

Faculty of Natural Sciences
Department of Biotechnology

1. **Name of the Department:** Department of Biotechnology
2. **Project Title:** Effect of Cytokines on the expression of cholesterol biosynthetic genes and Leishmania donovani infection in macrophages” under Fast Track Proposal for Young Scientists Scheme
3. **PI:** Dr. Abdur Rub
4. **Co-PI:** Nil
5. **Funding Agency:** SERB
6. **Amount funded:** INR, 25,00,000.
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** 2013 to 2016

Faculty of Natural Science Department of Chemistry

1. **Name of Department:** Department of Chemistry.
2. **Project Title:** Solvothermal Synthesis and Structural Characterization of ZnO, CdO, SnO₂ and In₂O₃ based Dilute Magnetic Semiconductor Nanoparticles.
3. **Project Investigator:** Dr. Tokeer Ahmad



4. **Co-Investigator:** None
5. **Funding Agency:** Council of Scientific and Industrial Research (CSIR)
6. **Amount funded:** INR 17.93 Lakhs
7. **Duration of the project:** 3 Years
8. **Starting date of the Project:** May 25, 2011
9. **Project objectives:** The following four objectives were proposed for this project.
 - a) Synthesis of ZnO, CdO, SnO₂ and In₂O₃ based dilute magnetic semiconductors (DMS) at low dopant concentration using the Solvothermal reaction set up. The transition metals (Mn, Co, & Ni only) will be used as the dopants and their quantities are fixed at 5%, 10% & 15% in the host lattice of the proposed oxides. Our main focus will be on SnO₂, In₂O₃ and CdO based DMS because these DMSs have not been widely reported. These dilute magnetic semiconductors may also be synthesized by Sonochemical Method. The proposed composition of the nanocrystalline powders are Sn_{1-x}M_xO₂, Cd_{1-x}M_xO and In_{2-x}M_xO₃ where M is transition metals (Mn, Co and Ni only) and x = 0.05, 0.10, and 0.15.
 - b) These dilute magnetic semiconductors will be characterize by X-ray diffractometer (XRD), Thermal Analyzer (TGA/DTA), Transmission Electron Microscopy (TEM), Surface area and Pore size distribution using BET Surface area analyzer.
 - c) To study their Optical and Magnetic Properties. The semiconductors have their special band gaps which depend on the size of the materials. Therefore the idea is to see the effect on the band gap by chemical methods and by doping certain amount of transition elements for their better application in electronic industries. How much nanopowders are magnetized after doping the proposed quantities will also be studied.
 - d) Comparison of experimental results produced by the Solvothermal and Sonochemical methods.
10. **A brief overview of the project:**

Nanomaterials are among the most challenging areas of current scientific and technological research. These Nanostructured materials have been fascinating the world of science and technology in the last fifteen years because of their tremendous possibilities in generating novel shapes, structures and the unusual phenomena associated with these materials. Such systems fascinate chemists and physicists

because they exhibit several novel phenomena. These nanoscale materials can be defined as those whose characteristic length (at least one length) lies between one and hundred nanometers. The properties of matter within this length scale are significantly different from individual atoms or molecules and from bulk materials. Dilute magnetic semiconductors (DMS) obtained by doping magnetic transition metals such as Mn, Co, Ni into nonmagnetic semiconductor lattices have attracted appreciable attention in recent years because of their potential applications in the field of spintronics, where the new electronic applications based on the spin degree of freedom has been explored. Various types of dilute magnetic semiconductors have been reported in the literature, in which oxide based DMS have various applications over non-oxide based DMS due to the following reason: (1) wide band gap suited for applications with short wavelength light, (2) transparency and dyeability with pigments, (3) high n-type carrier concentration, (4) capability to be grown at low temperature even on plastic substrate, (5) ecological safety and durability, (6) low cost etc.

11. **Infrastructure created from the project:** Knowledge creation

The following equipments have been installed from the project:

- a) Solvothermal/Hydrothermal Laboratory Autoclave Synthesis Unit with accessories
- b) High Temperature (1200°C) Programmable Furnace

12. **Project outcomes:**

S. No.	Items	Number
1.	Peer reviewed research papers	11
2.	Chapters in books	02
3.	Conference presentation	06
4.	Invited lecture delivered	08

Research papers from the project: 11

- a) Structural characterization and properties of nano-sized $Cd_{1-x}Co_xO$ dilute magnetic semiconductors prepared by solvothermal method, Tokeer Ahmad, Sarvari Khatoon, Samuel E. Lofland and Gohil S. Thakur, Materials Science in Semiconductor Processing 17, 207-215, 2014. {IF = 1.338}
- b) Solvothermal Synthesis of $In_{2-x}Co_xO_3$ ($0.05 \leq x \leq 0.15$) Dilute Magnetic Semiconductors: Optical, Magnetic and Dielectric Properties, Sarvari Khatoon, Kelsey Coolahan, Samuel E. Lofland and Tokeer Ahmad, J. Am. Cerem. Soc. 96, 2544–2550, 2013. {IF = 2.272}
- c) Synthesis, Magnetic and Dielectric Characterization of Nanocrystalline Solid Solutions of $In_{2-x}Ni_xO_3$ ($x = 0.05, 0.10$ and 0.15), Tokeer Ahmad, Sarvari Khatoon and Kelsey Coolahan, Mater. Res. Bull. 48, 3065-3071, 2013. {IF = 2.145}
- d) Structural Characterization, Optical and Magnetic Properties of Ni-doped CdO Dilute Magnetic Semiconductor Nanoparticles, Tokeer Ahmad, Sarvari Khatoon, Kelsey Coolahan and Samuel E. Lofland, J. Mater. Res. 28, 1245-1253, 2013. {IF = 2.354}
- e) Solvothermal Synthesis, Optical and Magnetic Properties of Nanocrystalline $Cd_{1-x}Mn_xO$ ($0.04 < x = 0.10$) Solid Solutions, Tokeer Ahmad, Sarvari Khatoon, Kelsey Coolahan and Samuel E. Lofland, J. Alloys Compd. 558, 117-124, 2013. {IF = 2.289}
- f) Effect of High Manganese Substitution at ZnO Host Lattice using Solvothermal Method: Structural Characterization and Properties, Sarvari Khatoon, Irshad A.

- Wani, Jahangeer Ahmed, Travis Magdaleno, Omar A. Al-Hartomy and Tokeer Ahmad, Mater. Chem. Phys. 138, 519-528, 2013. {IF = 2.353}
- g) Optical, Magnetic and Structural Characterization of $Zn_{1-x}Co_xO$ Nanoparticles Synthesized by Solvothermal Method, Sarvari Khatoon and Tokeer Ahmad, Bull. Mater. Sci. 36, 997–1004, 2013. {IF = 0.944}
- h) Solvothermal Synthesis of $Zn_{1-x}Mn_xO$ Nanoparticles Using Oxalate Precursor Route: Optical and Magnetic Properties, Tokeer Ahmad, Sarvari Khatoon and Omar A. Al-Hartomy, Arabian J. Chem. (In Press) 2013. {IF = 1.367}
- i) Optical and Magnetic Properties of Solid Solutions of $In_{2-x}Mn_xO_3$ (0.05, 0.10 and 0.15) Nanoparticles, Sarvari Khatoon, Kelsey Coolahan, Samuel E. Lofland and Tokeer Ahmad, J. Alloy Compd. 545, 162–167, 2012. {IF = 2.289}
- j) Fabrication of Nano-sized Solid Solution of $Zn_{1-x}Mn_xO$ ($x = 0.05, 0.10, 0.15$) in reverse microemulsions: Structural Characterization of Properties, Sarvari Khatoon, Aparna Ganguly and Tokeer Ahmad, Bull. Mater. Sci. 35 (3), 377-382, 2012. {IF = 0.944}
- k) Synthesis, Optical and Magnetic Properties of Ni-Doped ZnO Nanoparticles, Sarvari Khatoon and Tokeer Ahmad, J. Mater. Sci. Engg. B 2(6), 325-333, 2012.

Chapter in Books: 2

- a) A Review on Chemical Synthesis, Characterization and Optical Properties of Nanocrystalline Transition Metal Doped Dilute Magnetic Semiconductors, Tokeer Ahmad, Sarvari Khatoon and Ruby Phul, Special Volume on “*Functional Nanomaterials and their Applications*” Trans Tech Publications, Switzerland, Solid State Phenomena 201, 103-129, 2013.
- b) Chemical Synthesis and Structural Characterization of Nanocrystalline $Zn_{1-x}M_xO$ ($M = Mn, Ni, Co$ and $x = 0.05, 0.10, 0.15$) Solid Solutions, Sarvari Khatoon and Tokeer Ahmad, Int. J. Sci. Res. (In Press) 2013.

Research papers presented in conferences: 6

S. No	Name of the conference	Title of the paper	Authors	Dates	Venue
1.	International Interdisciplinary Science Conference	A Study of the nanocrystalline solid solution, $Zn_{1-x}Mn_xO$ ($x = 0.25, 0.50, \text{ and } 0.75$) prepared using solvothermal method	<u>Sarvari Khatoon</u> and Tokeer Ahmad*	Dec 2-4, 2010	CIRBSC, Jamia Millia Islamia, New Delhi
2.	National Review and Coordination Meeting of NANO Mission Council	Chemical synthesis, characterization and properties of Mn-doped ZnO and CdO solid solutions	<u>Sarvari Khatoon</u> and Tokeer Ahmad*	25 th - 27 th Feb, 2011	IIT Delhi
3.	Recent Advances in Chemistry (RAC-2011)	Chemical synthesis, characterization and properties of transition metal	<u>Sarvari Khatoon</u> and Tokeer Ahmad*	22 nd March, 2011	Jamia Millia Islamia

		doped metal oxide nanoparticles			
4.	7th National Symposium and Conference on Solid State Chemistry and Allied Areas (ISCAS-2011)	Manganese and Nickel Doped In ₂ O ₃ Dilute Magnetic Semiconductor Nanoparticles	<u>Sarvari Khatoon and Tokeer Ahmad*</u>	Nov 24-26, 2011	Jamia Millia Islamia, New Delhi, India.
5.	Recent Advances in Chemistry (RAC-2012)	Transition metal (Mn & Ni) doped Indium oxide Nanoparticles	<u>Sarvari Khatoon and Tokeer Ahmad*</u>	March 12, 2012	Jamia Millia Islamia
6.	DAE-BRNS 4 th Interdisciplinary Symposium on Materials Chemistry (ISMC-2012)	Structural Characterization, Optical and Magnetic Properties of In _{2-x} Mn _x O ₃ (0.05, 0.10 and 0.15) Dilute Magnetic Semiconductor Nanoparticles	Tokeer Ahmad*	Dec 11-15, 2012	BARC, Mumbai

Invited Lecture Delivered from outcome of the project: 8

S. No.	Invited Lecture Title	Dates	Venue
1.	Nanostructured Metals and Dilute Magnetic Semiconductors: Synthesis, Characterization and Properties	October 15, 2012	Recent Trends in Nanoscience and Nanotechnology, Local Symposium organized by University of Delhi, New Delhi
2.	Chemistry of Dilute Magnetic Semiconductor Nanoparticles	October 17, 2012	Department of Chemistry, University of Delhi, New Delhi
3.	Chemistry in Nanotechnology	December 08, 2012	National seminar on "Chemistry in Technology" organized by Ravenshaw University, Cuttack, Odisha
4.	Transition Metal doped Indium and Cadmium Oxide based Dilute Magnetic Semiconductor Nanoparticles	January 11, 2013	National Seminar on "Functional and Smart Materials" organized by Sharda University, Greater Noida.
5.	Nanostructured Dilute Magnetic Semiconductors: Structural Characterization and Properties	February 16, 2013	"8 th National Conference on Solid State Chemistry and Allied Areas" organized by Dr. H. S. Gour Central University, Sagar, M.P.
6.	Nanotechnology-IV	May 22, 2013	Refresher Course in Basic & Applied Science, conducted by UGC-Academic Staff College, University of Kashmir, Srinagar,

			Kashmir, 190006
7.	Designing of Simple to Complex Nanomaterials	August 23, 2013	International Conference on Multifunctional Materials, Energy and Environment organized by Sharda University, Greater Noida.
8.	Chemical Methods for Metals and Doped Nanomaterials	October 30, 2013	International Conference on Interdisciplinary areas with Chemical Sciences (ICIACS 2013) organized by Panjab University in association with Institute of Nano Science and Technology, Mohali.

13. [Benefit from the project to the society:](#)

The nanoparticles of ZnO, CdO and In_2O_3 based dilute magnetic semiconductors (DMS) at low dopant concentration have been synthesized successfully using the Solvothermal reaction set up which may be further applied in spintronic devices in electronic industries.

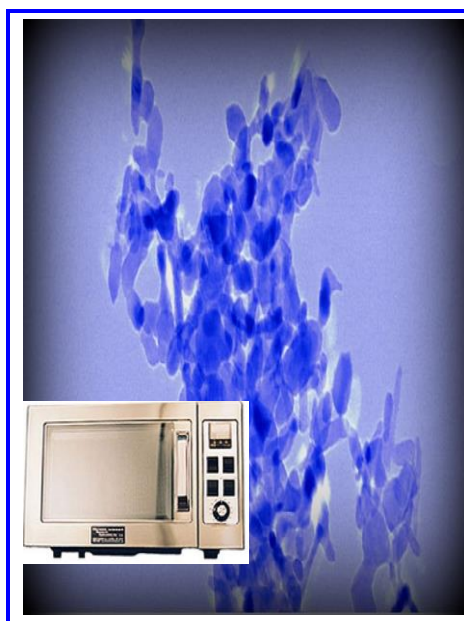
**Faculty of Natural Science
Department of Chemistry**

1. **Name of the Department:** Department of Chemistry.
2. **Project title:** Microwave-assisted Rapid Catalytic Degradation of Some Textile Dyes Using Poly(1-Naphthylamine)
3. **Project Investigator:** Dr.Ufana Riaz (Assistant Professor)
4. **Co-Investigator:**None
5. **Funding Agency:** UGC-Major Research Project
6. **Amount funded:** INR. 10,42,800.
7. **Duration of project:** 3 Years
8. **Stating date of the project:** July 1, 2012
9. **Project Objectives:**

The objective of the present was the application of microwave-assisted technique for the rapid degradation of common textile dyes such as *Malachite green*, *Congo Red*, *Bromophenol Blue*, *Remazol Black B*, *Alizarin* using poly(1-naphthylamine) as a catalyst.

10. **A brief overview/write-up of project:**




We have developed a microwave-active catalyst that works as efficiently as commonly used photocatalysts in absence of any UV-visible radiation and within a short span of time. The degradation rate and mechanism were found to vary with the type of catalyst used i.e nanocomposite or any other conducting polymer such as poly(o-toluidine), poly(aniline)(PANI), poly(1-naphthylamine) (PNA). The degradation by-products produced were non-toxic as compared to those produced using photocatalysts. The effect of exposure time did not significantly effect the percent degradation incase of all the dyes. Also higher loading of PNA did not influence the degradation rate.



- **Microwave-active catalyst was developed that works as efficiently as commonly used photocatalysts in absence of any UV-visible radiation and within a short span of time.**
- **The degradation rate and mechanism were found to vary with the type of catalyst used i.e nanocomposite or any other conducting polymer such as ,poly(aniline)(PANI),poly(1-naphthylamine) (PNA).**
- **The degradation by-products were non-toxic as compared to those produced using photocatalysts. The effect of exposure time did not significantly effect the percent degradation incase of all the dyes. Also higher loading of PNA did not influence the degradation rate.**

11. Infrastructure created from project:

We purchased photochemical reactor, Analytical micro-balance and Rotary shaker in this project work.

S.No	Name of equipment	Model	
1.	Photochemical reactor	Lelesil	
2.	Analytical Microbalance	Shimadzu	
3.	Rotary Shaker	Remi	

S. No	Name of Authors	Title of Paper	Journal Name	Year
1.	Ufana Riaz, S.M.Ashraf and Mohd.Aqib	"Microwave-assisted degradation of acid orange using a conjugated polymer, polyaniline, as catalyst"	Arabian Journal of Chemistry, Volume 7, Issue 1, January 2014, Pages 79-86	2013

2.	Ufana Riaz and S.M.Ashraf	Catalytic degradation of orange G under microwave irradiation with a novel nanohybrid catalyst	Journal of Environmental Chemical Engineering	2014
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12. Project outcomes :

(a) Papers Published

(b) Conferences Attended

S.NO	NAME OF AME OF AUTHORS	TITLE OF PAPER	CONFERENCE DETAILS	YEAR
1.	Ufana Riaz and Imran Ahmad	"Controlling the growth of nanostructured polycarbazole in Bentonite using peroxides via microwave-assisted solid state in-situ intercalation and po	National Conference on Advances in Chemical Sciences (ACS-2013) held at Department of Chemistry, Maharshi Dayanand University, Rohtak-124001, during March 1-2	2013
2.	Ufana Riaz and Chetna Sharma	<i>"Utilization of Poly(1-naphthylamine) nanotubes as a pH independent adsorbent of sulphonate dyes"</i>	National Conference on Advances in Chemical Sciences (ACS-2013) held at Department of Chemistry, Maharshi Dayanand University, Rohtak-124001, during March 1-2	2013
3.	Ufana Riaz and Chetna Sharma	<i>Microwave-assisted degradation of methyl Orange using poly(1-naphthylamine?) in absence of any photocatalyst</i>	International Conference on Chemistry: Frontiers & Challenges organized by department of Chemistry of Aligarh Muslim University, India, under the SAP program	2013
4.	Ufana Riaz and Chetna Sharma	<i>Effect of Benzoyl Peroxide on Microwave-Assisted Solid-State Intercalation and Polymerization of Carbazole</i>	International Conference on "Advances in Materials and Processing Challenges and Opportunities (AMPCO 2012)" during Nov. 2-4, 2012 organized by Deptt. of	2012

		<i>in Bentonite Clay Galleries</i>	Metallurgical and Material Engg. IIT Roorkee, Roorlee- 247667	
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13. **Benefit to society:**

We have developed a fast efficient and a facile technique for the rapid degradation of dyes that holds immense potential for commercialization.

**Faculty of Natural Science
Department of Chemistry**

1. **Name of the department:** Department of Chemistry
2. **Project Title:** Enhancement of fluorescent properties of conjugated polymer nano particles using luminol and its derivatives.
3. **PI:** Dr. Ufana Riaz
4. **Co-PI:** Nil
5. **Funding Agency:** DST-SERB
6. **Amount funded:** INR. 39,73,800
7. **Duration of the Project:** 3 years
8. **Starting date of the Project:** 1-07-2014
9. **Project objectives:** The proposed work focuses on the aspect of enhancement of the fluorescent properties of nano conjugated polymers for their application in near infrared (NIR) fluorescent imaging.

**Faculty of Natural Science
Department of Chemistry**

1. **Name of the Department:** Department of Chemistry.
2. **Project Title:** "Synthesis, characterization and biological evaluations on the metal
3. **Project Investigator:** Dr. Rahisuddin



4. **Co-Investigator:** None
5. **Funding Agency:** University Grant Commission
6. **Amount funded:** INR. 9, 85,800.
7. **Duration of the project:** 3 Years
8. **Starting date of the Project:** July, 2012
9. **Project objective:**

The main objectives of the research project are:

- a) Synthesis and characterization of novel N-Pyrimidinyl substituted phthalimide ligands.
 - b) Synthesis and characterization of novel N-Pyridinyl substituted phthalimide ligands.
 - c) Synthesis and characterization of Ni(II), Cu(II), Ru(III), Pt(II) metal complexes of the ligands.
 - d) Calf Thymus DNA interaction of metal complexes by Kinetic studies.
 - e) Cell line activities of the N-Substituted Phthalimide ligands and their metal complexes.
10. **A brief overview of the project:**

N-Substituted phthalimide derivatives are important target for drug discovery because of their pronounced pharmacological activity. They have shown promising bioactivities such as anti-tumor, antimicrobial, anti-inflammatory, anti-convulsant and DNA cleaving activity etc. Besides their significance in the medicinal chemistry, phthalimides have found many important applications in organic synthesis including protecting groups. The molecules contain a phthalimide ring, could easily interact with various active targets in biological system because of their hydrophobicity. Attention has been increasingly given to the synthesis of novel phthalimide analogues in drug chemistry because of their potential as labile pro drugs.

N-Substituted phthalimide compounds were synthesized by the condensation reaction of N-aminotetrachloro phthalimide with respective aldehyde.

N-Substituted bis-phthalimide analogues were also synthesized by the condensation reaction of phthalic anhydride with respective diamines in glacial acetic acid.

The compounds were characterized by elemental analysis, IR, ^1H NMR and UV.-Vis. spectroscopy. All spectral data are agreed well with the synthesized phthalimide derivatives.

The antibacterial screening of these compounds was carried out against *E. coli* (gram negative) and *S. mutans* (gram positive) bacteria. *In vitro* cytotoxic activity of the test compounds was also studied against SiHa and MCF-7 cancer cell lines. The test compounds exhibited remarkable antimicrobial and moderate cytotoxic activity. The interaction ability of the target compounds with calf thymus DNA (Ct-DNA) has been studied by means of UV-visible, fluorescence and viscosity measurement. Our *in vitro* findings are consistent with the DNA binding studies of the compounds.

11. [Infrastructure created from the project](#): N/A

12. [Project outcomes](#):

Poster Presentation/Participation in symposium/conference:

Title of presentation/paper	Topic of Seminar/conference / workshop	Institution & Place	Date
Design, Synthesis, Characterization and Biological Evaluation of Bis-Phthalimide Derivatives	National Symposium on Chemistry Under SAP (DRS-I),	Department of Chemistry, Aligarh Muslim University, Aligarh, UP	22 nd March 2014
Effects of polar protic and polar aprotic solvents on the stability and morphology of silver nanoparticles,	International Conference on Chemistry Frontiers and Challenges	Department of Chemistry, A.M.U., Aligarh, India	1-2 rd March, 2013

**Faculty of Natural Science
Department of Chemistry**

1. **Name of the department:** Department of Chemistry
2. **Project Title:** Synthesis of some Heterocyclic Compounds and their Screening against entamoeba histolytica
3. **PI:** Prof Amir Azam



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 10,55,800
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** July-2012 to June-2015

**Faculty of Natural Science
Department of Chemistry**

1. **Name of the department:** Department of Chemistry
2. **Project Title:** DRS-I To DRS-II for five year
3. **Coordinator:** Prof Khalid Iftikhar
4. **Deputy Coordinator:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 70,00,000
7. **Duration of the Project:** 5yr
8. **Starting date of the project:** April-2013 to March-2018

**Faculty of Natural Science
Department of Chemistry**

1. **Name of the department:** Department of Chemistry
2. **Project Title:** Studies for the sulphonation of Co-Polymer grafted PEEK films
3. **PI:** Dr. Saiqa Ikram



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 1,40,000
7. **Duration of the Project:** 2yr
8. **Starting date of the Project:** 2012

**Faculty of Natural Science
Department of Chemistry**

1. **Name of the department:** Department of Chemistry
2. **Project Title:** Phytochemical analysis of bioactive constituents of commonly used plants and development of antimicrobial activities thereof.
3. **PI:** Dr. Fehmeeda Khatoun
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 7,43,300
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** 2013-2016

Faculty of Natural Science Department of Chemistry

1. **Name of the department:** Department of Chemistry
2. **Project Title:** Chiral Chromatography of Compounds with two asymmetric centres
3. **PI:** Prof Imran Ali



4. **Co-PI:** Nil
5. **Funding Agency:** DST, RFBR
6. **Amount funded:** INR. 18,22,800
7. **Duration of the Project:** 2yr
8. **Starting & Completion date of Project:** November 2013
9. **Project Objective:**

Enantiomeric resolution of dipeptides, which is essential for medical science as different enantiomers possess dissimilar biological activities. Development of rationale for the separation of such stereoisomers at analytical, preparative, and production scales. Understanding of the general rules/mechanisms governing the separation of stereoisomers of the compounds possessing two chiral centers.

10. **A brief overview:**

The use of chiral drugs is increasing continuously all over the world. It is due to the fact that one of the enantiomers is pharmaceutically active while the other may be toxic or inactive or ballast. Therefore, chiral drugs provide safe and human friendly medication, which is an essential requirement of sound health. A high fraction, approximately 70%, of pharmaceuticals is chiral compounds. Many of these compounds possess two and more stereogenic centers: dipeptides and some β -blockers to name a few. In this project, we shall combine these two approaches and also employ molecular docking study for better understanding of the enantiorecognition processes. Dipeptides are chosen as probe compounds because individual stereoisomers of many dipeptides possess different biological activities. Besides, analyses of peptide stereoisomers have importance and applications in life sciences in pharmaceutical and food industries. Two types of chromatographic media will be investigated, a CSP with grafted antibiotic **Vancomycin A** and a **polysaccharide CSP amycoat RP**. Later is a new generation phase designed to provide a high throughput separation. The polysaccharide phases were not recommended in the past for the chromatography of dipeptides since they were not compatible with reversed phase conditions necessary for such analyses. At the same time, polysaccharide columns are characterized by high loading capacity that is important for preparative separations. Amycoat RP is designed to work under

reversed phase conditions; therefore, it can be used in this study. We expect it will provide an enhanced productivity in preparative mode, so far unavailable for dipeptides.

11. **Infrastructure created from the project:** –NA–

12. **Project outcomes:**

13. **Benefit from the project to the society:**

It is a well known fact that optically active pure drug is a key factor for human health. So that, the racemic drugs should be replaced by enantiopure homochiral drugs. Therefore, the continuous need and demand of chiral drug development is increasing day by day. By keeping these facts in mind, many pharmaceutical industries have started to manufacture and market optically active pure drug (single) enantiomer. Actually, on administration of enantiomeric drug racemizes in the body and may act as a toxic leading to some diseases or other side effects. This study will help the scientists, academicians and doctors to know the mode of action and its effect in human body. Besides, homochiral drug should be prescribed for the safe medication to the society.

Faculty of Natural Science Department of Computer Science

1. **Name of the Department:** Department of Computer Science
2. **Project Title:** Analysis of Microarray Data Using Artificial Intelligence Based Techniques
3. **Project Investigator:** Khalid Raza, Assistant Professor



4. **Co-Investigator:** Nil
5. **Funding Agency:** University Grants Commission.
6. **Amount funded:** INR. 1.85 Lakhs
7. **Duration of the project:** 2 Years
8. **Starting date of the Project:** April 01, 2013
9. **Project objectives:**

The prime objective is the analysis and interpretation of gene expression data using Artificial Intelligence based approach such as Artificial Neural Networks, Support Vector Machines, Genetic Programming, Model Tree and so on. The goal of the project includes: (i) application of machine learning techniques for classification and prediction of cancers based on microarray data; (ii) M5 Model Tree approach works as a white box model to find relationships between different input variables in multi-regression problem. M5 Model Tree would be exercised for finding regulatory relationships between different genes.

10. **A brief overview of the project:**

The bioinformatics deals with the analysis and interpretation of large sets of information derived from various biological experiments. One such type of large-scale experiment involves monitoring the expression levels of thousands of genes simultaneously under a particular condition, called gene expression. Microarray technology is one of the indispensable tools that biologists use to monitor genome wide expression levels of genes in a given organism. As microarrays technologies have become more prevalent, the challenges associated with collecting, managing, and analyzing the data from each experiment have essentially increased. Robust laboratory protocols, improved understanding of the complex experimental design and falling prices of commercial platforms, all these have combined to drive the field to more complex experiments, generating huge amounts of data. By measuring transcription levels of genes in an organism under different biological conditions (e.g. at various developmental stages and in different tissues), we can develop gene expression profiles that distinguish the dynamic functioning of each gene in the genome. The gene expression data are represented in the form of a matrix with rows representing genes,

columns representing samples (e.g. various tissues, developmental stages and treatments), and each cell of the matrix containing a number representing the expression level of the particular gene in the particular sample. We generally call such a table a gene expression matrix. For instance, if over expression of certain genes is correlated with a certain disease, we can explore which other conditions affect the expression of these genes and which other genes have similar expression profiles. Hence, we can investigate the compounds (potential drugs) that can lower the expression level of these genes.

With the help of Microarray technologies, we can find out answer of some challenging questions like: i) what are the functional roles of different genes and in what cellular processes do they participate? ii) how are genes regulated, how do genes and gene products interact, what are these interaction networks? and iii) how does gene expression level differ in various cell types and states, how is gene expression changed by various disease or compound treatment?

Several sophisticated statistical and computational tools have been developed to help biologists for the analysis of gene expression data and to identify novel targets from their experimental data. Among these techniques, clustering and statistical methods are most commonly used data analysis methods. Clustering generally groups the gene expression data with similar expression pattern, i.e. co-expressed genes. However, clustering approach suffers from several drawbacks. The statistical methods help to analysis gene expression data and infer relationships between genes. However, it fails to provide complex regulatory relations among genes.

We propose to apply Artificial Intelligence based approach, such as artificial neural networks, support vector machines, genetic programming and model tree, for the analysis gene expression data and find out differentially expressed or co-expressed genes.

11. [Infrastructure created from the project:](#)

Purchased high configuration laptop, Hard drive for huge data storage, printers and few books.

12. [Project outcomes:](#)

Khalid Raza and Atif N. Hasan, "A Comprehensive Evaluation of Machine Learning Techniques for Cancer Class Prediction Based on Microarray Data", International Journal of Bioinformatics Research and Applications, Inderscience Publisher (Acctd)

13. [Benefit from the project to the society:](#)

We may come up with a 'disease prediction model' with relatively acceptable accuracy that can predict disease (especially cancers) based on the gene expression data of the patient. The developed model may be useful for the early prediction of cancer and finding cancer-specific genes. The cancer-specific genes prediction may help pharmaceutical industry to create drug target.

Faculty of Natural Science
Department of Computer Science

1. **Name of the Department:** Department of Computer Science.
2. **Project Title:** Machine Learning-Based Methods for Protein-Protein Interaction Prediction.
3. **Project Investigator:** Khalid Raza, Assistant Professor.



4. **Co-Investigator:** None
5. **Funding Agency:** Jamia Millia Islamia. (Under Innovative Research Activities)
6. **Amount funded:** INR 1.0 Lakh
7. **Duration of the project:** ½ Years
8. **Starting date of the Project:** 1st August, 2014
9. **Project objectives:**

Protein-protein interactions (PPI) play a vital role in living cells due to the fact that most essential cellular processes are mediated by these kinds of interactions. Also, disease-causing mutations may disrupt in protein-protein interactions which may lead to a number of neurological disorders. The prediction of PPI has emerged as an important research problem in the field of bioinformatics and systems biology. There is a need to explore the area and apply sophisticated artificial intelligence based methods (such as machine learning) for the prediction of PPI.

Some of the objectives of this (short-term) research project are: i) a quick survey of the current state-of-the-art computational techniques (with focus on machine learning) for prediction of PPI, ii) a comprehensive evaluation of the existing state-of-the-art computational methods (machine learning) for PPI prediction, iii) integration of heterogeneous genomic data to enhance prediction accuracy of PPI.

10. **A brief overview of the project:**

Protein-protein interactions (PPI) play an important role in living cells that control most of the biological processes. Proteins mostly perform their functions with the help of interactions with other proteins. Disease-causing mutations affecting protein interactions can lead to disruptions in protein-DNA interactions, protein misfolds, new undesired interactions, or can enable pathogen-host protein interactions. Aberrant protein-protein interactions have implicated in a number of neurological disorders such as Creutzfeld-Jacob and Alzheimer's disease. With appropriate knowledge of interaction scientist can easily predict pathways in the cell, potential novel therapeutic target, and protein functions. This has motivated to map interactions on the proteome-wide scale. Most proteins perform their functions by interacting with other proteins. The PPI networks within a cell may increase our understanding about protein functions and

cellular processes. Over the past few years, due to advancement in computation biology and bioinformatics, an explosion in availability of functional biological data obtained from high-throughput technologies to infer PPI has been observed.

Many large-scale experimental methods have been employed to study protein-protein interactions including two-hybrid screens, X-ray crystallography, NMR and site-directed mutagenesis. But these experimental techniques are costly, tedious, time-consuming, labour-intensive and potentially inaccurate. On the other hand, tremendous protein interaction data has been generated out of proteomics research that need to be validated and annotated structural information.

Computational methods play a significant role in the prediction of PPI. They are used to predict potential interactions between proteins, to validate the results of high-throughput interaction screens and to analyze the protein networks inferred from interaction databases. The outcome of the proposed project may assist the biologist in predict and validation of protein-protein interactions.

11. [Infrastructure created from the project](#): books.

12. [Project outcomes](#): Research papers

13. [Benefit from the project to the society](#):

The study may reveal fruitful and relevant unknown interactions among proteins which may lead to better diagnosis and therapy of the disease.

**Faculty of Natural Science
Department of Geography**

1. **Name of the department:** Department of Geography
2. **Project Title:** Geovisualisation of Million+ Cities in the Central National Capital Region: An Impact Analysis Study of Delhi Metro Corridors Network on Urban Sprawl
3. **PI:** Dr. Madan Mohan



4. **Co-PI:** Nil
5. **Funding Agency:** ICSSR
6. **Amount funded:** INR. 7,00,000.
7. **Duration of the Project:** 24 months
8. **Starting date of the Project:** May-2013
9. **Project objectives:**

The main aims of the research project are mentioned as follows:

- i. to detect the spatial patterns of land development over the periods;
- ii. to examine the impact of Delhi Metro Corridors Network on urban sprawl;
- iii. to explore suitable strategies and sustainable policies for urban development.

In this context, the study set to answer the following research questions:

- i. What are the spatial patterns of land use existed from 2002 to 2012?
- ii. What are the impacts of Delhi Metro Corridors network on urban sprawl in the million+ cities in the CNCR Region?
- iii. Which are the suitable strategies and policies for better management of urban sprawl in the CNCR Region?

10. **A brief overview:**

Since the beginning of the 21st Century, there has been occurred a continuous increase of urban population, particularly in the cities of the Central National Capital Region (CNCR). The land-environment is under stress due to the increasing pressure of population. Population in-migration, industrial growth, transport infrastructure development etc. are the main factors that have been responsible for the urban sprawl.

The population growth has got tremendous momentum due to the Delhi Metro Corridors network expansion to all corners of the Delhi and particularly in the CNCR Region. It is noteworthy to mention that the present scenario of urban sprawl in the CNCR Region is due to the induction of Delhi Metro – transport network infrastructure development particularly for the needs of the masses and to

decongest the traffic on roads at the threshold of the 21st Century. This has also resulted into the rise of land values not only in Delhi but also in the CNCR region. But, it has minimized the travel time for long distance daily commuters to and fro from the Delhi city centre. However, the speed of urban sprawl has been noticed at very high phenomenal rate due to the development of Delhi Metro Corridors network in the CNCR region.

11. Infrastructure created from the project:

Infrastructure provided by the university.

12. Project outcomes:

Mohan, Madan (2014e) "Geosystems for Urban 3-D Modelling using Remote Sensing: A Study of Gurgaon City, Central NCR Region, India", in Dadhwal, V.K. et. al. (ed.) *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, ISPRS Technical Commission VIII Symposium, Hyderabad, India, Copernicus GmbH (Copernicus Publications), Volume XL-8, Commission VIII, pp. 1–8.

Mohan, Madan (2014d) "Geospatial Simulation using Remote Sensing and Geographical Systems: A Study of Bahadurgarh City, Sub-Region of Central NCR, Haryana State, India", in Dadhwal, V.K. et. al. (ed.) *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, ISPRS Technical Commission VIII Symposium, Hyderabad, India, Copernicus GmbH (Copernicus Publications), Volume XL-8, Commission VIII, pp. 1–7.

Mohan, Madan (2014c) "Global Positioning and Digital Modelling of Cities using Remote Sensing: A Study of Urban Complexes in Sub-Regions of Central NCR, India", in Dadhwal, V.K. et. al. (ed.) *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, ISPRS Technical Commission VIII Symposium, Hyderabad, India, Copernicus GmbH (Copernicus Publications), Volume XL-8, Commission VIII, pp. 1–6.

Mohan, Madan (2014b) "Key Features, Outcomes and Lessons Learned from the Land Reform Process in India", International Land Coalition, ILC 2014 Conference Proceedings, Beijing, CHINA, pp. 1-24.

Mohan, Madan (2014a) "3-D Digital Modelling using Multi-Spectral Remote Sensing Imagery: A Study of Million+ City, Faridabad, Sub-Region of Central NCR, Haryana State, India", XXV FIG International Congress, FIG 2014 Proceedings, Kuala Lumpur, MALAYSIA, pp. 1-19.

Mohan, Madan (2013) "GeoVisualisation and Spatio-Temporal Modelling from Satellite Imagery: A Study of Million+ City, Ghaziabad, NCR Region, India", in 26 International Cartographic Conference, ICC 2013 Proceedings, Dresden, GERMANY, pp. 1-19.

13. Benefit from the project to the society:

The on-going research project “GeoVisualisation of Million+ Cities” with a vision that a digital mapping of cities displays to represent physical space and provide an analysis framework for a deeper understanding of our sprawling cities to the urban development authorities, planners and policy makers for better urban development for the future. Therefore, the urban expansions are to be planned over the non-fertile agricultural land for sustainable urban and environment development which are the most important concerns for the new urban sprawling areas in the CNCR region at the threshold of the 21st Century.

Faculty of Natural Science Department of Geography

1. **Name of the Department:** Department of Geography
2. **Project Title:** Understanding Impacts of Desert Urbanization on Climate and Surrounding Environments to Foster Sustainable Cities Using Remote Sensing and Numerical Modeling
3. **PI:** Prof. Soe Myint, Arizona State University, USA
4. **Co-PIs:** Karen Seto, Yale University, Ronald Rindfuss, University of North Carolina, and Hwei-Ping Huang, ASU, Dr. Atiqur Rahman, Department of Geography, JMI



5. **Funding Agency:** National Aeronautics and Space Administration (NASA)
6. **Amount funding:** \$ 7, 65,990
7. **Duration of the Project:** Three years
8. **Starting date of the Project:** from 1 August 2012
9. **Project objectives:**

Overall objective of this project is to better understand the impacts of changing land cover spatial distribution, patterns and arrangements within and around these cities in relation to climate change and to use this knowledge to support adaptive management and foster sustainable desert cities.

To achieve this objective, it will be tried to answer the questions i) How do the internal features and spatial arrangements of land cover influence temperatures in desert cities and their surrounding desert environments? ii) What are the patterns and rate of change of LCLU including desert vegetation and agriculture within and around select desert cities over time (1990-2010)? iii) What is the relationship between surface and air temperatures, desert urban growth and land cover within and around desert cities? iv) What is the impact of the spatial arrangements of land cover and land fragmentation within and around desert cities on the surrounding environments? vi) How is UHI related to desert city population as compared to other cities in different climate regions? vii) What is the relationship between population, surface temperatures and vegetation at various administrative boundary levels?

10. **A brief overview:**

The research project tries to examine the distribution of urban infrastructure and vegetation in and around sub-tropical desert cities and the effects they have on local and regional climate to address the following:

- ✓ The influences of internal urban features, land fragmentation and spatial arrangements of land cover and land use (LCLU) in both the urban space and surrounding areas.
- ✓ LCLU patterns and rates of change within and around selected cities over time (1990-2010).
- ✓ Warming and climate change/variability impacts on the livability, resources, sustainability and growth of the cities.
- ✓ The balances between oasis cooling, surface morphology and fabric infrastructure heat storage and warming effects and their impacts over space and time.
- ✓ The magnitude and long-term influence of desert urbanization on regional precipitation, temperatures and airflow patterns.
- ✓ Adaptation, alternate management and land use planning scenarios for sustainable city development in these environments.

11. [Infrastructure created from the project](#): Nil

12. [Project outcomes](#):

The project outcome will be to get to know the pattern and rate of LCLU change i.e., dark impervious, bright impervious, trees/shrubs, grass, including desert vegetation and agriculture within and around the desert cities during 1990-2010. To understand the variation and intensity of the oasis effect of cities in desert environments over space and time. How spatial arrangements and patterns of LCLU relates to surface temperatures. Further to get to know how precipitation, temperature and regional airflow patterns are associated with the oasis effect. Further outcome will help to understand the dynamics, pattern, and rate of change of the population growth for the study cities and the relation to surface temperatures in comparison to non-desert cities, and whether the pattern of demographic growth in different cities is related to surface temperatures.

13. [Benefits from the project to the society](#):

The proposed project will be useful to support adaptive management in a desert environment and foster sustainable desert cities and their surrounding desert environments in an era of global climate variability, uncertainty and change, supporting the Strategic Plan of the U.S. Climate Change Science Program and elsewhere in the World.

Faculty of Natural Science Department of Geography

1. **Name of the department:** Department of Geography
2. **Project Title:** Foundational Work for a Brain-to-Society Diagnostics for Prevention of Childhood Obesity and its Chronic Diseases Consequences
3. **PIs:** Prof. Narendra K Arora, The INCLEN Trust International, New Delhi;
Prof Laurette Dube, McGill University, Canada
4. **Co-PIs:** Dr. Atiqur Rahman, Department of Geography, JMI & Prof Nikhil Tandon, AIIMS, Prof. Manju Malhotra, AIIMS, Prof. Saraswati, DU, Prof. Mark Daniel, The University of Melbourne, Australia



5. **Funding Agency:** Indian Council of Medical Research (ICMR) and the Canadian Institutes of Health Research (CIHR)
6. **Amount funding:** INR. 50,00,000/-
7. **Duration of the Project:** Five years
8. **Starting date of the Project:** 2010
9. **Project objectives:**
 - I. To study the sensitivity of various aspects of agriculture system and production (crop shift, nature of farming, ownership pattern of farms, number and size of farms, use of technology in agriculture) to urbanization over time
 - II. To understand and document the progressive effects of urbanization on the evolution/ development of agriculture supply chain (i.e. supply chain of food and agricultural products/ agri-food system/ value chain) from traditional to mature/ competitive supply chain in the selected geographical area
 - III. To explore how changes in agriculture system and agriculture supply chain relate to changes in socio-economic status of rural community/ farmers, income levels, occupational patterns, etc.
10. **A brief overview:**

The aims are to inspire policy, business and social change and innovation to ensure a healthy transition from tradition to modernity in the context of developing countries and to re-

establish caloric and nutritional balance in developed societies (Whole-of-Society BtS diagnostic), thereby enriching the health sciences on the mechanisms of diseases of affluence and inspire therapeutics from the brain to society. The healthy eating component of the Brain-to-Society Diagnostic Project weaves the full scientific and technological power of computational system sciences with breakthrough developments in genomic, neuroscience, management, and political sciences to promote a multi-tier and nested diagnostic approach to the prevention of obesity, chronic diseases and other health problems resulting from the poor alignment of modern society with the limits of biology (an abundance of food versus humans biological tendency to maximize food intake). Seeking to characterize the development of population data on environment responsiveness endophenotypes as a core theoretical and empirical bridge between gene, brain, and society, the program highlights the diversity of individual responses to common environmental exposure conditions (individual-centered BtS diagnostic) and the structural and dynamic features of the interplay between government, private sector and community that create the common pool of opportunities and constraints for healthy eating (commons-centered BtS diagnostic).

11. [Infrastructure created from the project](#): Nil

12. [Project outcomes](#):

Primary data will be generated on the initial status of agriculture system and agri supply chain in the region. Tracking changes over time will provide information on changes in agriculture system and agri supply chain that are sensitive to effects of urbanization. Data will also provide information and understanding of the pace at which changes take place in community systems with urbanization. This data may be used in future studies for purpose of understanding and isolating reasons for differences/ variation in the pace of change in agriculture systems/ supply chain across different regions exposed to urbanization. An understanding of how change in occupational pattern, income level and affluence leads to changes in lifestyle and food preferences will also emerge.

13. [Benefits from the project to the society](#):

The project is a unique initiative that brings together local, national and global scientists and organizations devoted to solving some of the modern worlds' most intractable problems lying at the interface of health and economics. The proposed objectives promise to make breakthrough contribution to a knowledge basis that can inform policy and help community leaders and others through the whole of society in choosing a portfolio of initiatives with single and combined health, social and economic outcomes are sustainable, transferrable and scalable worldwide.

Faculty of Natural Science Department of Geography

1. **Name of the Department:** Department of Geography
2. **Project Title:** Planning Atlas for Class II Towns of Uttar Pradesh
3. **PI:** Prof. Masood Ahsan Siddiqui



4. **Co-PI:** Dr. Haroon Sajjad, Dr. Lubna Siddiqui, Dr. Mansaf Alam



5. **Funding Agency:** DST
6. **Amount funded:** INR. 17 lacs
7. **Duration of the Project:** 2yr
8. **Starting date of the Project:** 2014
9. **Project objectives:**--
10. **A brief overview:**--
11. **Infrastructure created from the project:** --
12. **Project outcomes:** --
13. **Benefits from the project to the society:** ---
14. **Any other information you may think is important in this regard:** --

**Faculty of Natural Science
Department of Geography**

1. **Name of the Department:** Department of Geography
2. **Project Title:** A Cross Sectional analysis of Quality of Life of Elderly People in Ambedkar District, Uttar Pradesh.
3. **PI:** Dr Lubna Siddiqui



4. **Co-PI:** Prof Masood Ahsan Siddiqui, Dr Haroon Sajjad



5. **Funding Agency:** ICSSR
6. **Amount Funded:** INR. 4,0,8000.
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** 2011.
9. **Project objectives:**--
10. **A brief overview:**--
11. **Infrastructure created from the project:** --
12. **Project outcomes:** --
13. **Benefits from the project to the society:** ---
14. **Any other information you may think is important in this regard:** --

**Faculty of Natural Science
Department of Mathematics**

1. **Name of the department:** Department of Mathematics
2. **Project Title:** (DRS-I Level) under Special Assistance Programme
3. **Coordinator:** Dr. Mohd Hasan Shahid



4. **Deputy Coordinator:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 56,00,000
7. **Duration of the Project:** 5yr
8. **Starting data of the Project:** April-2012 to March-2017

Centre for Theoretical Physics

1. **Name of the department:** Centre for Theoretical Physics
2. **Project Title:** Probing Black Hole environment with X-ray Binaries
3. **PI:** Dr. Sanjay Jhingan



4. **Co-PI:** Gulab chand Dewangan
5. **Funding Agency:** ISRO
6. **Amount funding:** INR. 17,05,000
7. **Duration of the Project:** Ongoing
8. **Starting date of the Project:** 2014

9. **Project objectives:**

Black Hole X-ray binaries (BH-XRBs) are binary stellar systems where one of the components is a black hole. Such systems are unique laboratories for studying the phenomenon of accretion onto compact objects. They also provide the best laboratories to probe General Relativity in the strong field regime very close to a BH. In particular, the observation of fast X-ray variability (on sub-second scales) and broadband X-ray spectra including accretion disk emission, the broad iron line and Compton reflection offer a very promising and direct window onto the accretion processes and their time scales.

10. **A brief overview:**

Black Hole X-ray binaries (BH-XRBs) are binary stellar systems where one of the components is a black hole. Such systems are unique laboratories for studying the phenomenon of accretion onto compact objects. They also provide the best laboratories to probe General Relativity in the strong field regime very close to a BH. In particular, the observation of fast X-ray variability (on sub-second scales) and broadband X-ray spectra including accretion disk emission, the broad iron line and Compton reflection offer a very promising and direct window onto the accretion processes and their time

11. **Infrastructure created from the project:** Nil

12. **Project outcomes:**

Among the existing missions, XMM-Newton and Suzaku in special observing modes (timing and burst modes) provide both good timing and spectral resolutions. However, the data in these modes has not been fully utilized due to complexity of the data analysis and interpretation. We will use the timing/burst mode observations of

BH XRBs with XMM Newton and Suzaku to study temporal and spectral characteristics simultaneously. We plan to develop a new tool for simultaneous fitting of lightcurves and spectrum and characterize the variation of different spectral components, and thus probe extreme conditions in the immediate environments of accreting BHs

13. [Benefits from the project to the society:](#)

The Tools developed, the technical and scientific expertise gained, and the physics understood using the XMM-Newton and Suzaku data in this project will be directly useful for the study of accreting BHs using the upcoming Indian astronomy satellite mission ASTROSAT.

Centre for Theoretical Physics

1. **Name of the Centre:** Centre for Theoretical Physics
2. **Project Title:** Astrophysics and Cosmology from Higher Dimensional theories.
3. **PI:** Prof Anjan Anada Sen



4. **Co-PI:** Prof. Dabashis Ghoyal J.N.U Delhi
5. **Funding Agency:** DST
6. **Amount funded:** INR. 27,14,000

Faculty of Humanities & Languages Department of History & Culture

1. **Name of the Department:** Department of History & Culture
2. **Project Title:** "Dhikral-Niswa-al-Muta'abidat at Sufiyat' (Biographies of Sufi Women) Translation and Annotation
3. **Principal Investigator:** Prof. Sunita Zaidi



4. **Co-Investigator:** None
5. **Funding Agency:** University Grants Commission
6. **Amount funded :** INR 7,24,800
7. **Duration of the project:** 2 Years
8. **Starting date of the Project:** July01, 2011
9. **Project objectives:**

To study, translate from Arabic into English, annotation and overall assessment of the manuscript "Zikru al Niswath al Sufiyat al Mulabbidat (the biographies of devotional and mystic women), written by Abu Abdul-Rahman al-Sulami (325-412 A.H.). Small anecdotes and discourses of eighty four women who devoted themselves to the practice of Tasawwuf or Sufism. A large number of works on male Sufis have been published, but Sufi women like other women have not got their due place. By this work, their contribution will be highlighted. Their insights, devotion, piety, love for human being's welfare will be discussed. Though the book was written in the male dominated society, but the matter taken was Sufi women which show the significance of women.

10. **A brief overview of the project:**

Male Sufi saints are discussed at greater length in hagiographical works, but women saints hardly find a place there. In this context "*Dhikral-Niswa*" is very significant. This manuscript was discovered in the library of Islamic University in Riyadh. It was completed on 17 July, 1081.

The author was born in 937 A.D. His father died in 956-57 A.D., left nothing for family. He took the name of as-Sulami from his mother's side. *Ruth Roded* termed it "semi matrilineal ascriptions."

al-Sulami had influence of his maternal grandfather, his teacher spiritual master he developed interest in sacred biography, Muhammad ibn Khafif of Shiraz also influenced as-Sulami.

I have chosen "*Dhikral-Niswa*" to unveil the life and teachings of the Sufi women. It contains biographies of 84 female Sufis. I have translated all the biographies of the collection into English and comparing with other contemporary writings. Now I am annotating. I am comparing it with Ibn al-Jawzi's *Sifat as-Safwa* whose Sufi women are depicted as being more emotional and "Women like" than those of as-Sulami. But definitely both works are able to show the participation of women Islam. al-Jawzi's

female teacher Shuhda bint al-Ibari, a great hadith scholar had great influence on him. It is interesting to note that as-Sulami does not try to hide the criticism of Shaikh as-Nasrabadhi by one of his female disciples. I am trying to see also how far the Sufi women were able to develop close contacts with the commoners.

**Faculty of Humanities & Languages
Department of History & Culture**

1. **Name of the department:** History & Culture
2. **Project Title:** DRS-Phase-II to DRS Phase-III, (DRS Programme)
3. **Coordinator:** Prof. Amiya P. Sen



4. **Co-Coordinator:** --Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 56,00,000.
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** April-2013 to March-2018

Faculty of Humanities & Languages
Department of Islamic studies

1. **Name of the department:** Department of Islamic Studies
2. **Project Title:** Inter Religious Dialogue an Indian Perspective
3. **PI:** Prof Akhtarul Wasey
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 5,20,000
7. **Duration of the Project:** 2yr
8. **Starting date of the Project:** 2013- 2015

Faculty of Humanities & Languages Department of Arabic

1. **Name of the Department:** Department. of Arabic
2. **Project Title:** “Indian Arabic Poetry: A Critical and Analytical Study”
3. **Project Investigator:** Dr Mohammad Ayub, Professor Department of Arabic



4. **Co-Investigator:** None
5. **Funding Agency:** University Grants Commission
6. **Amount funded:** INR 10, 36,600.
7. **Duration of the project:** 2 Years
8. **Starting date of the Project:** April 01, 2013
9. **Project objectives:**

This project would be a new research work in which the major Indian Arabic Poets would be studied and their literary contribution would be analyzed. After the deep and detailed study of the poetry, samples of which are selected, their texts will also be critically analyzed. This critical analysis will be very beneficial to the scholars of Arabic literature. After completing the project, it will also be published so that the scholars, teachers and students of various colleges and universities may get benefited from it.

10. **A brief overview of the project:**

Poetry is one of the important genres of Literature. Arabic poetry was one of the fields where Indians have enough contribution from the early stage of their cultural relations. In the field of Arabic poetry our country is proud of having produced some eminent poets such as Shaikh Nasiruddin Chirag Dehlavi, Qazi Abdul Muqtadir, Shaikh Ahmad of Thanesar, Sayyid Ghulam Ali Azad, Maulana Baqir Agha, Mufti Sadruddin of Delhi and others whose compositions earned them fame and reputation not only in India, but also in the Arab world.

The subjects, themes and topics of Arabic Poetry are being based on national and international themes, issues and problems of their time since its beginning. In this poetry, there is a voice against every type of injustice, prejudice, hatred, inequality, poverty and destruction of values. The nature of the Indian Arabic Poetry has always been democratic and secular in its essence.

Therefore this project would be very helpful not only to understand the national and international issues and challenges but also will pave the way for solving and coping with these in a new way.

11. **Infrastructure created from the project:** Photocopies of Some manuscripts in Arabic Poetry have been collected. Many relevant books have been collected.

12. **Project outcomes:** This project would be helpful not only to understanding the related national and international issues but also provide new solution.

Faculty of Humanities & Languages Department of English

1. **Name of the Department:** Department of English
2. **Project Title:** DRS-I ToDRS-II, Translation of Nineteenth and twentieth Century Identified Indian Texts
3. **Coordinator:** Professor M Asaduddin, Head, Department of English.



4. **Deputy Coordinator:** None
5. **Funding Agency:** UGC, (DRS-I ToDRS-II)
6. **Amount funded:** INR 40 Lakh
7. **Duration of the project:** 5 years
8. **Starting date of the Project:** April 01, 2009 to March 31, 2014
9. **Project objectives:**

To identify, translate and edit seminal 19th and 20th century texts in Indian languages. One core area is to translate and edit the entire short fiction and non-fiction corpus of Premchand both in Urdu and Hindi. Seminars and workshops are organized to gather and disseminate knowledge of the thrust areas, and to offer training to new translators and editors. Visiting fellows with expertise in the thrust area are invited to interact with colleagues and students. Several writers were invited by providing them short residencies. They interacted with students in both formal and informal settings, gave readings and mentored young writer-aspirants in the university.

10. **A brief overview of the project:**

The project aimed at identifying major literary and cultural texts of the nineteenth and twentieth century's. Nineteenth century marks a watershed in India's cultural history. It is in this century that many of our writers made their mark, literatures were fashioned and languages developed, thus engendering a new outlook and a new world view. Our understanding of the twentieth century, and indeed the modern world will remain partial and limited if we are unable to take a long view of history and take things in a continuum. In stressing the modern and the contemporary students often tend to ignore the seminal impact of nineteenth century in shaping our thinking and consciousness. One of the focal points of the thrust area was the translation of the entire corpus of Premchand's short stories and non-fictional works. Towards this end an annual workshop was held every year in which 25-30 translators and editors participated. This is a process through which students were given hands-on training in translation. During the 5-year duration of the project we have been able to train about 80 translators.

We have also been able to build up a specialized library well-equipped with books on translation theory and practice, Indian literatures in translation and Gender Studies. The scholars and writers who were invited under the aegis of the project have

remained in touch with faculty members and students, thus forming an enduring relationship with the Department.

11. **Infrastructure created from the project:**

3 computers with a printer, book shelves and books

12. **Project outcomes:**

Books	4
Seminar	2
Workshop	6
Training translators	80

13. **Benefit from the project to the society:**

The project compiled and disseminated knowledge which will be of great value to the society. It published materials in the areas where there was a need to fill gaps in the existing body of knowledge.

Faculty of Education Department of Educational Studies

1. **Name of the department:** Department of Educational Studies
2. **Project Title:** DRS-II Under the Special Assistance Programme (SAP), DRS Programme
3. **Coordinator:** Prof Anita Rastogi



4. **Deputy Coordinator:** Dr. Arshad Ikram Ahmed
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 46,00,000
7. **Duration of the Project:** 5year
8. **Starting date of the Project:** 2013 to 2018
9. **Project objectives:**

To provide all sorts of research support including reference material, technical support for data analysis etc. to the Research Scholars, Teachers, Teacher Educators etc.

To engage in newer, current and relevant areas of educational research related to teacher education (e.g. policy research, quality issues in teacher education, developmental research) To disseminate of research findings to stakeholders (schools/ teachers/policy makers) To facilitate the linkages and alignment of challenges /issues at ground level and policies.

To promote development of curricula, pedagogy, techniques of evaluation and teaching –learning material.

To critically examine the existing teacher education curriculum to gauge the gaps between the role of teacher in the school system, teacher preparation and education of teacher educators.

To develop Training Management System (TMS) and Professional Development Record at District level to be used to consolidate and track various professional development activities across the cluster, block and district and even state and national levels.

Dissemination of Curriculum Frameworks and Policy documents in interpretable form to stakeholders to facilitate and support their implementation at ground level by the administrators, teachers and teacher educators. (e.g. NCFTE,09 , CCE, RTE)5

To document the pedagogical practices and classroom episodes of the teachers and teacher educators to be used as pedagogic tools in teacher preparation programmes to create new understandings and interpretations in theory and practice of teaching and teacher education

Designing of futuristic academic short term Certificate/ Diploma courses in education relevant to needs of the schools / teachers/ curriculum developers / designers which may increase employability and entrepreneurship; the programs focusing on teacher

education and related subjects having bearing on teacher preparation; the programs that equip / prepare the teachers/ teacher educators for the challenges they face in their work environments like inclusive education, leadership , instructional design , guidance and counselling etc.

Forge National and International synergies /linkages with individual and organisations engaged in teacher education and initiate active exchange programs(for teacher educators and students) leveraging the strengths

Faculty Development - Initiate active steps for intellectual regeneration and capacity building of teachers and teachers educators towards culture of research, research based pedagogical practices, Creation of more active interface with school teachers/ teacher educators.

Capacity development of teachers/ teacher educators / administrators etc. through the use of organic approach for organising In Service Teacher Education Programs. Conceptualise and design alternative modes to support teacher capacity building of in-service teachers/ 6 prospective teachers in the areas like innovative pedagogical approaches in classroom teaching, life skills , mental health etc.

Community engagement and extension services- To collaborate constructively with stakeholders in the community to make a positive contribution about learning and teaching.

To document best practices in the management of teacher education system in terms of inputs, processes and outcomes and make attempt to evolve a framework for Quality Teacher Education in the country. To engage, collaborate and develop capacity of personnel working in teacher education institutions at the District, Block and cluster level. To promote the integration of ICT for Professional Development of Teachers (both pre-service and Continuous professional Development Programmes.), research and administratin and develop pedagogically sound e-learning material for teachers/ teacher educators.

To provide a platform /forum to the teachers, teacher educators and policy framers to deliberate upon the challenges faced by the teacher education in the country and examine the probable solution to face these challenges

10. [A brief overview:](#)

Thrust Area: Teacher Education, Policies, Perspectives and Management Introduction. Given the vast and diverse landscape of the Indian education system, significant progress has been made towards the achievement of the goals laid out in the Constitution and the National Policy on Education. These include significantly higher levels of funding, access, enrollment, infrastructure and the recently legislated Right to Education (RTE) Act.

In spite of these developments, critical challenges continue to remain in areas such as retention, quality and equitable opportunities for all. Recent developments like the Right of Children to Free and Compulsory Education (RTE) Act, 2009, the National Curriculum Framework for Teacher Education 2009 (NCFTE), and other contemporary developments in the field of Teacher Education have renewed the vigour and resolve to address quality issues in teacher education system in the country. Together with RTE, the recommendations of XII Five year Plan for teacher education has created a positive pull and pressure to rejuvenate the teacher education system leading to systemic and sustainable improvements. In this context, the National Curriculum

Framework for Teacher Education (2009) voices the need and importance of professionally trained teachers and teacher educators. The quality of teacher educators is linchpin to the quality of teacher education and hence, professional preparation of teachers. Further, teachers are the most important factor that determines the quality of school education. Therefore, the content and pedagogical inputs provided by teacher education necessitate, teacher educators, who are qualified and competent to provide them. Hence, for sustainable systemic changes, effective management of teacher education system calls for a deeper discourse. India struggles with the search for teachers who can create appropriate learning environments, based on their understanding of content and pedagogy, and equally significant their dispositions, as a teacher needs to reconceptualise citizenship education and also internalise the ethos of fundamental duties of every citizen. Currently we are faced with an acute shortage of teachers in government and other schools, and the ability of those serving to facilitate fulfilment of basic objectives of learning, leave alone fulfilling national expectations of facilitating social change.

11. [Infrastructure created from the project:](#) -

12. [Project outcomes:](#)

The teaching community today finds itself exposed to severe public criticism and fast diminishing professional prestige. The professional competence, commitment and motivation to the profession are all the time questioned. There are demands to hold the teaching professionals accountable towards their professional obligations and lapses. Any effort to enforce accountability is to be preceded by clear articulation of what is expected of them, robust professional preparation program and continued support, well laid out and functional systemic enablers and systematic assessment of their performance.

The measures of teacher accountability need to be tied to institutional provisions that enable teachers to work. A pragmatic solution lies in holistic approach to teacher education system and creating convergent and integrated system of teacher education management, overseeing the quality of teacher/ teacher educators preparation and school education to support equity and encourage community involvement, to develop and put in place a mechanism to monitor the implementation of the policies on various physical and financial parameters with pre-defined outcomes for improving the overall quality of various activities of the teacher education institutions.

There is an urgent need to create better institutional mechanisms and systemic enablers to achieve excellence in the profession. Thus, the Department proposes to make a humble intervention in the area of Teacher Education with financial support from UGC to carve a niche in prime areas of teacher Education in both pre-service/ in-service teacher education and proposes the following objectives to be achieved in the next five years

13. [Benefits from the project to the society:](#)

Thus, the Department proposes to make a humble intervention in the area of Teacher Education with financial support from UGC to carve a niche in prime areas of teacher Education in both pre-service/ in-service teacher education and proposes the following objectives to be achieved in the next five years.

14. Any other information you may think is important in this regard:

No grant has been released by the funding agency till date. The project, therefore, is yet to start.

Faculty of Education
Department of Educational Studies

1. **Name of the department:** Department of Educational Studies
2. **Project Title:** Living, Learning and the Dynamics of Schooling: A Case Study of Communities living in the Dal Lake
3. **PI:** Dr. Farida Abdulla Khan
4. **Co-PI:** Nil
5. **Funding Agency:** ICSSR
6. **Amount Funded:** INR, 8,00,000.
7. **Duration of the Project:** 2yr
8. **Starting date of the Project:** 2014 to 2016

Faculty of Education
Department of Teacher Training & Non Formal Education

1. **Name of the department:** Teacher Training & Non Formal Education
2. **Project Title:** A Study of Factor Influencing the Education of Muslim Girls and other Educationally Disadvantaged Groups of Lucknow District in UP
3. **PI:** Dr. Fauzia Khan
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 6,79,600
7. **Duration of the Project:** 2yr
8. **Starting date of the project:** 2013-2015

Faculty of Engineering and Technology Department of Electrical Engineering

- 1 **Name of the Department:** Electrical Engineering Department
- 2 **Project Title:** Development of novel, efficient and cost effective, Power electronic based single phase system to convert solar energy from solar PV to Electric energy
- 3 **Project Investigator:** Ahteshamul Haque



- 4 **Co-Investigator:** None
- 5 **Funding Agency:** Ministry of New and Renewable Energy, Govt of India
- 6 **Amount funding:** INR 1 Crore, 6 lakhs, 31 thousand
- 7 **Duration of the Project:** 3years
- 8 **Starting date of the Project:** March 25, 2014
- 9 **Project objectives:**
To overcome the problem of energy crisis considering the climate change concern.
- 10 **A brief Overview of the project:**
To develop the efficient and cost effective single phase system to convert solar energy in electrical energy from solar photovoltaic system. From other perspective, this is to enhance the use of green technology.
- 11 **Infrastructure created from the project:**
A state of the art advance power electronic lab is in the set up process which will consist of high end instruments for research and development work.
- 12 **Project outcomes:**
Solar energy converts system in the final energy form for end users patents. Research papers, Ph.D, M.Tech, B.Tech Project and research Project will be done.
- 13 **Benefits from the project to the society:**
The broad objective of this activity is to enhance the use of green technology by the society to meet the energy demand by providing affordable solution
- 14 **Any other information you may think is important in this regard:**
It is the highest grant received by the electrical engineering department through R&D Project since inception in 1985.

Faculty of Engineering and Technology Department of Electrical Engineering

1. **Faculty:** Engineering & Technology, Electrical Engineering
2. **Project Title:** Design and Performance Evaluation of Communication Architecture Requirements for Substation Automation System.
3. **Principle Investigator:** Dr. Ikbal Ali Assistant. Professor



4. **Co-Investigator:** None
5. **Funding Agency:** AICTE
6. **Amount Funded:** INR. 10,00,000
7. **Duration of the Project:** 3years
8. **Starting date of the project:** March 16, 2013 March 12, 2016
- 9 **Project Objectives:**

The prime objective of this project shall be to establish a modelling and simulation platform to design and test the dynamic performance of the substation communication architecture, to model and test the functionality of protection and control IEDs, and to design and test the performance of the distributed, i.e. based on peer-to-peer communication over substation Ethernet LAN, automated protection and control schemes for power system

10 A brief overview of the project:

Introduction

The Department of Electrical Engineering, has been giving great emphasis on teaching and research in the areas of Substation automation, IED (Intelligent Electronic Devices) Communication, Ethernet in Substation, IEC 61850 based systems, SCADA systems and Smart Grid technologies.

While on the other hand it is also emphasising on the Sensor Technology, Industrial Automation Protocols, Fuzzy Systems, Soft-computing etc. to produce innovative, capable and highly motivated intellectual manpower to meet India's future technological needs in the area of power sector and Industry oriented research.

A substation is a strategic node in a power network, consists of a large number of switchgears controlled, supervised, and protected by a Substation Automation System (SAS) (as shown in Fig. 1). Thus, substation automation system's functions are highly time critical and demand high reliability and availability of the Substation Communication Network (SCN). Earlier, communication for these automation functions within the substation used to be through traditional method of hard wiring among microprocessor-based protective relays and serial peer-to-peer communications. Now Ethernet LAN based communication provides

more flexible, fast and reliable option. Switched Ethernet technology has reached to a very advanced level and can now support data transmission with speed of some Gbps presently and is expected to offer much more in near future.

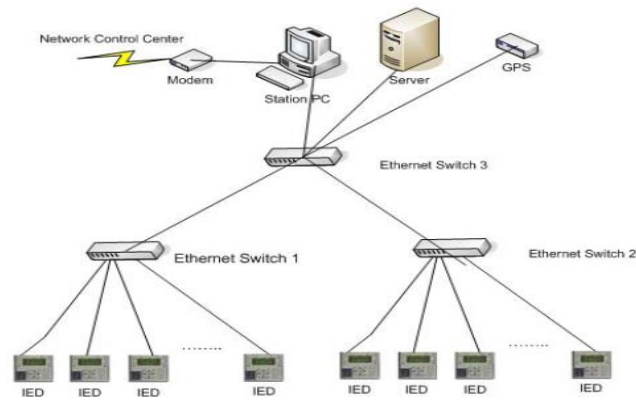


Fig. 1. Substation Automation System (SAS) with Star Topology.

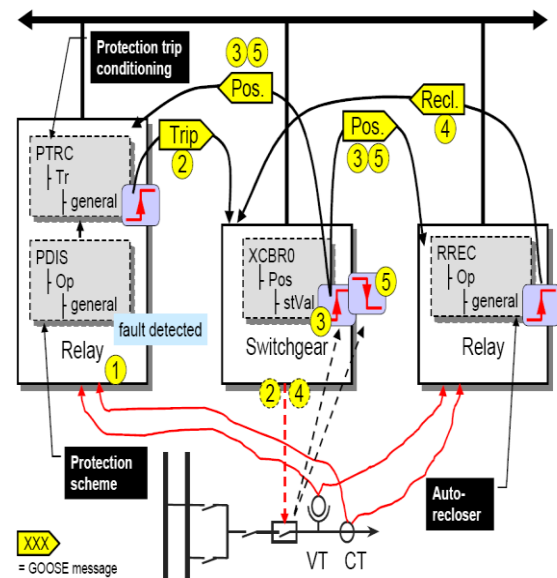


Fig. 2. Protection Scheme Logic Implementation using GOOSE Messages GOOSE model,

which is part of the standards IEC 61850(*Communication Networks and Systems in Substation*), is intended to provide the means for high priority and high-speed peer-to-peer

communication among IEDs (Intelligent Electronic Devices) to implement protection and control functions within substation. Fig. 2 depicts GOOSE messages exchange, over SAS Ethernet LAN, for implementing an auto-reclose function. IEC 61850 is also providing interoperability among various IEDs supplied from different vendors, encourage the implementation of Switched Ethernet based SCN. Moreover, According to the IEC 61850-5, the message transmission time requirements for SCN must be ensured under any operating conditions and contingencies inside the substation.

Substation Communication Network (SCN) Architecture along with communication methods/protocols and advanced IT based equipments, used to build SAS, play a very crucial role in the fast and deterministic operation of automation functions within substation and hence in maintaining the reliability, availability and survivability of the large, and very complex geographically distributed power network. Therefore, design and dynamic performance of the SCN must be studied during the planning stage in order to catch network performance problem ahead of the deployment stage. Implementation and testing of protection schemes, before commissioning, in a laboratory is always preferred and considered to be superior to debugging the interactions among IEDs in the real world Substation Automation System (SAS), as laboratory testing can incorporate a wide range of interactions by a well structured sample test plan.

In IEC 61850-5, clause 13 specifies the message performance requirements for all type of SAS and clause 15 states two approaches that could be used to study the SAS network performance-PICOM model and simulation of local-area network (LAN) performance. For a complete and most accurate performance analysis, simulation tools are proved to be the logical solution.

Relevance with ongoing academic activities

Substation Automation System composed of IEDs, Ethernet Switches, TCP/IP Router, gateways and other components. Designing and testing the performance of substation communication architecture is always required and beneficial before the actual deployment. Thus, the next generation of electrical grid will have monitoring, control and communication capabilities to the traditional electricity power grid to make it more energy efficient, reliable and safe. This is referred to as Smart Grid. Main advantages of smart grid are: reduction of peak demand, shifting usage to off-peak hours, lowering total energy consumption, enabling the customer to monitor and control the usage of devices with smart meters, enabling integration of grid with renewable energy sources of generation like tidal power, wind power, solar power, etc. Therefore, as an academic research activity we will try to model Different IEDs, Switches, Routers and gateways, Communication channels / protocols and evaluate the performance of various architecture of substation automation system. Modelling of different Substation automation components and performance testing of the complete system including network topology for a particular protection and control scheme is also required at the planning stage to ensure reliable and secure operation the protection & control schemes.

To achieve the above mentioned objectives, two important courses on “Communication Protocols” and “Data Communication and Computer Networks” have been introduced. The powerful modelling and simulation platform will be used for giving hands-on-training for better realization and understanding of the concepts of the subjects of “Communication Protocols” and “Data Communication and Computer Networks”. This continuous process of teaching computer communication to Electrical Engineering students with communication

network modelling & simulation tools will create a future knowledgeable work force confident of understanding and implementing Smart Grid Technologies, which is amalgamation of Electrical and ICT infrastructure

11 Infrastructure created from the project:

A automated protection and control schemes for power system

12. Project outcomes - Expected outcome

This project is intended to establish a modelling and simulation platform to design and test the dynamic performance of the substation communication architecture. This platform shall enable us:

- a) to design and test the performance of communication networks for substations.
- b) to model and test the functionality of protection and control IEDs.
- c) to model and test the performance of different communication protocols suited in SAS (Substation Automation Systems) applications.
- d) to design and test the performance of the distributed, i.e. based on peer-to-peer communication over substation Ethernet LAN, automated protection and control schemes for power system.
- e) to design and test the communication architecture for IEC 61850 protocol based SAS. IEC 61850 defines the QoS requirements associated with the SAS applications.
- f) to publish the results of our studies and findings in research journals of international repute to share them with the scientific community all over the world.
- g) to enhance the interaction with other members of the scientific community in India by holding workshops periodically, exchange of preprints and interim reports as well as presentations of the results in national and topical seminars.
- h) to spearhead the research activity in the Smart Grid Technologies.
- i) to produced knowledgeable and trained graduates. Who shall be job ready and be able to confidently handle the smart grid technologies challenges.

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering
2. **Project Title:** IEC 61850 Standard based Communication Configuration to Integrate Distributed Energy Resources (DER) in Distribution System
3. **Principle Investigator:** Dr. Ikbal Ali, Assistant. Professor



4. **Co-Investigator:** None
5. **Funding Agency:** Innovative Research Activities, JMI
6. **Amount funded:** INR 1, 00,000.
7. **Duration of the project:** 6 months
8. **Starting date of the project:** July 01, 2014
9. **Project objectives:**

Therefore the prime objective of this project shall be to model and simulate the communication configuration, needed to integrate DERs with distribution system as per IEC 61850 standards, and evaluate the performance of the designed communication configuration architecture for a practical scenario. The communication configuration of a DER includes information modeling, service modeling, communication protocols and telecommunication media, which are addressed by different parts of IEC 61850 standard, e.g. IEC 61850-7-420, IEC 61850-7-2, IEC 61850-8 and IEC 61850-6 etc.

10 **A brief overview of the project:**

Introduction: Motivation for this work originates from the fact that IEC 61850 [1] provides standard interoperable framework for functions and IEDs in substations. Moreover, power utilities world over are refurbishing their substations with IEC 61850 based automation systems. The IEC 61850 standard covers Communication Networks and Systems in Substation and has been defined to create a uniform, future-proof basis for the protection, communication and control of substations [2]. Substations are the nodal point for the power system, where protection, control and monitoring functions are implemented. IEC 61850 standards define the implementation of these functions based on Ethernet communication and helps in building a state-of-the-art Distribution Automation System leading to smart grid. Further, environment friendliness is creating enormous demand for green energy and the supporting technologies. While, smart grid paradigm is rapidly transforming the power sector to meet this demand by integrating advanced Communication and Information Technologies (CIT) and Distributed Energy Resources (DER).

To be able to work and to publish the results of the study, in an international journal, the department/university needs to have the legal access of relevant parts of the IEC 61850 standard document, which is possible through buying the standard document online on discounted price for the Universities.

World over IEC 61850 systems are being deployed. The substation automation systems designed according to the IEC 61850 standard, introduces interoperable approach for

monitoring, protection and control functions. However, to test the operating performance of the functions and systems, in terms of reliability, security and speed, in the real setup is not always feasible. However, this project will help in modeling and simulating the functions, devices and systems based on IEC 61850 standard on a powerful communication network simulation tool, i.e. OPNET Modeller [9], for which the department of Electrical Engineering, F/o Engg. & Technology, JMI has already acquired the license. Modeling and simulation platform created in this way shall be used to evaluate and test 61850-7-420 based communication configuration required for smooth integration of DER units to distribution systems as well as their monitoring, protection and control. The outcome of the study shall be published to provide a fundamental reference to all the stakeholders to create a roadmap for the efficient application and deployment of protection and control systems based on IEC 61850 and the distribution utilities the capability of optimal scheduling of DERs.

Potential aspect of the project in the field of social relevance and national importance: At present, India's installed power capacity is 2,28,721.73 MW with renewable energy contributing 28,184.35 MW or 12.32%[10]. From various energy technologies, a capacity addition of about 30,000 MW has been planned during the 12th Plan period 2012-2017[11]. Integration of DERs to distribution systems, along with automation of distribution system, will result in transformation of legacy grids in to smart grids. Government of India has set up the India Smart grid Task Force to serve as government focal point for activities related to smart grid and the smart grid forum with prime objectives of accelerating development of Smart Grid Technologies in the India Power Sector. Smart grids will result in reduction of peak load demand, lowering total energy consumption, enabling the costumer to monitor and control the usage of devices with smart meters etc.

Smooth integration and interoperable communications between DERs and distribution system are essential for stable operation of grid. Thus, this project intends to present an effective communication configuration architecture, based on IEC 61850 standards, which helps in smooth integration of DERs to distribution systems as well as their monitoring, protection and control.

11. [Infrastructure created from the project](#): None

12. [Project outcomes](#):

This project is intended to model and simulate the communication configuration as per IEC 61850 standards needed to integrate DERs. This project shall enable us:

- a) To model the IEDs, as per the information modeling in IEC 61850-7-420, required for different DERs related to protection, control or metering.
- b) To study the dynamic performance of the communication configuration architecture under various wired or wireless communication media as well as for a worst case traffic load to figure out the optimum choice.
- c) To design and evaluate the performance of communication configuration architecture needed to integrate DERs and distribution substation.
- d) To create a modeling and simulation platform to evaluate and test 61850-7-420 based communication configuration required for smooth integration of DER units to distribution systems as well as their monitoring, protection and control
- e) To publish the results of our studies and findings in research journals of international repute.

- f) To extend the results and models simulated in this project, to build the communication architecture for stable operation of micro grid.
- g) To be in tune with the ongoing research activities worldwide.
- h) Future Projects based on outcome of this project: Successful modeling and simulation of communication configuration, based on IEC 61850 Standards for integration of DERs to distribution system, shall be extended to optimally design and evaluate the performance of the communication configuration architecture requirements for micro grids in order to implement protection and control functions.

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the Department:** Electrical Engineering
2. **Project Title:** IEC 61850 for Energy Management in Microgrid
3. **Project Investigator:** Dr. Ikbal Ali, Assistant Professor.



4. **Co-Investigator:** None
5. **Funding Agency:** IEEE Standards Education Committee, EEE Educational Activities, 445 Hoes Lane, Piscataway, NJ 08854-4141, USA
6. **Amount funded:** USD 800
7. **Duration of the project:** 6 months
8. **Starting date of the project:** May 21, 2014
9. **Project objective:**
 - a) Introduction
 - b) Objective
 - c) Milestones

IEEE Standards Education Grant for Implementing Industry Standards

Enhanced protection, control, monitoring and metering between power distribution system and Distributed Energy Resources (DERs) can be achieved by deploying the appropriate communication configuration between them. The communication configuration of a DER includes information modeling, service modeling, communication protocols and telecommunication media, which are addressed by IEC 61850-7-420, IEC 61850-7-2, IEC 61850-8 and IEC 61850-6 standards. This project intends to simulate the communication configuration as per IEC 61850 standards, using network simulation tool i.e. OPNET modeler, needed to integrate DERs and evaluate the performance of the designed communication configuration architecture. In IEC 61850-7-420, the group of data objects that serve specific functions are defined as logical nodes and composition of relevant logical nodes for providing information needed for a particular DER device is defined as logical device. While an Intelligent Electronic Devices (IED) may comprise of one or more logical devices. Project work concentrates on extensive modeling of the IEDs required for different DERs to represent specific characteristics related to protection, control or metering. Communication services between IEDs to exchange protection, control and metering messages will also be simulated. Dynamic performance of the communication configuration architecture shall be studied under various wired or wireless communication media as well as under possible worst case traffic load to figure out the optimum choice. The performance of communication configuration shall also be evaluated and compared with the recommended limits, on delivery time requirement of messages to be transferred between external IEDs (i.e. DER IEDs) and substation, available in IEEE 1646-2004 standard. Since IEC 61850 does not specify time delivery requirements between IEDs of DERs and substations. A successfully modelled and tested IEC 61850-7-420 communication configuration allows smooth

integration of DER units to distribution systems as well as their monitoring, protection and control. Also information exchange related to status of switches, circuit breakers and the metered data between different DERs and distribution system is possible and allows distribution utilities the capability of optimal scheduling of DERs. List of technical industry standards that will be analyzed:

1. IEC 61850-4-720 (also taking help of other parts of the same standard e.g. IEC 61850-7-2, IEC 61850-8 and IEC 61850-6)
2. IEEE 1646-2004

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the Department:** Electrical Engineering
2. **Project Title:** Resilience Mechanisms for Survivable Ad hoc Networks
3. **Principal Investigator:** Dr. Shabana Mehfuz



4. **Co- Investigator:** No
5. **Funding Agency:** AICTE
6. **Amount Funded:** INR 9,50,000
7. **Duration of the Project:** 2 years
8. **Starting Date of Project:** April, 2012
9. **Project Objectives:**
 - a) Analyze and quantify the impact of different types of challenges and failures on normal network service operation. Examining existing survivable approaches for MANETs. Study metrics, classes of network resilience, policies and ways to negotiate them.
 - b) Identification of survivability key properties and requirements for MANETs.
 - c) Proposal of a new classification of defence lines. Developing resiliency-oriented algorithms which maintain survivability attributes in MANETs.
 - d) Simulating and validation of proposed algorithms. Explore the survivability performance of devised solutions.
 - e) Developing metrics and synthetic intrusions to assess performance and overhead of proposed resilience mechanisms for MANETs.
10. **Brief overview of the Project:**

The wireless arena has been experiencing exponential growth in the past decade. There have been great advances in network infrastructures, growing availability of wireless applications, and the emergence of omnipresent wireless devices such as portable or handheld computers, PDAs, and cell phones, all getting more powerful in their capabilities. These devices are now playing an ever-increasingly important role in our lives. Mobile users can rely on their cellular phone to check e-mail and browse the Internet, travellers with portable computers can surf the internet from airports, railway stations, cafes, and other public locations, files or other information can be exchanged by connecting portable computers via wireless LANs while attending conferences, and at home.

There are situations in which user-required infrastructure is not available, cannot be installed, or cannot be installed in time in a given geographical area. Providing the needed connectivity and network services in these situations requires a mobile ad hoc network. The vision of mobile ad hoc networking is to support robust and efficient operation in mobile wireless networks by incorporating routing functionality into mobile nodes. Such networks are envisioned to have dynamic, sometimes rapidly changing, random, multihop topologies, which will be composed of relatively bandwidth-constrained wireless links.

Due to their communication type and constraint resources, Mobile Ad Hoc networks are vulnerable to diverse types of attacks and intrusions. Wireless communication, for example, is susceptible to interferences and interceptions. Portability has made devices each time smaller, with resource limitation, and thus easy targets for overload attacks. The fully network decentralization, absence of support infrastructure and dynamic topology increase the vulnerability to many attacks such as impersonation, Sybil, selective forwarding, blackhole, wormhole among others.

Survivability refers to a system capability of completing its goals and requirements in a timely manner in face of attacks, intrusions, failures or accident. In general, these faults abuse of existent system vulnerabilities, introduced accidentally or deliberately during the development of the system. An attack can successfully exploit system vulnerabilities resulting in an intrusion.

This project is intends to develop preventive, reactive and tolerant approaches which operate together to provide a survivable MANET.

11. **Infrastructure created from the project:** None

12. **Project outcomes:**

- a) Expanding ring search algorithm in MANETS modified and Parameters such as Packet delivery ratio, Energy spent Throughput and Average delay improved to increase the survivability of MANETS.
- b) A resilience mechanism based on Game theoretic approach is developed for attacks and network performance is enhanced.

13. **Benefit from the project to the society:**

Mobile Ad Hoc networks hosts must ensure functionalities and guarantees provided by support structures in wired networks. Routing, access control and node authentication are examples of network functionalities that must be performed by node cooperation. Nevertheless, those hosts present characteristics, such as constraint resources (processing, memory, bandwidth, energy and others), mobility and wireless communication that limit their capacity to execute dense activities and increase the complexity on providing network management, control and security.

Due to their communication type and constraint resources, Mobile Ad Hoc networks are vulnerable to diverse types of attacks and intrusions. Wireless communication, for example, is susceptible to interferences and interceptions. Portability has made devices each time smaller, with resource limitation, and thus easy targets for overload

attacks. The fully network decentralization, absence of support infrastructure and dynamic topology increase the vulnerability to many attacks such as impersonation, Sybil, selective forwarding, blackhole, wormhole among others.

This project aims at providing solutions to the above mentioned problems. Therefore this project is very relevant as MANETs have applications in the communication systems involved in SCADA systems, Substation Automation Systems, smart grids etc. which are frontier areas in power sector research. MANETs are also used in Vehicular services for transmission of news, road conditions, weather, music. Local ad hoc network can be used with nearby vehicles for road/accident guidance. MANETs also have applications in smart environments where Wireless Sensor Networks are used. Smart environment can be setup in laboratories, conference rooms, classrooms etc to facilitate communication, data and file transfer etc. MANETs are used to setup virtual classrooms or conference rooms.

**Faculty of Engineering and Technology
Department of Electrical Engineering**

1. **Name of the department:** Electrical Engineering
2. **Project Title:** Power system Automation
3. **PI:** Prof. Mini S. Thomas



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funding:** INR. 73,00,000
7. **Duration of the Project:** 5year
8. **Starting date of the Project:** 2013

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering Department
2. **Project Title:** DRS-II under special assistance programme.
3. **Coordinator:** Prof Mini Thomas



4. **Deputy Coordinator:** Prof Zaheeruddin



5. **Funding Agency:** UGC
6. **Amount funded:** INR. 44,76,000
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** April-2013 to March-2018

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering Department
2. **Project Title:** Development of Nanostructured Ceramic Sensor by Sol-Gel Method
3. **PI:** Dr. Tarikul Islam



4. **Co-PI:** Nil
5. **Funding Agency:** DST, GOI
6. **Amount funded:** INR. 21,00,000
7. **Duration of the Project:** 3year
8. **Starting date of the Project:** 1/05/2012 to 30/04/2015
9. **Project objectives:**

Objective of the present proposal is

1. To study the Sol-Gel science to form the nano porous structure of ceramic for sensing application.
2. Formation of the thin film of porous ceramic on ceramic substrate by dip coating/spin coating. Different pore morphologies of ceramic will be formed by selecting suitable sol-gel formation parameters and optimizing the process parameters.
3. Formation of the capacitive sensor for sensing gaseous moisture/displacement and its characterization to determine the electrical parameters of the sensor. The steps involve fabricating the capacitive sensor: (a) Formation of electrode on the substrate, (ii) deposition of thin film/thick film (iii) formation of another electrode. Efforts will also be made to form inductive sensor. The steps involve for fabricating an inductive sensor (i) deposition of thin film on the ceramic substrate (ii) Deposition of thin film directly on ferrite core and (ii) Utilization of high Q ferrite for the formation of moisture sensitive inductor.
4. Development of detection electronics circuit for converting capacitance change due to moisture into voltage signal

10. **A brief overview:**

Sol-gel science is a simple, low cost chemical route to prepare ceramic nano-structure with controllable pore morphology. This method can be exploited to fabricate nano structure to give expected electrical properties for sensor. Tape casting is another method to fabricate good quality ceramic nanostructure for thick film sensor. The characterization of the ceramic nanostructure prepared by sol-gel method leads to better understanding of the fabrication process and process parameters. Understanding

the phenomenon governing the change in the electrical properties upon exposure to moisture or other environment. Optimization of the parameters of the sensor. Possible utilization of the sensor in the sealed environment where monitoring moisture is very important with detection electronics circuit. Fabrication of the integrated LC sensor for measuring humidity in sealed package

11. [Infrastructure created from the project:](#)

Equipments: a) automatic liquid dispensing system, b) daq Card for interfacing with pc

12 [Project outcomes:](#)

(A) Development Of Single Chip Lc Sensor For Noncontact Humidity measurement in lower range. For the first time we have successfully developed a lc sensor for measuring humidity in lower range.(b) development of a very low cost moisture sensor on flexible substrate in trace level. This device has the potential to offer very low cost moisture measurement from 100 to 1000 ppm. (c) development of impedance measurement circuit for capacitive humidity sensor. (e) one student is pursuing ph.d and two students are pursuing m. Tech dissertation work
(f) Three papers have been published in the international journals. Three papers have been published in the international conferences.

13. [Benefits from the project to the society:](#)

- (a) Monitoring the quality of food product in sealed package.
- (b) Monitoring of humidity for human comfort

Faculty of Engineering and Technology Department of Electrical Engineering

1. **Name of the Department:** Electrical Engineering Department
2. **Project Title:** Development of Nano Structured Ceramic Sensor.
3. **Principal Investigator:** Prof. Tarikul Islam



4. **Co- PI:** Prof. Shakeb Ahmad khan
5. **Funding Agency:** Department of Science & Technology (DST), NEW DELHI (GOI)
6. **Amount Funded:** INR. 21 Lakh
7. **Duration of the Project:** 3 year
8. **Starting Date of Project:** 01/05/2012, closing date of the project: 30/4/2015
9. **Project Objectives:**

Present proposal is to study the Sol-Gel science to form the nano porous structure of ceramic for sensing application. Formation of the thin film of porous ceramic on ceramic substrate by dip coating/spin coating. Different pore morphologies of ceramic will be formed by selecting suitable sol-gel formation parameters and optimizing the process parameters. Formation of the capacitive sensor for sensing gaseous moisture/displacement and its characterization to determine the electrical parameters of the sensor. The steps involve fabricating the capacitive sensor: (a) Formation of electrode on the substrate, (ii) deposition of thin film/thick film (iii) formation of another electrode. Efforts will also be made to form inductive sensor.

The steps involve for fabricating an inductive sensor (i) deposition of thin film on the ceramic substrate (ii) Deposition of thin film directly on ferrite core and (ii) Utilization of high Q ferrite for the formation of moisture sensitive inductor. Development of detection electronics circuit for converting capacitance change due to moisture into voltage signal.

10. **Brief Overview of the Project:**

Sol-gel science is a simple, low cost chemical route to prepare ceramic nano-structure with controllable pore morphology. This method can be exploited to fabricate nano structure to give expected electrical properties for sensor. Tape casting is another method to fabricate good quality ceramic nanostructure for thick film sensor.

The characterization of the ceramic nanostructure prepared by sol-gel method leads to better understanding of the fabrication process and process parameters.

Understanding the phenomenon governing the change in the electrical properties upon exposure to moisture or other environment. Optimization of the parameters of the sensor. Possible utilization of the sensor in the sealed environment where monitoring moisture is

very important with detection electronics circuit. Fabrication of the integrated LC sensor for measuring humidity in sealed package.

11. [Infrastructure created from the project:](#)

Equipments: A) Automatic liquid dispensing system, b) daq card for interfacing with pc.

Project outcomes (Milestones):

(A) Development of single chip LC sensor for noncontact humidity measurement in lower range. For the first time we have successfully developed a LC sensor for measuring humidity in lower range.

(B) Development of a very low cost moisture sensor on flexible substrate in trace level. This device has the potential to offer very low cost moisture measurement from 100 to 1000 ppm.

(C) Development of impedance measurement circuit for capacitive humidity sensor.

(E) One student is pursuing Ph.D and two students are pursuing M. Tech dissertation work

(F) Three papers have been published in the international journals. Three papers have been published in the international conferences.

12. [Benefit from the project to the society:](#)

(a) Monitoring the quality of food product in sealed package.

(b) Monitoring of humidity for human comfort

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering Department
2. **Project Title:** Design and Development of Psychoacoustic Devices
3. **PI:** Dr. Munna Khan



4. **Co-PI:** Nil
5. **Funding Agency:** Defence research and development organisation, GOI
6. **Amount funded:** INR. 9,55,000.
7. **Duration of the Project:** 3 year
8. **Starting date of the Project:** 01/07/2012 to 30/04/2015

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering Department
2. **Project Title:** Vision based expert system for Vacuum picking of Cotton
3. **PI:** Dr. Munna Khan



4. **Co-PI:** Nil
5. **Funding Agency:** CSIR-CMERI DST
6. **Amount funded:** INR. 39,50,000
7. **Duration of the Project:** 3year
8. **Starting date of the Project:** 01/04/2013 to 30/04/2015

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering Department
2. **Project Title:** Modelling & Simulation of eddy –Current Brakes for energy absorber
3. **PI:** Prof Ibraheem



4. **Co-PI:** Dr. Arunesh Kumar Singh



5. **Funding Agency:** UGC
6. **Amount funded:** INR. 12,62,800
7. **Duration of the Project:** 3year
8. **Starting date of the Project:** 01/07/2012 to 31/07/2015

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering Department
2. **Project Title:** Visual Inspection System for Railroad Tracks
3. **PI:** Dr. Zainul Abdin Jaffery



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 14,35,800
7. **Duration of the Project:** 3 year
8. **Starting date of the Project:** 01/04/2013 to 31/03/2016
9. **Project Objectives:**

The objective of this research project is to investigate the feasibility of using machine-vision technology to develop automatic inspection systems that are able to detect the defects in railway tracks such as, missing clips that hold the rail track to the sleepers on the ground and cracks in rail track. These systems could increase the ability in the detection of defects and reduce the inspection time in order to guarantee more frequently the maintenance of the railway network.

In this project it is proposed to carry out the following task.

- To collect the actual images of the rail track having faults such as missing fastening cracks in the rail tracks, wear and deformation in the hexagon nuts.
- To develop algorithms for the classification and detection of these faults

10. **An overview of the Project:**

Safety in railways is one of the major issues for Indian railways and metro rail system. The condition of the track is very important in this prospective, in particular when high speed trains are envisioned. Frequent monitoring of the track is therefore critical to plan proper and cost effective maintenance. Detection of wear and deformation of tracks at an early stage allows for better scheduling of the maintenance, avoiding the need of immediate action when dangerous conditions are observed. Advance maintenance planning reduces also costs since the limited human and equipment resources can be better used. Besides, accurate maintenance decreases the acoustic pollution due to bad coupling between wheel and track: this is relevant especially within the town borders. Railroad engineering practice requires

tracks to be inspected for physical defects at specific intervals. This may include detecting defects relating to the ballast section, ties, fasteners, rail, and special track work. These inspections are done as often as twice per week. Usually this task is performed by trained personnel that periodically walk along the railway network searching for visual anomalies. Actually, this manual inspection is slow, laborious and potentially hazardous, and the results are strictly dependent on the capability of the observer to detect possible anomalies and to recognize critical situations. Enhancements to the current manual inspection process are possible using machine-vision technology, which consists of recording digital images of track elements of interest and analyzing them using special algorithms to identify defects or their symptoms.

11. [Infrastructure created from the Project](#): Nil
12. [Project outcomes](#): Nil
13. [Benefits from the project to the society](#): Nil

Faculty of Engineering and Technology
Department of Electrical Engineering

1. **Name of the department:** Electrical Engineering Department
2. **Project Title:** Development and implementation of nature inspired optimization techniques in AGC of interconnected power system with parallel AC/DC links.
3. **PI:** Dr. Naimul Hassan



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 9,27,800
7. **Duration of the Project:** 3year
8. **Starting date of the project:** 01/04/2013 to 30/04/2016

Faculty of Engineering and Technology
Department of Applied Science & Humanities

1. **Name of Department:** Department of Applied Science & humanities
2. **Project Title:**
 - a) Investigation of Photoconductive response of indigenously grown ceramic/CNT composite film for the application of optical detector
 - b) Investigation of optical properties of CNT composite film for the application of optical detector.
3. **Principal Investigator:** Prof. S. S. Islam



4. **Co-Investigator:** None
5. **Funding Agency:**
 - a) Investigation of Photoconductive response of indigenously grown ceramic/CNT composite film for the application of optical detector sponsored by Department of Science & Technology (DST), Govt. of India
 - b) Investigation of optical properties of CNT composite film for the application of optical detector sponsored by University Grant Commission, Govt. of India
6. **Amount Funded:**
 - a) Investigation of Photoconductive response of indigenously grown ceramic/CNT composite film for the application of optical detector sponsored by Department of Science & Technology (DST), Govt. of India – INR 44.27 lakh
 - b) Investigation of optical properties of CNT composite film for the application of optical detector sponsored by University Grant Commission, Govt. of India – INR 14.75 lakh
7. **Duration of project:** Three Year for All.
8. **Starting Date of Project:**
 - a) Investigation of Photoconductive response of indigenously grown ceramic/CNT composite film for the application of optical detector -2014
 - b) Investigation of optical properties of CNT composite film for the application of optical detector -2013
9. **Project Objective:**
 - (1) *Investigation of Photoconductive response of indigenously grown ceramic/CNT composite film for the application of optical detector*
 - a) Growth of alumina / CNT composite thin/ thick film by dip/spin and tape-& gel-cast techniques where the composite will be developed through sol-gel route
 - b) Composite thin/thick film characterization and its analysis by Raman, FTIR, SEM and AFM studies
 - c) Design and fabrication of photo detectors with necessary electrical circuits,

d) Light wavelength & power dependent photoconductivity studies of thin/ thick film,

e) Detector Performance Analysis

(2) *Investigation of optical properties of CNT composite film for the application of optical detector-*

The fabrication of CNT composite films where the concept of CNTs network is thought about instead of manipulation on single fiber the proposed work constitutes four main elements – (1) preparation of ceramic/CNT composite thin film by dip/spin coating and thick film by gel-cast and tape cast method, (2) characterization of surface morphology and film quality, (3) Photoconductivity studies in the UV-Vis-IR region, and (4) performance studies of composite CNT detector and its analysis.

10. **A brief overview of the project:**

(1) *Investigation of Photoconductive response of indigenously grown ceramic/CNT composite film for the application of optical detector:*

A single CNT is a perfect 1D system. Studying single-CNT-based photo detectors can help us understand the real operation principle of 1D detectors, which enables fabrication of photo detectors with optimized performance. The one-dimensional (1D) hollow cylindrical structure of CNTs possesses exceptional optoelectronic properties, which enables them to function as core materials for light emitters and photo detectors. Semiconductor CNT is a direct band-gap material, which is essential for high-performance photo detectors. The noise of 1D photo detectors using CNTs can be extremely low because of phonon scattering suppression and size shrinkage. The quantized energy level and phonon bottleneck in the CNT give prolonged carrier life time. The 1D structure with high surface-to-volume ratio can inherently increase the signal-to-noise ratio with shortened carrier transit time, which may lead to a higher operating temperature that is significant for long-wavelength photo detectors. It has been demonstrated that CNT-based middle-wave IR sensors can operate at room temperature. The peak responsivity of the detectors can be tuned to the desired wavelength by controlling the diameter of CNTs, since the bandgap energy is inversely proportional to the diameter in quantum confined structures, and the diameter of CNTs can be easily tailored by electrical breakdown. As a result, the CNT detector can cover the spectrum from UV to long-wave infrared. The dominant Fermi level pinning effect in planar contact is trivial in the 1D structure, and therefore, the performance of CNT infrared detectors can be improved by selecting proper metals. In addition, multiple electron-hole pair generation in nanostructures could potentially increase the sensitivity of CNT detectors. Photodetector operation typically involves three consecutive processes to transform the optical signal into electrical signal, namely carrier generation, carrier separation, and carrier transport. In

other words, photodetectors with high sensitivity require high quantum efficiency, low noise, long carrier life, and short carrier transit time. Therefore, CNTs have the potential to outperform their bulkier counterparts if their unique features are fully utilized in the sensor design.

(2) Investigation of optical properties of CNT composite film for the application of optical detector

The work envisaged under this project is a new attempt to find the photoinduced interaction of CNTs embedded in a reinforced structure which is made of CNT/Ceramic composite. The composite will be transformed in the form of thin and thick film made by spin/dip coating and gel-/ tape-cast techniques. The studies will help the researchers in fabricating high performance optical material with required photosensitive properties. From the literature it is understood that no such studies have been carried out so far on CNT based nanocomposite thick/thin films for electronic and optical applications. All the reports available so far are based on the photo response properties of pure, aligned, and single fibre CNT. But it is also interesting to note that the method of composite material as well as its casting to make film is simple, cheap, and reproducible. The attempt to make CNT photodiode so far is full of difficulties and these arise due to the concept of using single tube of a particular diameter, chirality, conducting type, design and manipulation of tube segregation etc. The preliminary studies conducted by our group on the composite CNTs as proposed show very encouraging results. Instantaneous response and 100% recovery during light OFF/ON cycle have motivated us to go further in depth studies.

11. **Infrastructure Created from the project:**

Research Laboratory

12. **Project outcome:**

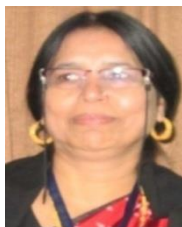
The results on fabrication and characterization of composite CNTs and its application as a photo sensing device will be communicated to the scientific community at large through publication in research journals of national/ international repute. Furthermore, it is proposed to enhance interaction with other members of the scientific community by holding workshops periodically, exchange of preprints and interim reports as well as presentations of the results in national and topical seminars. Patent document will be filed on the performance of a photodetector made from ceramic/ CNT composite film subject to the success of the proposed study.

13. **Benefit from the project to the society:**

The present proposal is conceived to harness the excellent photoresponse properties of CNTs embedded in a reinforced structure; the proposed study will help to understand the utility of the proposed simple and alternative route to overcome the complicated problems and bottlenecks for making optoelectronic devices from CNTs as mentioned.

Faculty of Engineering & Technology
Department of Applied Sciences & Humanities

1. **Name of the department:** Department of Applied Sciences & Humanities
2. **Project Title:** Phytochemical Analysis of Bioactive Constituents of Commonly used Plants & Development of Antimicrobial activities thereof
3. **PI:** Dr. Fehmeeda Khatoon, Asst Professor.



4. **Co-PI:** Dr. Saiqa Ikram
Asst. Professor, Dept. of Chemistry
Faculty of Natural Sciences, JMI
- DR. F Rehman
Principal Faiz-E-Aam Degree College
CCS University Meerut (UP) 25001
5. **Funding Agency:** UGC
6. **Amount funding:** 7, 43, 300
7. **Duration of the Project:** Three Year
8. **Starting date of the Project:** 01-04-2013 to 01-04-2016
9. **Project objectives:**

The research objectives of the study are as follows:

To investigate the Phytochemical composition of some Indian medicinal plants and Biological screening of different plant extracts against various microbial strains
Material and Methods:

- *Extraction of plant material in different solvents*
The fresh plant material was purchased from stock market and stored in the laboratory for further reference. Later on the material was ground to coarse powder and extracted in different solvents in Soxhlet apparatus for the time period of 72hours.
- *Phytochemical analysis of different extracts*
The phytochemical test was done by different methods as Wagner Test, Braemer's test, Salkowaski test, NaOH/H₂SO₄ test, Keller Killiani test and Frothing test
- *GC-MS analysis*
GC-MS analysis of the extract was carried out using a Shimadzu 2010 gas chromatograph fitted with an AB-Wax column. Helium was used as a carrier gas. Sample (0.1ml) was injected in the injector in split less mode. The chemical component separated from the extract was identified by comparing the retention time of the chromatographic peaks with those of authentic compound using the WILEY8.LIB and NISTO5s
- *Biological activity*

Antifungal Activity: Minimum Inhibitory Concentration (MIC), Growth Curve Studies, Disc Diffusion Assay, Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM).

Antibacterial Activity: Disc Diffusion Assay, Growth Curve Studies, Minimum Inhibitory Concentration and Scanning Electron Microscopy

10. A brief overview:

India is well known for its varietal medicinal plants and is one of the richest countries in the world in regard to genetic resources of medicinal plants. It exhibits a wide range in topography and climate, which has a bearing on its vegetation and floristic composition. More ever, the agro climatic conditions are conducive for introducing and domesticating new exotic plant varieties. Plants contain a wide variety of compounds called phytochemicals, mainly described as those compounds having medicinal properties. Scientists have identified thousands of phytochemicals, although only a small fraction has been studied closely. Some of the better known phytochemicals include beta carotene and other carotenoids, ascorbic acid (vitamin c), folic acid and vitamin E. Plants containing phytochemicals not only have effect to some particular diseases, but because of their antioxidant or hormone like actions, they also give beneficial healthful effects in humans. The increases of fungal infection, toxicity of some antifungal agents, interaction with different kind of drugs and development of resistance of some species of fungi have led to search for new antifungal agents. Hence, antimicrobial efficacies from plants have to be explored. For this purposes we have selected some Indian medicinal plants as *Salix viminalis*, *Juglans regia*, *Cinnamomum cassia*, *Curcuma longa* and *polygonum bistorta*. Phytochemical tests have been done for *Salix viminalis*, *Juglans regia*, *Cinnamomum cassia*, & *Curcuma longa* results has been shown in table1, Table 2, Table 3 and Table 4. Preliminary phytochemical screening of *Polygonum bistorta* will be carried during next session.

Table 1. Phytochemical analysis of *S. viminalis* leaves extract. The test was based on colour intensity.

Phytochemicals	Name of test	Colour observed	Colour intensity
Alkaloids	Wagner Mayer	Pale yellow Brown ppt.	+ +
Phenols/ Flavonoids	NaOH, NaOH/ H ₂ SO ₄ , ALCl ₃	Deep yellow, Colour less yellow	++ ++ +
Steriods / Terpenoids	Salkowaski	Red colour	++
Glycosides	H ₂ SO ₄ Keller Killiani	Dark Brown Brown Ring	+ +
Tannins	Braemer Iodine	Dark Blue Faint Bluish	+ +
Saponins	Frothing	Colourless	-

Note: - absent, + slightly present, ++ moderately present

Table 2. Phytochemical analysis of *Juglans regia* leaves extract. The test was based on colour intensity.

Phytochemicals	Name of Test	Colour observed	Colour intensity
Alkaloids	Wagner	Pale yellow	+
	Mayer	Brown ppt.	+
Phenols	NaOH	Deep yellow	++
	NaOH/H ₂ SO ₄	Colourless	++
	AlCl ₃	Yellow	+
Terpenoids	Salkowaski	Red colour	++
Glycosides	H ₂ SO ₄	Dark brown	-
	Keller Killiani	Brown ring	-
Tannins	Braemer	Dark blue	+
	Iodine	faint bluish	+
Saponins	Frothing		+
			+

- = Negative (absent), + = Positive (slightly present), ++ = Positive (moderately present)

Phytochemicals	Name of Test	Colour observed	Colour intensity
Alkaloids	Wagners	Pale yellow	+
	Mayer	Brown ppt.	+
Phenols/ Flavonoids	NaOH	Deep yellow	++
	NaOH/H ₂ SO ₄	Colourless	++
	AlCl ₃	Yellow	+
Steroids/Terpenoids	Salkowaski	Red colour	++
Glycosides	H ₂ SO ₄	Dark brown	-
	Keller Killiani	Brown ring	-
Tannins	Braemer	Dark blue	+
	Iodine	faint bluish	+
Saponins	Frothing		-

Table 3. Phytochemical analyses of *Cinnamomum cassia* bark extract. The test was based on colour intensity

- = Negative (absent), + = Positive (slightly present), ++ = Positive (moderately present)

Table 4. Phytochemical analysis of *Curcuma longa* leaves extract. The test was based on colour intensity.

Phytochemicals	Name of test	Colour observed	Colour intensity
Alkaloids	Wagner Mayer	Pale yellow Brown ppt.	+ +
Phenols/ Flavonoids	NaOH, NaOH/ H ₂ SO ₄ , AlCl ₃	Deep yellow, Colour less yellow	++ ++ +
Steroids / Terpenoids	Salkowaski	Red colour	++
Glycosides	H ₂ SO ₄ Keller Killiani	Dark Brown Brown Ring	++ +
Tannins	Braemer Iodine	Dark Blue Faint Bluish	+ +
Saponins/Starch/ Anthraquinones	Frothing		-

Negative (absent), + = Positive (slightly present), ++ = Positive (moderately present)

GC-MS Analysis:

The extract was separated by gas chromatography, Shimadzu (2010) model; GC was fixed with AB-Wax column. Gas chromatography-mass spectrometry (GC-MS) is a method that combines the features of gas-liquid chromatography and mass spectrometry to identify different substances within a test sample. It collects data in the full scan mode in the ratio of m/z. The range of mass fragments is determined and identified by using software of phytochemicals library. GC-MS analysis has been done for all the plant extracts except *Polygonum bistorta*.

Biological Screening:

Biological investigation has been done for *Salix viminalis* leaves extract on different *Candida* species. *In vitro* Antifungal activity of the test extract was studied against three fungal isolates at different concentrations 4mg/ml, 8mg/ml and 12mg/ml. As presented in Table-5, fig. 1 & 2 results shown that the test extract has significant antimicrobial activity against different tested pathogens. Increase in concentration of test extract leads to significant decrease in growth with suppressed and delayed exponential phase with respect to control (Fig.3). On solid media (filter disc assay) effective inhibition of growth of *Candida* species by test extract was found to increase in concentration dependent manner, our findings by scanning electron microscopy suggest that this potential bioactive extract has distinct influence on *Candida* cells by causing breakage in the cell membrane and leakage of intercellular material (Fig. 4B).

The extract has shown clear Anticandidal activity in both solid and liquid medium. Uncertain mechanism of action appears to originate from membrane breakage.

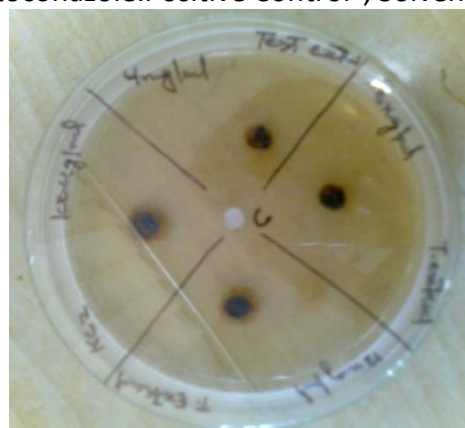
Test Extract	Zone of Inhibition (mm)		
	<i>C. guilliermondii</i>	<i>C. glabrata</i>	<i>C. parapsilosis</i>
4mg/ml	5	5	4
8mg/ml	9	7	6
12mg/ml	12	10	11
ketoconazole ^a (100µg/ml)	16	15	15
Control ^b (1%DMSO)	-	-	-

Fig. 1: Bar diagram showing comparison between antifungal activities of different test extract concentrations (*S. viminalis* leaves extract) and standard antifungal drug against (a) *Candida guilliermondii* (b) *Candida glabrata* (c) *Candida parapsilosis*

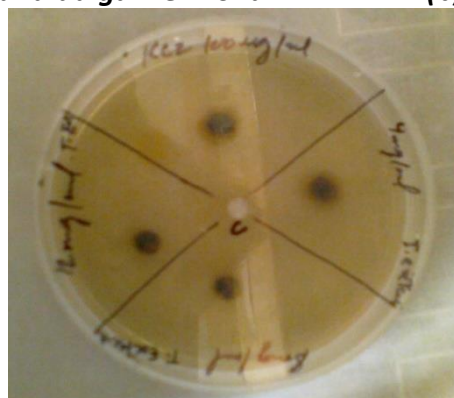
Table 5: Antifungal activity screening data for different test extract (*S. viminalis* leaves extract) concentrations and ketoconazole. Positive Control^a, Solvent Control^b



(a) *Candida guilliermondii*

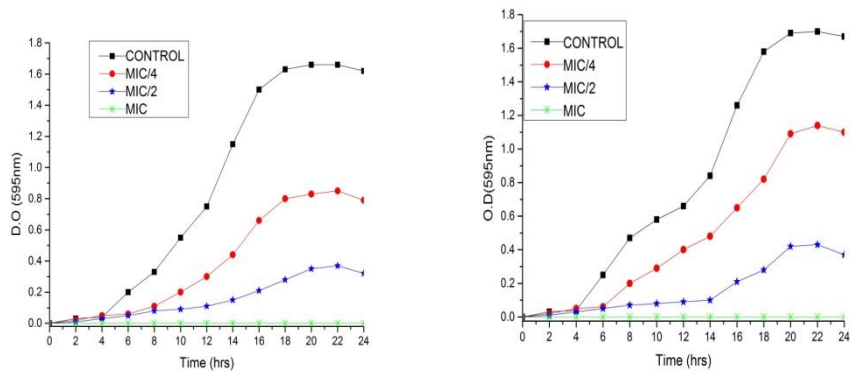


(b) *Candida glabrata*

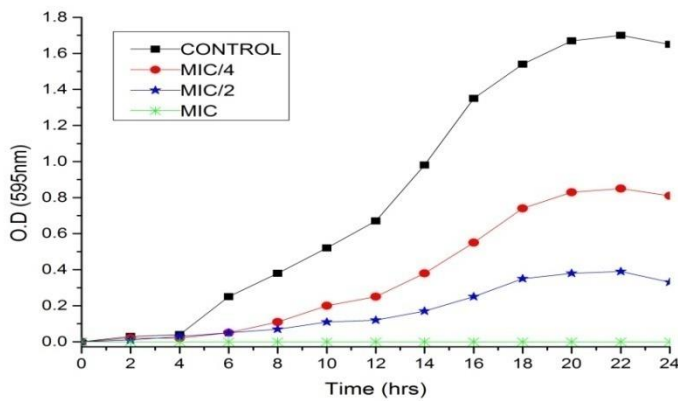


(c) *Candida parapsilosis*

Fig. 2: Photographs obtained in filter disc assay of the test extract (*S. viminalis* leaves extract) against some fungal isolates (a) *Candida guilliermondii* (b) *Candida glabrata* (c) *Candida parapsilosis*

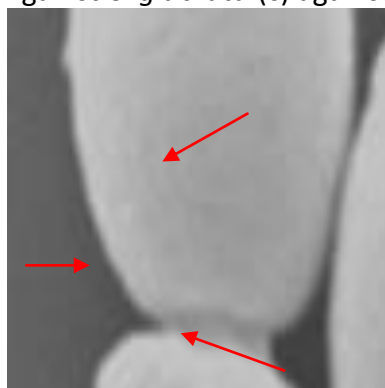


9. (a) *Candida guilliermondii* (b) *Candida glabrata*

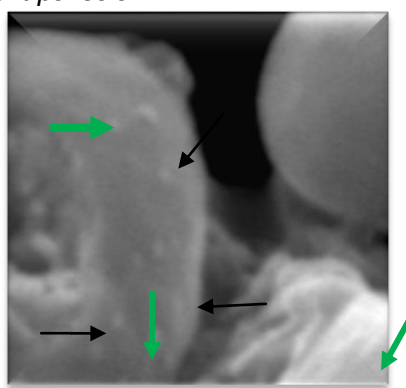


10. (c) *Candida parapsilosis*

Fig. 3: Effect of different concentrations of test extract (*S. viminalis* leaves extract) on growth of *Candida* species. Growth curve pattern against absorbance at 595nm (hrs) shows complete inhibition of growth at MIC values (a) Against *C. guilliermondii* (b) Against *C. glabrata* (c) against *C. parapsilosis*



Showing no change
Showing Intercellular Material
Coming out of the cell.



Showing breakage of cell wall

Fig. 4: Scanning electron micrographs (SEM) of *Candida glabrata* (a) Untreated control and (b) Treated with compound (*S. viminalis* leaves extract)

11. [Infrastructure created from the project:](#)

As we all know medicinal plants has played an important role since ancient times for the treatment of different kind of illnesses. Ayurveda is one of the traditional system of medicine practiced in the India subcontinent and can be traced back to 6000BC. Therefore Ayurveda medicine is largely based on herbal mineral preparation and has specific diagnostic and therapeutic principles.

This project involves five medicinal Plants viz. *Salix viminalis*, *Curcuma longa*, *Juglans regia*, *Cinnamomum cassia* and *polygonum bistorta* their phytochemical investigation and antimicrobial activity.

Candida species are ubiquitous yeasts and common residents of mucosal surfaces of the human oral cavity, the gastrointestinal and the urogenital tract. Essentially all areas of the human gastrointestinal tract can harbour *Candida*. The most commonly isolated species of yeast isolates from the human gastrointestinal tract is *Candida albicans*, followed by *C. tropicalis*, *C. parapsilosis*, *C. glabrata* and. *C. albicans* is a causal agent of opportunistic oral and genital infections in humans. So it is very interesting to check anticandidal activity of all these plants.

According to the analysis 463 human genes are changed during the infection with few type of bacteria, like *Mycobacterium tuberculosis* etc. In spite of the long and compelling history of traditional use of all these plants, study of their medical properties is still needed. A few studies has been done on some of these plants and the mode of action is not given yet, thus the objective of this project is to treat fungal and bacterial diseases in human beings. This will be beneficial for the current generation as well as future generation. The focus of this project is to provide Ayurveda medicine for the societies who are suffering from fungal and bacterial diseases and clinical uses also.

Faculty of Engineering & Technology
Department of Applied Sciences & Humanities

1. **Name of the department:** Department of Applied Sciences & Humanities
2. **Project Title:** Enhanced and tunable photoluminescence from metals doped tris (8-hydroxyquinoline) aluminum(Alq3) nanowires for optoelectronics devices
3. **PI:** Dr. Zeeshan H. Khan
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 14,61,800

Faculty of Engineering & Technology
Department of Applied Sciences & Humanities

1. **Name of the department:** Department of Applied Sciences & Humanities
2. **Project Title:** Synthesis & Characterization of nanomaterials and its applications in Purification of ground water near industrial areas
3. **PI:** Dr. Weqar Ahmad Siddiqui



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 8,85,800
7. **Duration of the Project:** 3yr
8. **Starting date of the project:** 2013 to 2016

Faculty of Engineering and Technology
Department of Electronics & Communication

1. **Name of the Department:** Department of Electronics & Communication Engineering
2. **Project Title:** Development and up gradation of VLSI and Nanoelectronics Lab in Electronics Engineering.
3. **Project Investigator:** Dr Sajad A Loan.



4. **Co-Investigator:** None
5. **Funding agency:** AICTE
6. **Amount funded :** INR 7,00,000
7. **Duration of the project:** One Year
8. **Starting date of the Project:** October, 2013- October, 2014
9. **Project objective:**

The main objective of this project is improving the quality of our research by providing the state of the art facilities to our students particularly research scholars. With this project we can develop and upgrade the existing VLSI and Nanoelectronics lab of our Department and this will be a step forward in making this lab as one of the best VLSI and Nanoelectronics design centers in India. Since the electronic technology is changing at a rapid pace, so accordingly we have to prepare ourselves to face the rapid changes of technology. The driving force for the changing electronics world is the VLSI design and nan electronics, so we need a huge manpower to have expertise in this highly advanced field. This lab has been producing a good number of chip designers and after the project the number and quality of VLSI engineers that will be produced will grow significantly. Further, nan electronics is an upcoming field and is going to revolutionize the electronics world in the future. This project will become the base of a full-fledged nan electronics research and development program in our department.

10. **A brief overview of the project:** -

11. **Infrastructure created from the project:**

We are in process of purchasing some high end computers and an advanced nan electronics and device simulator, Silvaco.

12. **Project outcome:**

Work is going on different topics of VLSI and nan electronics; we are expecting some high impact factor journal publications and patents soon.

13. **Benefit from the project to the society:**

My students are an important part of our society. This project is helping them in doing advanced research; it means it is directly helping the society. They will be ready to accept some challenging jobs and will try to address various problems electronics devices are currently facing.

Faculty of Engineering and Technology Department of Mechanical Engineering

1. **Name of the Department:** Department of Mechanical Engineering
2. **Project Title:** (SAP) Friction Stir Welding and Ultrasonically Assisted Machining.
3. **Principal Investigator:** Prof. Zahid Akhtar Khan



4. **Co Investigator:** Dr. Arshad Noor Siddique



5. **Funding Agency:** (UGC SAP)
6. **Amount Funded:** INR 33.0 Lakhs
7. **Duration of the project:** Five Years
8. **Starting Date of the Project:** October 12, 2012
9. **Project Objectives:**
 - a) To develop Friction Stir Welding (FSW) procedure for welding of different materials and alloys,
 - b) To generate knowledge on the effect of FSW parameters on the weld quantity of different similar and dissimilar base materials.
10. **A brief overview of the project:**

FSW is a fast growing area and the latest trend is to develop this technology for welding of high temperature softening materials like steel. FSW of such materials require equipment which are not readily available and are very expensive. This projects aims at developing an indigenous facility for the welding of such materials. Also knowledge sharing will be done with other academic institutions and industries regarding FSW. A high capacity vertical milling machine (VMM) would be retrofitted and developed to undertake research in the FSW of ferrous materials. After the VMM is in place work fixture design and its fabrication, tool-holder design and its fabrication, and tool design would be done. Subsequent to the tool and fixture design and fabrication instrumentation for measurement of temperature may also be done to ready the machine for research in FSW process.
11. **Infrastructure created from the Project:**

- a) A robust Vertical Milling Machine.
 - b) Work Fixture
12. **Project outcomes:** The project is in the initial stages, a lot of support work is going on in full swing. Typical machine-to-FSW tool interface has been designed and it is being fabricated. The development of fixture for various joining strategies is under progress, some of its modules have already been developed. Once the experimentation starts there exists great potential to generate knowledge resulting in quality publications.
13. **Benefits from the Project to the Society:**
- a) Indigenization of the recent technology which is otherwise highly patented.
 - b) Training and knowledge generation that can be disseminated and shared among the peer institutions.
 - c) Establishment of a hotspot in the area of FSW and Friction Stir Processing (FSP).

Faculty of Engineering and Technology Department of Mechanical Engineering

1. **Name of the Department:** Mechanical Engineering
2. **Project Title:** FIST-DST
3. **Coordinator:** Prof. Abid Haleem



4. **Deputy Coordinator:**
5. **Funding Agency:** DST
6. **Amount funded:** INR 1 Crore 32 Lakhs
7. **Duration of the project:** 5 year
8. **Starting date of the Project:** November 2013
9. **Project objectives:**

Procurement of state of the art equipment in the area of Product Design and strengthening research in the area of product design
10. **A brief overview of the project:**

Product design is an important upcoming area of engineering. This project is for developing a futuristic laboratory in the area of product design and development. In this Lab we would be experimenting with three dimensional scanning, printing, testing and analyses of new design
11. **Infrastructure created from the project:**
 - a) 3D Modelling Machine –white light scanner
 - b) Fatigue Testing Machine
 - c) 3D Printer
 - d) A CAD Lab will also be established with the state of the art software's and hardware.
12. **Project outcomes:**

Developing research and teaching infrastructure in the area of product design.
13. **Benefit from the project to the society:**

Engineers and researchers getting good exposure in product design.

Faculty of Engineering & Technology Department of Civil Engineering

1. **Name of the department:** Department of Civil Engineering
2. **Project Title:** Comprehensive Water Management Plan for HUDA Pinjore Township at Haryana
3. **PI:** Prof Gauhar Mehmood



4. **Co-PI:** Nil
5. **Funding Agency:** HUDA
6. **Amount funded:** INR. 17,20,000
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** --
9. **Project objective:**

The objective of the project is to inculcate the ideas for the water resource development through government and public participation using latest state of art like concentric ring circle.

10. **A brief overview:** The rainwater harvesting master plan has been developed for HUDA pinjore area to retain the water level because the groundwater level has acquired a declining trend beyond control. The project gives emphasis on the recharge of groundwater resources for every land use, like roof top to open space

Zoning has been done for the study area and a master plan has been developed for HUDA Pinjore. area 26 structures have been suggested out of which 6 structures have been installed rest are in process.

Once it is completed the impact on water level will be investigated for research purpose.

11. **Infrastructure created from the Project:** The research in the field of rainwater harvesting has got the difficulties like execution and implementation due to lack of fund and space this project will be used as field laboratory for the impact assessment of rainwater harvesting on the quality and quantity of groundwater with its relation to ecology, biodiversity, construction and Human health, this sort of infrastructure is not available to other universities in India including IIT where there is a sandwich between university and executing authority like municipal corporation Gurgaon.

12. **Project outcome:** --

13. **Benefit from the Project:**

Water is a basic requirement for human beings and this project directly addresses to water resource development , conservation and overall improvement of environment which is basically related to development of society in a better way.

Faculty of Engineering & Technology Department of Civil Engineering

1. **Name of the department:** Department of Civil Engineering
2. **Project Title:** Comprehensive Water Management Plan for Amg plants -Pt, PT Plant & Component Plant. Job includes Requirement of Water for various purposes Vs Availability from the Ground water resources, rain water Harvesting & recycling with reuse align with various development & Conservation Policy
3. **PI:** Prof Gauhar Mehmood



4. **Co-PI:** Nil
5. **Funding Agency:** M/s Escorts Ltd Faridabad
6. **Amount funded:** INR. 7,20,000
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** --
9. **Project Objectives:**

The objective of the project is to inculcate the ideas for the water resource development through government and public participation using latest state of art like concentric ring circle.

10. **A brief overview:**

The rainwater harvesting master plan has been developed for HUDA Pinjore area to retain the water level because the groundwater level has acquired a declining trend beyond control. The project gives emphasis on the recharge of groundwater resources for every land use, like roof top to open space

Zoning has been done for the study area and a master plan has been developed for HUDA Pinjore area 26 structures have been suggested out of which 6 structures have been installed rest are in process.

Once it is completed the impact on water level will be investigated for research purpose.

11. **Infrastructure created from the Project:**

The research in the field of rainwater harvesting has got the difficulties like execution and implementation due to lack of fund and space this project will be used as field laboratory for the impact assessment of rainwater harvesting on the quality

and quantity of b groundwater with its relation to ecology, biodiversity ,construction and Human health, this sort of infrastructure is not available to other universities in India including IIT where there is a sandwich between university and executing authority like municipal corporation Gurgaon.

Faculty of Engineering & Technology Department of Civil Engineering

1. **Name of the department:** Department of Civil Engineering
2. **Project Title:** Feasibility and Design of rainwater Harvesting Master Plan of Municipal Corporation Gurgaon
3. **PI:** Prof. Gauhar Mehmood



4. **Co-PI:** Nil
5. **Funding Agency:** Municipal Corporation of Gurgaon
6. **Amount funded:** 19,90,000
7. **Duration of the Project:** 3yr
8. **Starting date of the Project:** --
9. **Project Objective:**

The objective of the project is to inculcate the ideas for the water resource development through government and public participation using latest state of art like concentric ring circle.

10. **A brief Overview:**

The rainwater harvesting master plan has been developed for MCG Gurgaon area to retain the water level because the groundwater level has acquired a declining trend beyond control. The project gives emphasis on the recharge of groundwater resources for every land use, like roof top to open space

Zoning has been done for the study area and a master plan has been developed for M.C.G. area 265 structures have been suggested out of which 84 structures have been installed rest are in process. Once it is completed the impact on water level will be investigated for research purpose

11. **Infrastructure created from the Project:**

The research in the field of rainwater harvesting has got the difficulties like execution and implementation due to lack of fund and space this project will be used as field laboratory for the impact assessment of rainwater harvesting on the quality and quantity of groundwater with its relation to ecology, biodiversity, construction and Human health, this sort of infrastructure is not available to other universities in India including IIT where there is a sandwich between university and executing authority like municipal corporation Gurgaon.

12. **Project outcome:** --

13. **Benefit from the Project to the Society:**

Water is a basic requirement for human beings and this project directly addresses to water resource development, conservation and overall improvement of environment which is basically related to development of society in a better way.

Faculty of Engineering & Technology Department of Civil Engineering

1. **Name of the Department:** Department of Civil Engineering
2. **Project Title:** Fund for Improvement of S & T Infrastructure in universities & higher educational institutions (FIST)
3. **PI:** Prof. Sirajuddin Ahmed



4. **Co-PI:** Nil
5. **Funding Agency:** DST
6. **Amount funded:** INR. 77,00,000.
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** November, 2010
9. **Project objectives:-**
 - To develop research infrastructure in the field of Environmental Engineering and Sciences
 - To procure state of the art equipment in the area of environmental quality quantification

10. A brief overview:

Quantification contaminants and pollutants in water, air and soil is utmost important for assessment of its source and possible impact on human and its environment. This funding is for development of futuristic laboratory in the area of environmental quality analysis

11. Infrastructure created from the project:

- a) Gas chromatography–mass spectrometry (GC-MS): is an analytical method that combines the features of gas-liquid chromatography and mass spectrometry to identify different substances within a test sample. Applications of GC-MS include drug detection, fire investigation, environmental analysis, explosives investigation, and identification of unknown samples. GC-MS can also be used in airport security to detect substances in luggage or on human beings. Additionally, it can identify trace elements in materials that were previously thought to have disintegrated beyond identification.
- b) Atomic absorption spectroscopy (AAS) It is a spectro analytical procedure for the quantitative determination of chemical elements using the absorption of optical

radiation (light) by free atoms in the gaseous state. In analytical chemistry the technique is used for determining the concentration of a particular element (the analyte) in a sample to be analyzed. AAS can be used to determine over 70 different elements in solution or directly in solid samples used in pharmacology, biophysics and toxicology research.

12. **Project outcomes:**

- a) Developing infrastructure for research in Environmental and Contamination Engineering
- b) PhD scholars already enrolled on contamination assessment related research work.
- c) Infrastructure developed will provide a platform and facilitate for interdisciplinary reassert in the university.

13. **Benefits from the project to the society:**

The infrastructure developed from this funding by the DST will provide research facility in the area of Environmental Engineering and contamination. The facility will help in monitoring the level of pollution and contamination in water, air, soil, raw food and plants etc. Such studies may have direct consequence on forming regulation, & standards and also drafting government policies public health.

Faculty of Engineering & Technology Department of Civil Engineering

1. **Name of the Department:** Department of Civil Engineering
2. **Project Title:** Pilot Plant Design and Performance Evaluation of Sub Surface RZTS for secondary Treatment of Effluent from Steel Industry
3. **PI:** Prof. Sirajuddin Ahmed



4. **Co-PI:** NA
5. **Funding Agency:** Research and development Centre for Iron & Steel, Ranchi (SAIL)
6. **Amount Funded:** INR. 9,00,000.
7. **Duration of the Project:** 5yr
8. **Starting date of the project:** 2010
9. **Projective objective:**

The objective of the project is to construct pilot scale constructed wetland to create facility to evaluate the performance of Root Zone Treatment System (RZTS) on industrial effluent. The pilot plant was established to generate the scientific and technical data regarding the performance of RZTS for treatment of effluent from steel plants.

10. **A brief overview:**

The objective of the project is to construct pilot scale constructed wetland to create facility to evaluate the performance of Root Zone Treatment System (RZTS) on industrial effluent. The pilot plant was established to generate the scientific and technical data regarding the performance of RZTS for treatment of effluent from steel plants. The study included detailed literature review of the subject and provides technical guidance in designing of root zone treatment system. The study simultaneously required supervision and guidance in the installation, stabilization and operation and maintenance of RZTS.

11. **Infrastructure created from the project:**

- a) Consumables for laboratory

12. **Project outcomes:**

- a) Assessment of performance of RZTS on industrial effluent.

- b) Characterization of waste water generated by steel industry.
- c) Performance evaluation of RZTS on meeting discharge standards of steel industry.
- d) Already two M. Tech dissertation completed and one Ph.D. Thesis is under progress
- e) Two papers already published

13. **Benefits from the project to the society:**

The pilot plant will promote R & D activities on Root Zone Treatment System in treating steel industry effluent at tertiary level. There are possibility of saving huge quantity of water as the treated effluent can be reused for high volume and low value consumption.

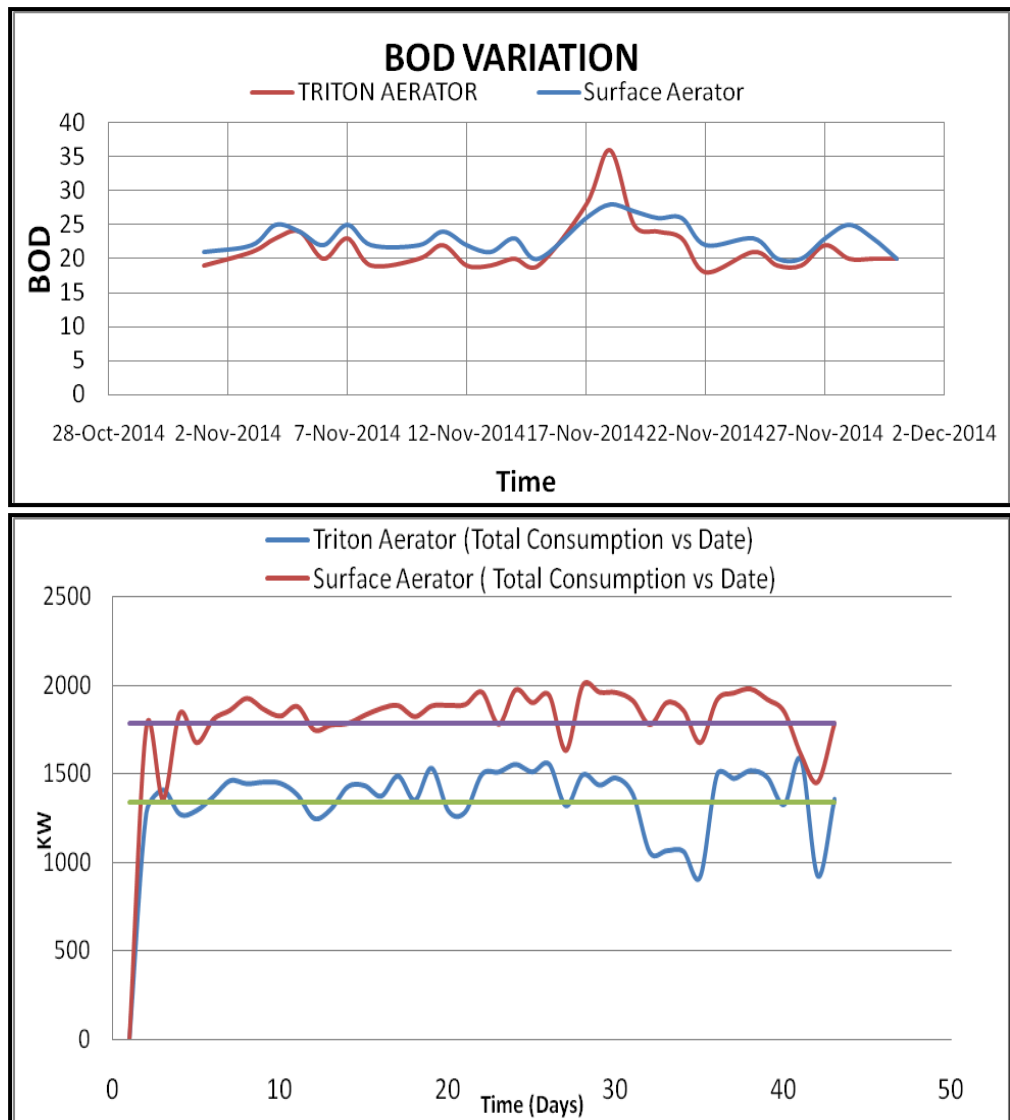
Faculty of Engineering & Technology Department of Civil Engineering

1. **Name of the Department:** Department of Civil Engineering
2. **Project Title:** Comparative performance analysis of triton and surface aerator for sewage treatment by activated sludge process at Yamuna Vihar STP-I, New Delhi
3. **PI:** Prof. Sirajuddin Ahmed



4. **Co-PI:** Nil
5. **Funding agency:** EUROTEK Environmental Pvt Ltd, E-51, F –Road, Manjusar GIDC, Savli, Vadodra 391 775 Gujrat
6. **Amount funded:** INR. 1,25,000.
7. **Duration of the project:** 6m
8. **Starting date of the Project:** November, 2014
9. **Project objective:**
 - Performance analysis study of TRITON aspiration aeration system in comparison to conventional surface aerator for aeration under activated sludge process.
 - Analysis of merits and demerits of TRITON aspiration aeration system
10. **A brief overview:**

The study was undertaken to evaluate the performance of TRITON aspiration aeration system in comparison to conventional surface aerator for aeration under activated sludge process. Merits and demerits of TRITON aspiration aeration system was evaluated by analyzing the inlet and outlet level of BOD, COD and NH₃ along with the power consumption in comparison to conventional surface aerators.
11. **Infratructure created from the project:** Consumables for laboratory
12. **Project outcome:**
 - Effectiveness of TRITON aspiration aeration system was evaluated in comparison to conventional surface aerator system under activated sludge process.
 - Efficiency of Triton Aerator system was found to be little high in comparison to surface aerator system; though it was not significant



- One M. Tech Thesis is under progress
- One research paper is being prepared for possible publication

13. **Benefit from the Project to the society :**

The performance data of these aerators will be useful for guiding policy makers for selecting energy efficient aerators for sewage treatment plant using Activated Sludge process.

MMAJ Academy of International Studies

1. **Name of the department:** MMAJ Academy of International Studies
2. **Project Title:** A multi-dimensional Study of Imperial Order and Its Journey towards Neoliberal Imperialism Under Globalization
3. **PI:** Prof Sunanda Sen
4. **Co-PI:** Prof Anjan Chakrabarty (Calcutta University); Prof Byasdeb Dasgupta (Kalyani University, West Bengal); Dr Satyaki Roy (Institute of Industrial Studies, New Delhi) Prof Surajit Majumdar (CESP, JNU, New Delhi); Prof Shri Prakash (AIS, JMI)
5. **Funding Agency:** ICSSR
6. **Amount funded:** INR. 4,28,500
7. **Duration of the Project:** Initially 2 years and later extended by 1 more year
8. **Starting & Completion date of Project:** 21/06/2012 to 07/03/2015
9. **Project Objectives:** To study the pattern colonial and contemporary issues relating to capitalism, finance and labour. Research output include detailed studies on each with publishable papers and monographs, to be presented in the international conference , on February 9th and 10th of 2015
10. **A brief overview of the project:**
The completed work include the following: (1) Indentured Labour and the Age of Empire; (2) Labour Flexibility in India and Labour Market Reforms (3) Financialisation and Corporate Investments; (4) Theories of Imperialism;(5) The World of the Third;(6) Changing Pattern of Textile Industry in India
11. **Infrastructure created from project:**
Installed a computer and a laser printer in AIS. In addition collected data set (on line) from Prowess (CMIE) and other sources
12. **Project Outcomes:**

International Conference in Delhi	9-10 th February 2015
Interim Workshops (internal) Kolkata Delhi and Delhi	July 2014; September 2014
Participation in conferences	February 2014 (Boston University); June 2014 (Rome University) June 2014 (Cambridge University UK)
Publications (articles) Sunanda Sen	Review of Keynesian Economics (January 2014); Boston University GEGI (October 2014)

Publication (Books) Sunanda Sen	(i) Dominant Finance and Stagnant Economies (OUP 2014) (ii) Development on Trial (Orient Black Swan 2014)
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Research likely to be useful and relevant for policy making in the country

MMAJ Academy of International Studies

1. **Name of the department:** MMAJ Academy of International Studies
2. **Project Title:** Under the Scheme of Area Studies Programme
3. **PI:** Director MMAJ Academy
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 32,00,000
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** 2011 to 2016

MMAJ Academy of International Studies

1. **Name of the department:** MMAJ Academy of International Studies
2. **Project Title:** Under the Scheme of Area Studies Programme
3. **PI:** Director MMAJ Academy
4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funded:** INR. 55,00,000
7. **Duration of the Project:** 5yr
8. **Starting date of the Project:** 2011 to 2016

MMAJ Academy of International Studies

1. **Name of the Centre:** MMAJ Academy of International Studies
2. **Project Title:** India-Africa Relations: Implications for China
3. **PI:** Dr. Bijay Ketan Pratihari, Assistant Professor, Academy of International Studies (AIS)
4. **Co-PI:** Nil
5. **Funding Agency:** Indian Council for Social Science Research (ICSSR)
6. **Amount funded:** INR. 3,60,125
7. **Duration of the Project:** Initially for two years but extended till now.
8. **Starting date of the Project:** 1/3/2010.
9. **Project objectives:**
The aim of the project is to evaluate India and Africa relations and its implications for China under globalisation
10. **A brief overview:**
India and Africa enjoy a long standing historical relationship. Contacts and trade between India's western part and Africa's eastern part has been going on for centuries. The recent India-Africa Forum Summit in April 2008 emphasized India's competitive edge over traditional European and new Asian powers in the recent race to engage Africa. The new rush to Africa is not just for its economic resources but also for its growing political importance. India claims its advantage from its old and shared relationship with African countries. This relationship is multi dimensional and grew by accommodating the sensitivities and interests of each other. The key to understand India's Africa policy is to understand its engagements with African countries under the globalisation and vis-à-vis traditional powers and new Asian competitors.

Historically speaking, in the pre-colonial period Indian traders were present in the eastern coast of Africa. The common subjugation of India and Africa to colonial rule gave common experiences and legacies. It also led to massive movement of Indian indentured workers to various African territories to replace slave workers. Resistance and fight against colonial and racial domination brought them together. In this regard Gandhiji's contribution is immense. After India's independence decolonization and anti-racialism became the key rallying point for India and Africa.

During 1960s India restructured its policies towards Africa. It started new policies under ITEC, South-South cooperation and collective self-reliance. Through these policies India again regained its lost ground in Africa. In this process, India realized that Africa is diverse. It is a continent and cannot be treated like one country. In the 1980s it became selective engagements with African states and issues. In the post-

cold war period, there was a growing perception that Africa was being neglected and marginalized both politically and economically. There is a feeling that they are now of little strategic importance to the big powers in the post-cold war period.

During the cold war period India's foreign policy was more inward looking due to the regional and domestic pressure. However due to the economic liberalization in the 1990s, India give more emphasis to trade and economic relationship with new countries especially African countries. This is mainly due to the oil and other strategic minerals required for the rapid economic growth of India.

Research Questions

- ❖ The historical goodwill and cultural relations are strong enough to give India a competitive edge in Africa.
- ❖ India would have taken some aggressive proactive policies towards Africa if China factor was not there.
- ❖ Is China just the latest in a line of exploiters of Africa's rich mineral resources who put their own economic interests above humanitarian, environmental or human rights concerns?
- ❖ Is China's engagement with Africa an extension of south-south solidarity?
- ❖ Does China's involvement enable African countries to free themselves from the tyranny of debt and conditionality of structural adjustment programmes?
- ❖ Is Africa swapping one tyranny for another?

13. [Benefits from the Project to the Society:](#)

This study will propose various policy measures to improve the relationship with African countries under globalisation. Instead of following China, India should have a definite policy approach to deal with African countries under the changing global situation. We have a longstanding relationship with African countries. This advantage many countries do not have. The outcome of the findings will benefit, academicians, research scholars, journalists, students and other stake holders.

MMAJ Academy of International Studies

1. **Name of the department:** MMAJ Academy of International Studies
2. **Project Title:** US Policy towards Pakistan After Cold War Era
3. **PI:** Dr. Kuldeep Kumar
4. **Co-PI:** Nil
5. **Funding Agency:** ICSSR
6. **Amount funded:** 28,000/ (Per Month)
7. **Duration of the Project:** 2yr
8. **Starting date of the Project:** April 2012 -2014
9. **Objective of the Project:** Objective of the project is to look out the US Pakistan relations after Cold War Era in mean time to see the relations on nuclear issue, Afghan issue Terrorism etc.
10. **A brief overview:**

In the project it highlighted from historical background of US- Pakistan in various regimes of Pakistan. Point out through various Chapters (Total V) that I completed.

2. In the Project, it also highlighted nuclear issue: In Nuclear relations how Pakistan and the United States diplomatically moved their steps for their own benefits. Another major factor and terrorism that may basic need to work with each other and transportation of the same.

India Arab Cultural Centre

1. **Name of the Centre:** India Arab Cultural Centre
2. **Project Title:** Investment in the Indian Ocean Rim Countries: Implications for India's Energy Security"
3. **Principal Investigator:** Dr Sameena Hameed
4. **Funding Agency:** ICSSR
6. **Amount funded:** INR 4, 96,650
7. **Duration of the project:** 2 years
8. **Starting date of the Project:** April 15, 2012
9. **Project objectives:**

The project aims to examine the energy resources of the countries in the Northern Indian Ocean rim countries. It aims to examine the trade and investment scenario of the countries under study. It also aims to examine India trade and investment relation with these countries as well as emerging business opportunities in this region. It aims to examine the potential of India's energy sector to meet its domestic energy consumption. It also aim to examine the extent to which India can leverage its best practices, technology in the energy sector in general and renewal energy in particular to establish clean energy strategic partnership with the energy rich countries of the region for its energy security.
10. **A brief overview of the project:**

India's trade and investment in the region has significantly improved over the years but are far from its potential. It has already invested in the power plants in South Asian countries and have started cross border power trade. From the perspective of its energy security, it needs to leverage its expertise in renewable energy and energy efficient green buildings like Bangladesh, Bhutan, and Myanmar to be able to get investment opportunities in generate more exportable surplus of oil and gas in the region. The energy resource rich countries of the region also face domestic energy security concerns as their economies expand. They need resources and technical expertise to exploit renewable sources of energy in order to generate more exportable surplus of oil and gas. India can sign a clean energy partnership with the counties of the region and have collaborative research and higher educational curriculum to prepare a cadre of experts specializing in green building materials, recycling process and renewable energy equipment and services.
11. **Infrastructure created from the project:** N/A
12. **Project outcomes:** The report will be compiled after completion of the project
13. **Benefit from the project to the society:** It would help in policy making by giving detailed information of the energy resource base in the Northern Indian Ocean Rim Countries. It provide insights into India's existing trade matrix with the countries in the region and its relative position vis a vis its competitors.

It gives information of investment policies, opportunities in the region and strategies for India to increase its economic presence and influence in region to establish a strategic partnership with the energy rich countries of the region.

14. [Any other information you may think is important in this regard](#): It helps to document India's best practices, patents and technology in energy sector.

Dr. K. R. Narayanan Centre for Dalit & Minorities Studies

1. **Name of the Centre:** Dr. K. R. Narayanan Centre for Dalit & Minorities Studies
2. **Project Title:** A Study of Select Indian Awqaf in terms of Empowerment and Inclusion of the Marginalised Muslims Prospects and Problems
3. **PI:** Prof. Mujtaba Khan



4. **Co-PI:** Nil
5. **Funding Agency:** ICSSR
6. **Amount funded:** INR.15,00,000.
7. **Duration of the Project:** 18 months
8. **Starting date of the project:** June-2014 to December-2015

AJK Mass Communication Research Centre

1. **Name of the Centre:** Anwar Jamal Kidwai Mass Communication Research Centre
2. **Project Title:** National Mission on Education through Information Communication and Technology (NME-ICT). Development of E-content multimedia material for undergraduate courses
3. **Principal Investigator:** Director, AJK MCRC, JMI
4. **Co-Investigator:** Nil
5. **Funding Agency:** UGC-CEC
6. **Amount funding:** INR 69,00,000/-
7. **Duration of the Project:** Ongoing Project
8. **Starting date of the Project:** Phase-1 started in the year 2010
Phase-2 started in the year 2013
9. **Project objectives:**
 - a) Promote generation of e-Content in all subjects;
 - b) Develop teachers and experts resources in e-content creation;
 - c) Make available the e-content to teachers and students through various delivery modes for formal and non-formal education, for supplementing and complementing the process of teaching and learning in higher education;
 - d) Develop partnerships between educational institutions and the IT industry for the continuous development of new content and methodology taking into account contemporary technology.
10. **A brief overview of the project:**

Innovation in teaching and learning through the use of ICT, for mass education. The specific areas are creation of courseware e-content, for undergraduate & Post graduate subjects
11. **Infrastructure created from the project:** Computer Peripherals.
12. **Project outcomes:** Produced E-content multimedia video lectures for undergraduate courses taught at university and college level
13. **Benefits from the project to the society:**
 - a) E-content multimedia video lecture developed in the following subject:
 - b) B.A. Communication and Journalism (Phase-1)
 - c) A Hon's Hindi Journalism (Phase-2)
 - d) B. Sc Life sciences
 - e) B.A Business studies
 - f) B.A Fine Arts

FTK-Centre for Information Technology

1. **Name of the department:** FTK-Centre for Information Technology
2. **Project Title:** Student Mobility Project.
3. **PI:** Dr. S. K Naqvi



4. **Co-PI:** Nil
5. **Funding Agency:** UGC
6. **Amount funding:** INR. 40,00,000
7. **Duration of the Project:** Ongoing
8. **Starting date of the Project:** 2012
9. **Project objectives:**

At the inaugural Australia India Education Council (AIEC) meeting in New Delhi on 1 August 2011, enhancing student mobility was identified as a key priority area for the Council. Consequently, this project to develop a database of credit arrangements in place between Indian and Australian universities was initiated.

Hence the Australia India Credit Transfer Database was designed for Indian and Australian college and university students to discover which programs and subjects they can undertake overseas (in Australia or India) that should give them credit in their home country.

10. **A brief overview:**

In April 2010, the Education Ministers of the Commonwealth of Australia and the Republic of India agreed to the establishment of the Australia India Education Council (AIEC) to expand collaboration in education, training and research.

The AIEC is a bi-national body with representation from academia, policy makers and industry which aims to set the strategic direction of the bilateral education, training and research partnership and to develop strategic advice to focus and shape collaborative efforts.

11. **Infrastructure created from the project:** Nil
12. **Project outcomes:** Now we are trying to get the data related to Indian Universities which are having Credit Transfer arrangements with Australian Universities for the Australian Students. After getting the required information we will enter it into the database.
13. **Benefits from the project to the society:**
Student mobility and welfare

- Quality assurance and qualifications recognition
- Skills agenda
- Higher education and research

FTK-Centre for Information Technology

1. **Name of the department:** FTK-Centre for Information Technology
2. **Project Title:** EdRP Mission Projects
3. **PI:** Dr. S. K Naqvi



4. **Co-PI:** Prof. Zahid Hussain Khan &



Dr. Muzaffar Azim



5. **Funding Agency:** Ministry of Human Resource Development, Government of India
6. **Amount funding:** INR. 28,50,000
7. **Duration of the Project:** Ongoing
8. **Starting date of the Project:** 2010
9. **Project objectives:**

The objective of this module is to provide users an on-line system to accomplish various purchase related activities prevalent in the Institutes and Research Organizations. The Purchase and Inventory Control System (PICO) is a sub-system of the University-ERP System being developed under the EdRPMission Project of MHRD. The PICO system will encompass all of facilities required to acquire nonconsumable and consumable items, manage their inventory and write-off them as and when required.

The system will also offer facilities to manage the associated purchase and maintenance contracts.
10. **A brief overview:**

The ERP Mission project has been sanctioned by the National Mission on Education through ICT (NMEICT), MHRD with the objective of developing an Open Source ERP

System for Universities and other educational institutions. The collaborative project is lead by IIT Kanpur with the other teams being Aligarh Muslim University, Dayalbagh Educational Institute, IGNOU, Jamia Millia Islamia, etc. Under the leadership of IIT Kanpur, each partner institution is actively engaged in developing of modules using Open Source tools.

11. [Infrastructure created from the project](#): Nil

12. [Project outcomes](#):

ERP Mission Modules

- Course management
- Student record, profiles
- Grant management
- Faculty expertise database
- Online exams, OMR
- Online Admissions
- Project management
- Time Table management
- Payroll and Tax management
- Purchase & Inventory Control (PICO)
- Library management
- Brihaspati General Accounting System (BGAS)

13. [Benefits from the project to the society](#):

The development phase of the PICO module is almost complete and now it is in testing phase. Currently we are working on to integrate it with BGAS (Brihaspati General Accounting System), which is also a module of EdRP Mission Project being developed by IIT Kanpur. Also we are looking to implement it in any institute/university as suggested by PRSG.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** Mapping Early Childhood Development Service Provision in Selected districts of Andhra Pradesh and Tamil Nadu.
3. **Principal Investigators:** Prof. Zubair Meenai, Director, Jamia Millia Islamia and Prof. Rekha Sharma Sen, Chair Professor
4. **Team Members:**
 - a) Dr. Renu Singh, Visiting Professor, Young Lives
 - b) Dr. Saba Firdos, Research Assistant
 - c) Ms. Seema Naaz, Research Assistant
 - d) Ms. Sufia Azmat, Assistant Professor
 - e) Dr. Neelima Chopra, Assistant professor
 - f) Ms. Prachi Vashishtha, Assistant professor
 - g) Dr. Nimisha Kumar, Assistant professor
5. **Funding Agency:** Save the Children
6. **Amount funded:** INR 40, 76,000
7. **Duration of the project:** 14 months
8. **Starting date of the Project:** From- February 2013. Completion date: March 2014
9. **Project objectives:**
 - a) To map the ECD services for children and families of young children in identified communities
 - b) To determine awareness about services, patterns of access to services as influenced by religion, caste, class and gender as well as extent and nature of utilization of services
 - c) To identify issues, including barriers, in the access and utilization of services by the families including their level of satisfaction with the services available
 - d) To explore providers' assessment of ECD services and their perception of congruence between their training and actual service delivery
 - e) To ascertain systemic gaps in service delivery of ECD services
10. **A brief overview of the Project:**

The early years of life are crucial for lifelong development. Provision of Early Childhood Development (ECD) services in the community can go a long way in compensating for the gaps in the family. Presently, provisioning for ECD is by the government, the private sector and the NGO sector. Utilization of ECD services is influenced by gender, as well as class and caste profile of the families. Provisioning of ECD services needs to be looked at along with quality. While the 'hard ware' aspects (the state of the building, the variety of services, the teacher-child ratio) of quality are easily measurable, the quality aspects of 'software' (pedagogical strategies, counseling and guidance for health and nutrition) are difficult to capture. Correlating child outcomes, specifically school readiness, health status and nutritional status, with provisioning, access and patterns of use of ECD services can help to reveal differences across communities in child development and the gaps and strengths in programming, facilities and services within each community. This can help to place communities/ children along a continuum from least to most vulnerable, yielding multiple maps of

the community. This baseline data can then be used to work towards meeting the needs of young children and their families. Thus the study will in terms of ECD provisioning, class and caste profile on one hand and early childhood development indicators specifically school readiness, health status and nutritional status on the other.

With this rationale, a study is to be conducted in two phases.

Phase 1 (presently ongoing) will focus on

- a) Identifying ECD service provision
- b) determining access and utilization
- c) assessing community's perception of the services available

Phase 2 to be undertaken after completion of Phase 1 will focus on quality dimensions of services

11. **Infrastructure created from the project:** N/A

12. **Project outcomes:**

- a) Research reports of the two states,
- b) Conference
- c) Articles

13. **Benefit from the project to the society:**

The findings of the study will provide data to the Departments of Women and Child Development in the states to review the extent and quality of service provision to young children and take steps towards enhancing provision, access and quality. Data about the extent of presence of NGO and private sector and the quality of their service provision can be used to stimulate their increased presence with quality service provision.

14. **Any other information you may think is important in this regard:**

The study is being carried out with the collaboration of Avinashilingam University, Coimbatore and Sri Padmavati Mahila Vishwa Vidyalayam, Tirupati.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** Evaluating Efficiency of Intervention with Mothers through Changes in parenting practices, community's attitudes towards children and children's health and nutrition indicators in Selected Districts in Odisha, India.
3. **Principal Investigator:** Prof. Zubair Meenai, Director, Jamia Millia Islamia, and Prof. Rekha Sharma Sen, Chair Professor

4. **Co-PI:**

Research Assistants

Review of Literature, Tool development

- a) Dr. Saba Firdos, Research Assistant
- b) Ms. Seema Naaz, Research Assistant

Other team Members

Tool development

- a) Ms. Sufia Azmat, Assistant Professor
- b) Dr. Neelima Chopra, Assistant professor
- c) Dr. Nimisha Kumar, Assistant professor

Training of Research Investigators

- a) Ms. Sufia Azmat, Assistant Professor,
- b) Ms. Prachi Vashishtha, Assistant professor

Advisory Support

- a) Dr. Renu Singh, Visiting Professor, Young Lives, New Delhi

5. **Funding Agency:** Hands to Hearts International ("HHI"), a non-profit, non-governmental organization, USA.
6. **Amount funded:** INR 31, 75,000
7. **Duration of the project:** 17 months
8. **Starting date of the Project:** January 1, 2013 Completion date: May, 2014
9. **Project objectives:**

The present research project is an ex post facto research with causal-comparative research design with one experimental and one control group which aims to investigate the effects of intervention for mothers aimed at enhancing their understanding of child development and improving parenting practices leading to healthy child development such as strengthened love, attachment and bonding between mothers and improved child outcomes related to health and nutrition.

10. A **brief overview of the project:**

Hands to Hearts International (HHI) is an international organization which carries out a variety of training interventions for primary caregivers (mainly mothers and grandmothers) in selected districts in Odisha, India. The districts, predominantly rural and agrarian, are Angul, Puri, Deogarh, Dhenkanal and Sonepur. The training is delivered by their local implementing partner, Viswa Yuva Kendra (VYK).

The following are the objectives of the study which aimed to assess the efficiency of intervention:

- A. To study the changes in parenting practices along the following dimensions:
 - a) Parent initiated talk, play and songs

- b) Use of appropriate language and tone
 - c) Responsiveness to child's playfulness and exploratory behaviour; child's questions; mutual engagement in child's play activity
 - d) Massage techniques
 - e) Responsiveness to baby cues and child's emotions
 - f) Nutrition and hygiene practices when feeding children and during daily care routines
- B. To measure the short term and long term gains in knowledge of mothers across child development domains.
 - C. To assess the impact of mothers' changed hygiene and nutrition practices on children's health and nutritional status;
 - D. To examine the extent and nature of fathers' involvement in child rearing
 - E. To determine the impact of training on reduction of parenting stress for mothers.
 - F. To investigate the ripple effect of training manifested as positive changes in community's attitudes towards children and child rearing practices
11. **Infrastructure created from the project:** N/A.
12. **Project outcomes:**
 Research report, Article In peer reviewed journals. Workshops and training implemented by HHI for its partner VYK on the basis of report of the study.
13. **Benefit from the project to the society:**
 The findings from the research study will enable the HHI to take a critical look at their training programme and identify ways of strengthening it and improving its quality. There is evidence that a strong and supportive caregiving relationship supports the development of a child who is physically, intellectually and socially healthy, and more resilient to the damaging effects of poverty and violence. Evidence suggests that early child development can be improved through interventions such as parenting support, with effects greater for programmes of higher quality and for the most vulnerable children.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** The Uttarakhand Disaster and Lives of Young Children & Pregnant Lactating Mothers: An exploratory Study of Impact, Coping and Interventions
3. **Principal Investigator:** Prof. Zubair Meenai, Director, Jamia Millia Islamia.
4. **Co-Investigators:**
 - a) Dr. Nimisha Kumar, Assistant professor, Jamia Millia Islamia
 - b) Ms. Prachi vashishtha, Assistant professor, Jamia Millia Islamia
 - c) Ms. Sufia Azmat, Assistant Professor, Jamia Millia Islamia
5. **Funding Agency:** Indian council for Social Science Research (ICSSR)
6. **Amount funded:** INR 37, 24875.
7. **Duration of the project:** 24 months
8. **Starting date of the Project:** February 3, 2014- February 3, 2016
9. **Project objectives:**

The aim of the proposed study is to explore the social and psychological impact of the Uttarakhand disaster, survey the ongoing interventions as well as evaluate the coping and resilience among young children and mothers after the recent Uttarakhand floods with a view to:

- (a) Developing a module of early learning relevant to disaster preparedness to be incorporated in ECE and Anganwadi Centres; and
- (b) To delineate areas of concern pertaining to social and psychological impact of disaster and to suggest possible implications for policy development specifically for the disaster prone areas in the country.

10. **A brief overview of the project:**

It has been acknowledged that India has been traditionally vulnerable to natural disaster on account of its unique geo-climatic conditions. Recent major such disasters were Andhra Pradesh Cyclone (1996), Jabalpur Earthquake (1997), Super Cyclone in Orissa (1999), Gujarat Earthquake (2001) , Tsunami in Tamil Nadu(2004) and Uttarakhand Floods (2013). This shows that Natural disasters are a reality in contemporary times. The worst affected in disasters in any country are the marginalized sections (poor, elderly, women and children) of the society because of their already marginalised status, vulnerabilities to losses, lack of access to resources and their diminished ability to recover from set-back. There is a dearth of research on impact assessment of disasters on the weaker and vulnerable sections in disaster prone areas. The criticality of early years is globally acknowledged and India has the highest population of children in the age-group of 0-6years with the implication that focus of relief and interventions should be directed towards young children and mothers. Education and health infrastructure suffer serious harm during a disaster and pose a major hindrance to a sense of normalcy. Recovery and resumption of essential infrastructure and services for women and children is usually hindered due to lack of funds and gaps in the policy framework. The situation thereby demands that early intervention should focus on developing disaster preparedness, psychological hardiness and social inclusion in relief and rehabilitation work as well as developing relevant policy measures. Bronfenbrenner's Ecological systems approach (1974, 1976)

views the child as developing within a complex system of relationships affected by multiple levels of the surrounding environment, from immediate settings of family and school to broad cultural values and programs. The child is at the centre of this model. The model acknowledges that a child affects as well is affected by the settings in which she spends time. The model provides a theoretical framework for the study as it acknowledges that a child affects as well is affected by the settings in which she spends time.

11. **Infrastructure created from the project:** N/A

12. **Project outcomes:**

This research project is in its initial phase and so its early produce outcomes.

13. **Benefit from the project to the society:**

- a) This study will have policy implications and can contribute to the policies in the area of early childhood care and education, maternal health and disaster management
- b) The study will contribute to the development of a conceptual model of resilience and coping for young children, pregnant and lactating women with a special focus in disaster affected areas.
- c) The findings of the study will also add new dimension to the area of early childhood education by recognizing the need for preparing young children through building their psychological and social competence to cope up effectively in adverse situations.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR), Jamia Millia Islamia, New Delhi.
2. **Project Title:** Provision and Assessment of ECD services within the 5 km radius of Jamia Millia Islamia
3. **Principal Investigator:** Prof. Zubair Meenai, Director, Jamia Millia Islamia
4. **Co-Investigators:**
 - a) Dr. Saba Firdos, Research Assistant, Jamia Millia Islamia
 - b) Ms. Seema Naaz, Research Assistant, Jamia Millia Islamia
5. **Funding Agency:** Save the Children
6. **Amount funded:** INR.1, 00,000.
7. **Duration of the project:** 16 month
8. **Starting date of the Project:** October 2012
9. **Project objectives:**
 - a) Mapping provision of ECD services,
 - b) Assessment of quality of ECD provision within these services.
10. **A brief overview of the project:**

The centre has been established for research and advocacy for promoting the holistic development of young children. One of the activities of the centre is aimed towards capacity building of institutions working in the field of ECD. The research is proposed to determine the spread of ECD services around Jamia Millia Islamia & to assess the quality of some of the ECD components.
11. **Infrastructure created from the project:** N/A
12. **Project outcomes:**
 - a) To prepare a directory of institutions operating within 5 km radius of Jamia Millia Islamia.
 - b) The directory of institutions will be use the purpose of placement of the students of M.A programme in Early Childhood Development for field work.
 - c) Capacity building will be organized for teachers from these institutions.
 - d) Workshops and Trainings will be organized for teachers as well.
13. **Benefit from the project to the society:**

This directory will support to parent and community to explore various schools to their children within their premises. The schools and the teacher will be benefited by the awareness and exploration training and workshops.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** Evaluation of the Curriculum component 'Teaching of English at the Jamia Nursery School
3. **Principal Investigator:** Prof. Rekha Sharma Sen, Chair Professor, Jamia Millia Islamia
4. **Co-Investigator:** None
5. **Funding Agency:** Save the Children
6. **Amount funded:** INR 2, 00,000/-
7. **Duration of the project:** 8 months
8. **Starting date of the Project:** From October1, 2013
9. **Project objectives:**
 - a) To examine the teaching of English in the kindergarten and pre-primary classes
 - b) To find out teachers' beliefs regarding how children learn to read and write English; the difficulties and issues they are facing in their teaching
 - c) To examine children's competencies in reading, writing and meaning making
 - d) To suggest modifications in curriculum and pedagogy based on the analysis of above, train teachers with respect to the modifications, guide implementation of modifications and evaluate their effectiveness
10. **A brief overview of the project:**

The Jamia nursery, which conducts a preschool programme of two years duration for children between the ages 3+ to 5+ has been directed to formally introduce the teaching of English from the Kindergarten class in the year 2011. The Principal and the teachers of the school have requested for a formal evaluation of the curriculum and pedagogy of teaching of English and the outcomes in terms of children's learning. The teachers have identified gaps in their own teaching and the curriculum such as lack of clarity regarding introduction of English, the difficulty in teaching of English given the children's linguistic and socio-cultural backgrounds; the variation among teachers regarding their facility of using English as medium of conversation.

The project is conceptualized in four stages:

Stage 1: Analysis of pedagogy and curriculum content as well as children's competencies,

Stage 2: Training of teachers in alternate curriculum content and teaching methodologies

Stage 3: Implementation of alternate pedagogy

Stage4: Process documentation of implementation of alternate pedagogy and evaluation of effectiveness of alternate pedagogy, including enhancement in children's competencies with respect to English
11. **Infrastructure created from the project:** N/A
12. **Project outcomes:** Research Report
 - a) Training workshop for teachers of Jamia Nursery (already organized) and weekly review Sessions (ongoing)
 - b) Workshop for teachers in Spoken English to be organized by CIE, Delhi University
13. **Benefit from the project to the society:**

Teaching of English as a second language is fraught with difficulties in many contexts in the country given the fact that children's socio-cultural backgrounds by and large do not contain an exposure to English and many of the children would be first generation learners of English. This situation is true of eth children attending the Jamia nursery. A major reason for the inability of children to articulate and speak their thoughts using the English language even by secondary classes stems from the fact that English is not introduced in meaningful ways in the early years and the pedagogical approach fails to develop in the child an interest in reading of English. By training the teachers in appropriate pedagogy for teaching of languages in general and English in particular, the project will contribute towards meaningful education of the young child.

14. **Any other information you may think is important in this regard:**

This project is being facilitated by the resource Support provided by faculty members of Early Literacy Programme, Dept. of Elementary Education and Department of Education and Languages, NCERT.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre For Early Childhood Development and Research (CECDR)
2. **Project Title:** Quality of early childhood education: An investigation in the MCD Schools of Delhi.
3. **Principal Investigator:** Dr. Neelima Chopra
4. **Co-Investigator:** None
5. **Funding Agency:** Indian Council for Social Sciences Research (ICSSR), New Delhi.
6. **Amount funded:** INR 6, 00,000.
7. **Duration of the project :** 15 months
8. **Starting date of the Project:** From April 1, 2013
9. **Project objectives:**

Given the critical significance of the early childhood years, it is imperative for every child to get the opportunity to develop in a stimulating environment. MCD schools play a pivotal role in providing early childhood education to children belonging to lower and middle SES strata. However, it has been pointed out that the early childhood programme of MCD schools is not very effective due to a variety of reasons. Objectives of the study are:

 - a) To study the structural quality of early childhood programmes of MCD schools
 - b) To study the process quality of early childhood programmes of MCD schools.
10. **A brief overview of the project:**

Permissions to conduct observations in nursery, grade one and grade two classrooms were obtained from the MCD headquarters. Once the permission was obtained, the list of all the schools in three municipal corporations with nursery classrooms was obtained from the concerned officials. Three schools from each of the 12 zones under the three municipal corporations were selected randomly from this list. Review of literature was conducted and consulted experts in the area and decided to use the Early Childhood Education Quality Assessment Scale (ECEQAS) developed by Ambedkar University Delhi to assess the quality of early childhood educational programmes. The tool is an observation guide and consists of three parts. Part 1 is an observation recording sheet in which the actual activities being conducted in the classrooms are recorded at 10 minutes interval. Part 2 focuses on the physical or the structural conditions of the school. It includes basic necessities like drinking water, toilets seating arrangements teacher-child ratio and so on. Part 3 focuses on the process aspects and observes the quality of teacher child interaction. Once the tool was identified the research staffs were oriented to the tool and each item was discussed. Pilot-testing of the tool was also conducted. A few modifications were also suggested and incorporated in the tool.
11. **Infrastructure created from the project:** N/A
12. **Project outcomes:** Research papers, articles, workshops & trainings for teachers
13. **Benefit from the project to the society:**

The study will help in understanding the structural and process quality of early childhood educational programmes of MCD schools. The study will throw light on the classroom processes and therefore help in understanding the strengths and weakness of the primary educational institution in Delhi.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** An Investigation into the dialectical relationship between social situation of development of children and Pedagogical practices in Jamia Nursery school.
3. **Principal Investigator-** Ms. Prachi Vashishtha
4. **Co-Investigator:** None
5. **Funding Agency:** Save the Children
6. **Amount funded:** INR 1, 64,000
7. **Duration of the project:** 8 Months
8. **Starting date of the Project:** From January 24, 2014
9. **Project Objectives:**
 - a) To explore the institutional practices organized around children's everyday lives.
(This will give information about how individual motives and intentions are shaped)
 - b) To investigate the pedagogical practices in the school
(It will give information about the schools as an institution, how teaching-learning practices are organized, activity conducted, interactions patterns between students and teachers, amongst students, and amongst parents and students and power dynamics, relationship between documents/ theory and practice are reflected in the day to day settings)
10. **A brief overview of the project:**

High drop-out rate, poor quality of teaching-learning practices in the classrooms and little space for children's socio-cultural realities in teaching-learning are some of the facts about Indian educational scenario which no one can dispute. Universalisation of elementary education thus, poses a formidable challenge to India: the number of children dropping out, not attending school regularly and never enrolled is immense (Sachdeva, 2003). One of the main factors leading to high drop-out rate and poor quality education is that children find it difficult to relate to the classroom processes (Panda, 2009). Unless children participate in the classroom they will neither learn, nor will stay in the system for long. This relationship is contingent on the quality of classroom discourse and particularly on the ability of the teacher to respond to the needs of culturally and linguistically diverse learners in the class. The lack of basic infrastructure and resources at the school level and influence of neoliberal policies at the level of governance has reduced the focus in the area of education to allocation of funds, monitoring resources, formulating laws and accreditation rather than engaging in core educational discourses which are built on classroom dynamics, teacher-child relationship and teaching-learning practices. National curriculum framework 2005, have clearly indicated the importance of the learning context in which the child constructs one's knowledge. Keeping in mind the context of the learner in which the child is interacting and making sense of her world, is therefore considered very critical in designing teaching-learning processes. This also is our aim to attempt investigating into this research study.
11. **Infrastructure created from the project:** N/A
12. **Project outcomes:** Research papers, articles, seminars, workshops, conferences, trainings, innovations.

13. **Benefit from the project to the society:**

This research project does have direct implications to bring about qualitative changes in the classroom dynamics, teacher-child relationship and teaching-learning practices, and therefore in the learning of the child. Based on this understanding, the early childhood educators could take into consideration both the developmental stage and the social and cultural milieu of children when designing the teaching-learning experiences for them. Besides this, the theoretical understanding that this study would provide, could add to the existing literature available in these domain of classroom teaching- learning practices.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** Stress & Resilience in street children: An exploratory study in South Delhi.
3. **Principal Investigator:** Dr Nimisha Kumar
4. **Co-Investigator:** None
5. **Funding Agency:** Save the Children
6. **Amount funded:** INR 1, 64,000
7. **Duration of the project:** 8 months
8. **Starting date of the Project:** From July 22, 2013
9. **Project objectives:**

The main objective of the study is to explore the stress and resilience in street children aged 5 to 8 years living in South Delhi. The sub-objectives are:

 - a) To study the nature and level of stress in these children.
 - b) To study resilience in these children.
 - c) To study beliefs regarding self, others and life/future in these children.
10. **A brief overview of the project:**

The Children living on the streets are still children undergoing development, despite their life conditions. They experience risks and challenges that, at the same time, may jeopardize their development and promote the acquisition of strategies for dealing with life on the streets. Research indicates that during the early childhood years, it is important for children to have good quality of care and opportunities for learning, adequate nutrition and community support for families, to facilitate positive development of cognitive, social and self-regulation skills. The study of resilience in development has overturned many negative assumptions and deficit-focused models about children growing up under the threat of disadvantage and adversity. The finding that resilience is made of ordinary rather than extraordinary processes offers a more positive outlook on human development and adaptation, as well as direction for policy and practice aimed at enhancing the development of children at risk for problems and psychopathology.

The project involved data collection on daily stress as well as stressful life events as well as information related to various dimensions of resilience (such as coping, spirituality, temperament, competence, social support, etc.) as well as depression. The sample comprised of 60 children aged 6 to 8 years living with or without family on the streets or in shelter homes in South Delhi. In addition, five semi-structured interviews have also been targeted from stakeholders i.e. professionals belonging to various organisations working for street children in Delhi. The study has adopted a Mixed Methods design. The data collection is in the final stages and compilation as well as analysis work is to begin shortly.
11. **Infrastructure created from the project:** N/A
12. **Project Outcomes:**

Paper titled 'Stress and Resilience in street children of South Delhi' presented in the International Conference on Multi-disciplinary health care held at AIIMS, New Delhi on 12th January 2014.
13. **Benefit from the project to the society:**

- a) In line with the global recognition of child empowerment and citizenship as well as the vitality of the life-long developmental implications of the quality of life in the early childhood years, this study will have important implications in terms of contribution to the latest data pool as well as relevant policy making.
- b) These implications will be even more crucial as the sample being studied is one of the most marginalised and stigmatised sections of society, i.e. street children.
- c) It is also possible that discovering the processes that allow street children to develop resilience will create a deeper understanding of the processes involved for other children.
- d) It will help us understand the developmental trajectories of these children living in challenging circumstances as well as the factors which facilitate their transitions into adulthood. The study will generate further avenues for research and intervention for this neglected section of the Indian child populace.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** The role of fathers in early childhood development: A study of Middle-income households in South Delhi, India.
3. **Principal investigator:** Dr. Nimisha Kumar
4. **Co-Investigator:** Ms Sufia Azmat
5. **Funding Agency:** Indian Council of Social Science Research (ICSSR)
6. **Amount funded:** INR 6,00,000 lakhs
7. **Duration of the project:** 18 months
8. **Starting date of the Project:** From July 1, 2013

9. **Project objectives:**

The main aim of the study is to explore the role and responsibilities of fathers in early childhood development in Middle-income families in South Delhi, India. The sub-objectives are:

- a) To study father's role in five main areas of early childhood development, i.e., Health, Nutrition, Education, play and care/protection.
- b) To study the impact of socio-cultural factors (education, religion, occupation, mothers employment status and type of family) on father's role in child development.
- c) To search for and review existing Indian research literature on the role of fathers in children's upbringing and development.
- d) To pursue and achieve contextualised theory building on the central area of study.

10. **A brief overview of the project:**

The study aims to investigate the role of fathers in five main areas of child development and also to explore the effect of demographic, cultural and social factors on the same. The qualitative nature of the study based on the grounded theory methodology will elicit valuable in-depth information and lead to theory development in this important but relatively un-researched area. The plan is to conduct detailed and in-depth semi-structured interviews of 20 Muslim fathers and 20 Hindu fathers regarding their role and responsibilities as fathers. These fathers will be from middle income category. The wives as well as children of these fathers will also be interviewed briefly for their perception regarding the father's role.

Providing care for children through the life-cycle needs inputs from all care givers: men and women. Motivating men and other adult family members to play a role in child care is necessary to both provide balanced parenting to children and to break the typical association between women and care.

The engagement of the father in children's development activities is a relatively new concept in developing countries. A father has a great role to play in their child's development. In our culture, most of the children live in a nuclear or a combined family. Father is one of the major members in this family. If parents know the importance of fathers' involvement in child development, it may enhance father's involvement in child rearing practices.

11. **Infrastructure created from the projects:**

As part of the source material, some latest books on fatherhood including conceptual as well as research based texts are in the process of being acquired by the centre.

12. **Project outcomes:**

- a) Paper titled ' Impact of fathers on child development outcomes: A review study' presented at the International Conference on Multi-disciplinary healthcare at AIIMS, New Delhi on 12/1/14.
- b) Paper titled ' The role of fathers in early childhood development within a rapidly changing urban society' at the Indian Social Science Congress held at the AMU, from December 27-31 2014

13. **Benefit from the project to the society:**

Criticality of early childhood has been recognized globally and there is a dearth of research on fathers' role in early childhood development especially in the Indian context. Fatherhood is a quite a multi-dimensional concept which seems to involve many interacting variables, including the powerful influence of society and gender role. Awareness of this at both on personal and societal level will hopefully result in gradual changes in regard of fathering role. Most of the research work on fatherhood has been conducted in the western countries. In Asian countries including India, family research has traditionally focused on mothers' roles. The present study is a unique idea to explore the fathers' role in middle income household of south Delhi. This study will help us to understand whether and how men's family role has changed, how they differ from those in the western societies and what consequences such changes have on the well-being of family members. Families in Asia are experiencing rapid transitions under diverse culture, demographic, socio-economic contexts. In many societies, patriarchy remains a dominant family ideology despite on impressive increase in women's education and labour force participation.

Centre for Early Childhood Development and Research (CECDR)

1. **Name of the Centre:** Centre for Early Childhood Development and Research (CECDR)
2. **Project Title:** Care Within and Outside Home for School Age Children with Insulin Dependent Diabetes Mellitus: The Psychological Challenges for Children and Their Mothers.
3. **Principal Investigator:** Dr. Neelima Chopra
4. **Co- investigator:** none
5. **Funding Agency:** ICMR, New Delhi
6. **Amount Funded:** INR 14,6000/-
7. **Status:** technically approved on 30th Dec 2014. (Funds not released).
8. **Period:** 18 months

Centre for Culture, Media & Governance.

1. **Name of the Centre:** Centre for Culture, Media & Governance.
2. **Project Title:** (DRS-I level, DRS Programme) UGC Special Assistance Programme (SAP)
3. **Coordinator:** Prof. Biswajit Das.



4. **Deputy Coordinator:** Mr. Vibhodh Parthasarthi



5. **Funding Agency:** University Grant Commission
6. **Amount funded:** INR 60 Lakhs
7. **Duration of the project:** 5 years
8. **Starting date of the Project:** April 01, 2013
9. **Project objectives:**

The idea of the project is to undertake multi-method research as well as disseminate research findings by organising national seminars and inviting experts in the field. Subsequently these finding may be published in an edited volume along with invited papers from scholars working in the thrust area, as follow:

Media Diversity, Media Pluralism and Media & Democratisation.

10. **A brief overview of the project:**

The Proposed research programme intends to undertake research in the area of News and Democracy. Conventional understanding of 'News' such as 'gatekeeping' and 'watchdog' function of media are taken for granted. These concepts are no more viable and do not provide theoretical comfort to grasp the relationship between media and Democracy in the recent times. The past Sixty four years of Indian Democracy has shown a distinct trend that cannot be captured in conventional and antiquated notion of polity, one has to address the transformation as well as study the changes that have informed our relationship of media and Democracy. Further, the proliferation of media has posed new questions.

Drawing on key concepts in social sciences and developments in the media environment, the research programme will profile and contextualise the changes in the working of the media-changes arising as much from the proliferation of new technologies as from the shifting trajectory of the media industry in the 20th century to address the issue of Media and Governance.

The question arises:

- a) Does the proliferation of News Channels strengthen Democracy or weaken it?
- b) How does News Channels in different regions frame these diversities?
- c) Can one construct a vibrant democracy on the basis of a vibrant media in a particular region?
- d) Can one construct certain indicators as markers of Democracy in a specific state?
- e) Lastly, would it help to construct a media Index as a marker of Democracy in India?

11. **Infrastructure created from the project:**

This project intends to set up a video conferencing system so as to interact with other universities in India as well as abroad and make such exercise as a regular exercise of the pedagogy and curriculum of post Graduate programme at the centre. Besides, the idea is to connect with researchers across the world, share data and exchange information's in the area proposed under the project.

12. **Project outcomes:**

The project outcome will be the conferences, workshops along with articles and Books

13. **Benefit from the project to the society:**

The three volumes would be published on:

- a) News and Democracy
- b) Media and Diversity
- c) Media Policy and Regulation

Centre for Culture, Media & Governance

1. **Name of the Centre:** Centre for Culture, Media & Governance.
2. **Project Title:** Minorities and the Indian Press: Marginalization and Exclusion in the News Media
3. **Principal Investigator:** Dr. Saima Saeed



4. **Co-Investigator:** Dr. Athikho Kaisii



5. **Funding Agency:** ICSSR
6. **Amount funded:** INR 20 Lakhs
7. **Duration of the project:** 3 years
8. **Starting date of the Project :** October 2013
9. **Project objectives:**

The project has a three-fold objective:

 - a) To examine the portrayal of minorities in the Press to study the relationship between media, minorities and their exclusion and marginalization
 - b) To investigate into the reasons for such stereotypical, distorted and under-representation of minorities in the media as made empirically evident from the data so collected
 - c) To make policy recommendations to make the Press more plural and diverse.
10. **A brief overview of the project:**

It is not enough to locate the issue of exclusion and marginalization in the classic binaries of class, caste and religious majority-minority framework. Given the high level of mediation in our social world, media are deeply implicated in the creation, dissemination and perpetuation of these categories. More specifically, news media in producing, organizing and controlling the sense-making aspect of events that structure the world we live in, not only affect our understanding of reality but play a decisive role in generating levels of political, social and cultural exclusions and new forms of marginalization in allowing certain groups greater representation while denying similar media access to others. Indeed, many of these excluded populations remain on the

fringes of society as much as they do of the media lens with each feeding into the other. This proposed project looks at this as not a matter of mere coincidence but a major area of social enquiry that needs to be calibrated and analysed if we are to address issues of inclusion, equal citizenship rights and social justice to all sections of society. The fact that the media images are so powerful in structuring social reality makes media an ideological and a highly political force in contemporary society.

11. **Infrastructure created from the project:** Computers and software's

12. **Project outcomes:**

The project outcome will be the conferences, workshops along with articles and Books

13. **Benefit from the project to the society:**

The project has policy implications in that it examines whether the current media policies create an adequate platform for a fair, just and unbiased representation of the minorities on the one hand and equitable access to them to the news media resources on the other. Over and above these, the project hopes to unravel the crucial relations of power that are played out between the State, media and the marginal.

Centre for Culture, Media & Governance

1. **Name of the Centre:** Centre for Culture, Media & Governance.
2. **Project Title:** Tracking Access under Digitalisation.
3. **Principal Investigator:** Prof. Biswajit Das; Mr. Vibhodh Parthasarthi



4. **Co-Investigator:** None
5. **Funding Agency:** Ford Foundation
6. **Amount funded:** USD 2 Lakhs
7. **Duration of the project:** 3 years
8. **Starting date of the Project:** July, 2013
9. **Project objectives:**
 - a) Evaluate the nature of Access provided by DTH Licensees
 - b) Develop a framework to measure Access to TV through the values of Openness, Affordability, Availability & Diversity
 - c) Map dynamics of Access to distribution infrastructure at the Supply (Licensees) & Demand (Viewers) levels

10. **A brief overview of the project:**

The compulsory shift from analogue to digital cable which is taking place across the country in four phases has meant the addition of a set top box (STBs) in the Television (TV) paraphernalia of every household. A parallel shift that has taken place is the rapid growth in another segment of TV distribution, the Direct to Home (DTH) households which also require STBs. While well to do households in urban India have been attracted by the range of broadcast programming, on-demand services and interactive features of DTH; but being a wireless service, DTH has also been particularly attractive to geographically dispersed households, especially in rural India, hitherto not catered to by cable operators. This buoyancy in DTH subscription along with the phased digitization of cable services makes the television distribution market worthy of systematic study. This project, Tracking Access under Digitalization, seeks to identify and map key dynamics shaping access in this emerging ecology-both, concerning the service providers and the viewers.

11. **Infrastructure created from the project:**

The following instruments have been bought:

Instruments	Description	Pieces
Computers	HP	2
Printer (3 in one)	HP	1
Dongles	D-Link	2

The purchase of the following instruments is under process:

Instruments	Description	Pieces
Audio-recorders	TBC	3
Tablets	TBC	2
Camera	TBC	1

12. **Project outcomes:** Details of Different Studies under the Project

Completed Data Collection

S. No.	Working Title	Project Team/ Consultant (s)	Deadline /Status
1.	Dip-stick survey of Digital Media Exposure and Electoral Behaviour	Tabarez A. Neyazi, Vibodh Parthasarathi & Susan Koshy	Data Tabulated
2.	A study on the Relevant Market based on DTH case-law & policy	Shruti Ravi	Data Tabulated

On-going Data Collection

S. No.	Working Title	Project Team/ Consultant (s)	Deadline
1.	A study on the DTH case-law	Rajat Kumar/ consultant	Feb 2014
2.	Legislature's engagement with the Cable & DTH related issues	Susan Koshy	March 2014
3.	Analysis of the select TRAI Consultation Papers on Cable & DTH	Sandeep Bhushan	March 2014
4.	Case-study of DTH Companies	Consultants	Aug 2014 (1 st phase)

Studies under development

S. No.	Working Title	Project Team/ Consultant (s)	Tentative Commencement
5.	Viewers experience of digital switchover	Arshad Amanullah Sandeep Bhushan Shruti Ravi Susan Koshy	March 2014
6.	A study on Consumers' response in TRAI Consultation Papers	Sandeep Bhushan	March 2014
7.	A household survey of DTH users	Survey Agency	March 2015

Some of these studies will be presented by the Project Team in the Annual Congress of IAMCR to be held at Hyderabad between 15-17 July 2014.

Details of Workshops to be held under the Project

Possible themes of internal half day workshops/roundtables (to be held)	Tentative Dates
Cable & DTH Law	April 2014

Digital Dividends	May 2014
Research Tools of Ethnographic Study of the DTH users	May 2014
Consumer Groups	June 2014
Findings of Pilot Study of Ethnographic Study of the DTH users	July 2014
Case-studies of Cable & DTH companies	Sep 2014
Findings of Ethnographic Study of the DTH users in two cities	October 2014
Findings of Ethnographic Study of the DTH users in four cities	Feb 2015
Findings of Quantitative Household Survey of the DTH users in four cities	May 2015
Digital Switchover in the Television Distribution Segment	July 2015

13. [Benefit from the project to the society:](#)

The following social groups will benefit from the knowledge produced by the Project:

- a) Advocacy groups addressing media reform and media justice
- b) Regulatory bodies seeking primary data on transitions to digitalisation
- c) Post-graduate students/faculty in Media Studies and associated social sciences

Centre for Culture, Media & Governance

1. **Name of the Centre:** Centre for Culture, Media & Governance.
2. **Project Title:** Mediated Publics and Machines of Democracy
3. **Project Investigator:** Prof. Biswajit Das



4. **Co-Investigator:** Dr. Athikho Kaisii; Mr. Vibhodh Parthasarthi.



5. **Funding Agency:** ICSSR
6. **Amount funded:** INR 27,53,075 Lakhs
7. **Duration of the project:** 2011-2014
8. **Starting date of the Project:** March 2011
9. **Project objectives:**
 - a) **Media Pluralism in India**

In the first phase effort will be made to study the media contents in the reselected regions of the country through studying Television News. The idea is to assess plurality of sources, plurality of voices, and plurality of carriage. By studying plurality of voices, we can decipher the nature of publics shown and heard, the way they are shown and heard and finally, how the issues of such community are framed. Plurality of sources will demystify the monopoly of source. Finally, rigorous content analysis will reveal the way these voices are shown and heard in a Democracy.
 - b) **Media and Diversity Index**

Since the first stage of the research will collect various information's, some of them might not be useful in the first stage of the report. These data and information's across the regions will be useful in the second stage to build an index. Through pilot study the index will be experimented and verifiability may be assessed. The Idea is to develop Media as a marker of Democracy.
 - c) **Media Regulation and Democratisation in India**

In this phase we would discuss issues of inclusions and exclusions that have to do with media power and access, of how media opens itself to some groups and publics and is closed to certain others. This then would imply that we study the existing media scenario, media ecology, legal and regulatory frameworks which are instrumental to such exclusions and inclusions in an attempt to suggest/ recommend democratic

possibilities that can make media more open to groups formerly in the periphery of media representation. This involves issues of not just media and its role in a democracy but a felt need for greater media democratization.

10. **A brief overview of the project:**

This research project aims at explaining differences in news content with regard to factors inherent in the political system, political culture, media system and media culture of a country. To that end, the proposed project will develop a new model for explaining news content from a cross-regional perspective. The underlying assumption is that differing structural conditions favour different patterns of journalistic behaviour and values. Based on the results of this analysis, the project also aims at assessing the quality of news coverage in selected regions in India with regard to normative standards for democratic quality of news. Do leading regional news organizations offer a broader range of viewpoints than the metro? Do leading regional news organizations adopt a more critical, or even adversarial, stance to government than in metro channels? Do they present political news in a more dramatized, sensational fashion than in metro? Have news organizations in regions become more similar over time because of commercial pressure? This analysis is a challenging task, since there is no uniform consensus on the meaning of democracy across the countries. While the various models have important features in common, each of them carries different normative expectations on citizens, politicians and the news media. Which model of democracy a country ‘realizes’ within its political communication arrangements is not dependent only on the behaviour of its citizens or elected representatives. Of equal, or greater, importance is what kind of democracy the news media contribute to in their daily political affairs coverage. The question of what model of democracy a national media system assists and endorses lies at the heart of this study.

11. **Infrastructure created from the project:**

The following instruments have been bought:

Instruments	Description	Pieces
Computers	HP	2
Television	Samsung	1

12. **Project outcomes:**

Workshop	International Workshop on Mapping Media Pluralism at CCMG, Jamia Millia Islamia, on 1st March, 2013.
Workshop	International Workshop on Measurements of News by Prof. Frank Esser, Department of Mass Communication and Media Research, University of Zurich and Prof. Sven Engesser, Department of Informatics, University of Zurich at CCMG, JMI, on 25th February, 2013.

13. **Benefit from the project to the society:**

This project will provide policy prescriptions to understand the following:

- a) The nature of Diversity and Plurality of Indian Media
- b) Index to measure Media Diversity across regions in India.
- c) To understand Media Regulation and Democratisation.

Centre for Culture, Media & Governance

1. **Name of the Centre:** Centre for Culture, Media & Governance
2. **Project Title:** Media Framing in India's 2014 Election Campaigns: Mass Circulation Indigenous English Language Press, and the Parties, Issues and Candidates
3. **PI:** Prof. Daniel Drache York University, Toronto Canada



4. **Co-PI:** Dr. Taberez A. Neyazi



5. **Funding Agency:** Shahstri Indo India Institute
6. **Amount funded:** CAD. 10,000
7. **Duration of the Project:** 2 Year
8. **Starting date of the Project:** April 2014 to March 2016
9. **Project objectives:** The first objective of the research project involves monitoring and assessing the Indian print media, on factors of political culture and media systems, using a comparative understanding of the Canadian media experience. Also, given how history is currently witness to the unprecedented role of web mobilisation in democratisation in Egypt, Tunisia, Libya and other countries, an allied question will be to explore the practices of diversity within the social media, and its interrelationship with the traditional news media.
Secondly, the insights from the media monitoring will then help develop a media diversity index, which will be shared then among wider social movement actors, academics, media policy analysts and students. The collaboration is shaped in the form of small-scale studies to be carried out by students and faculty in both the centres, and joint workshops.
10. **A brief overview:** The collaborative research project between Comcult, York University, Toronto and the Centre for Culture, Media and Governance, Jamia Millia Islamia, New Delhi analyses the role of English press in framing two election campaigns in world's largest democracy. It does so by looking at the multiple and

contested intersections between the formation of diverse 'publics', evolving media systems and changing face of democratic institutions in Indian and Canadian society. It involves firstly, monitoring and assessing the Indian print media, on factors of political culture and media systems, using a comparative understanding of the Canadian media experience. Secondly, these insights will then help develop a media diversity index, which will be shared then among wider social movement actors, academics, media policy analysts and students. The proposed research therefore analyses how English press frames elections campaigns through a study of the Delhi assembly election campaigns in 2013 and the national election campaigns 2014.

Centre for Culture, Media & Governance

1. **Name of the Centre:** Centre for Culture, Media & Governance.
2. **Project Title:** The Interplay of Influence in the 2014 Lok Sabha Elections: New Voters, New Media, New Parties
3. **PI:** Prof. Holli A. Semetko Media and International Affairs & Professor of Political Science, Emory University



4. **Co-PI:** Dr. Taberez A. Neyazi



Dr. Anup Kumar, Cleveland State University, Cleveland



5. **Funding Agency:** Emory University
6. **Amount funded:** USD 28,849
7. **Duration of the project:** April 2014 - March 2016
8. **Starting date of the Project:** April 2014
9. **Project objectives:**

The primary short term objective is to publish results in leading outlets on the 2014 Indian General election campaign in which hypothesis and questions about influence and identity will be addressed to establish the uses and impacts of social networks and traditional media, as well as party campaigning, on citizens perceptions and voting behaviours.

A second, longer term, institutional objective is to establish India as a home for methodologically innovative election campaign research with this study as the basis for applications to support future campaign and election studies in the world's largest democracy and train graduate students and scholars in research design and methods. A number of scholars involved in European Election Studies and national election studies in Europe are part of the International Advisory Board for this project, some of whom have guest lectured to JMI students.

10. [A brief overview of the project:](#)

India's 2014 General Election represents the beginning of a new phase in campaigning in the country, with TV, the press and the internet together providing more opportunities than ever before for citizens, interest groups, political parties, candidates and leaders to connect. This research uses multiple methods, contexts, and sources of data to address questions and hypotheses about influence and identity. The research design focuses on the uses and impacts of networks, social and traditional media on citizens' perceptions of issues, candidates, parties and leaders, and their campaign and voting behaviors. A two-wave panel study in Delhi and a cross-sectional post-election survey in Bangalore--two metropolitan cities where the internet users are estimated to be at nearly 40 percent (IAMAI 2013)—along with content analysis of various media and sentiment analysis of social media are supported by the grant. The panel study will permit us to assess stability and change over the course of the campaign at the individual-level in the dynamic arena of the capital city in which a high proportion of voters remained undecided at the start of the 2013 Assembly election campaign based on our earlier study conducted at the Centre. Local sources of subsequent support made it possible to conduct post-election surveys in Mumbai and Guwahati.

11. [Infrastructure created from the project:](#) Not yet

12. [Project outcomes:](#) We have completed a two-wave panel study in Delhi and a cross-sectional post-election survey in Bangalore and are now in the process of analysing the data.

We added a post-election survey in Mumbai thanks to support from local sources. We are in the process of analysing the data.

Sentiment analysis of social media has been conducted at the Institute for Technology and Management, Navi Mumbai under the supervision of Sudipto Chakarborty.

We are collaborating with Dr. Pahi Saikia, assistant professor of political science, in the Department of Humanities and Social Sciences at IIT-Guwahati, Assam, to train her graduate students as interviewers and they conducted a post-election survey in Guwahati, the commercial capital of Assam. This is a pilot project for Dr. Saikia, her graduate students, and us.

13. [Benefit from the project to the society:](#)

The project aims to break new ground in campaign research in India with this 2014 study as the basis for developing a long-term study of campaigns and election studies in India and train graduate students and scholars in research design and methods. This project will result in India's first 21st century campaign study that will share survey data with Indian scholars and with the larger interested academic community so that a global generation of graduate students and faculty may learn about and develop new campaign research involving India and potentially include cross national comparisons with data from campaign studies in countries in the European Union, North and South America and Japan.

Centre for Culture, Media & Governance

1. **Name of the Centre:** Centre for Culture, Media & Governance.
2. **Project Title:** India at Leisure: Media, Culture and Consumption in the New Economy
3. **PI:** Mr. Vibhodh Parthasarathi



Mr. Adrian Athique Chair of the School of Arts, University of Waikato



4. **Co-PI:** Nil
5. **Funding Agency:** UGC under India New Zealand Education Council (INZEC) programme
6. **Amount funded:** INR 8,25,450
7. **Duration of the project:** June 2014 to December 2015
8. **Starting date of the Project:** June 2014
9. **Project objectives:**

With a book project underway from this first research phase, this project proposes to turn attention to the demand side of the media economy. Augmented by fresh contributions from eminent international & national collaborators and up-to-date research, the project will undertake a thorough interdisciplinary analysis of the demand side of the Indian media economy, especially the field of consumption. Following Raglan, a second conference and symposium will be held at the Centre for Culture, Media and Governance, Jamia Millia Islamia in New Delhi in February 2015. From June 2014, a fresh round of field research in the National Capital Region, will be undertaken including ethnographic studies of media consumers along with a detailed analysis of up to date empirical data on the media industries and their markets, including shareholdings, investment patterns, profits and returns.

The overall aim of our research partnership is not only to bring together scholars from the two countries, but also to provide an innovative and in-depth interdisciplinary analysis of the Indian media economy.

10. **A brief overview of the project:**

One of the most striking features of India's ongoing economic transformation has

been the runaway success of a sector of the economy that was almost entirely neglected by India's planners during the socialist era, and one which remains little understood today by international analysts and investors. This is India's leisure economy, which is often overlapping with the media economy (give their enthusiasm for a range of pursuits from sports to movies, from texting to television) and now forms a major constituent of the nation's social and economic life. With this background, in 2013, an INZEC-funded project constituted a bi-national working group to analyze the dynamics of India's media economy. The first phase of this entailed focusing on exploring the supply side of the media economy. The symposium held at Raglan, Waikato in February 2014 examined new financial models, industrial re-organisation and the embedding of the media economy in the complex fabric of India's business cultures.

Centre for Culture, Media & Governance

1. **Name of the Centre:** Centre for Culture, Media & Governance.
2. **Project Title:** Science Granting Councils: An Exploration of Policies and Practices for Building Research Capacity.
3. **PI:** Prof. Biswajit Das



4. **Co-PI:** Mr. Vibhodh Parthasarathi



5. **Funding Agency:** IDRC
6. **Amount funded:** INR 19,67920
7. **Duration of the project:** Feb 2014- Sep 2014
8. **Starting date of the Project:** February 2014
9. **Project objective:**
 - Develop an informational model for participatory governance.
 - To conduct a study in the Jamia neighbourhood to assess the needs of communities
 - To develop the information system using internet and mobile technologies based on the model
 - To develop website for
 - sharing of information and views of between the communities of experts and people in general recording and counting of votes
 - To develop a mobile application that can textually query the website and vote on poll questions
 - To conduct a one day workshop on the experiences and learning of this and other similar initiatives.
10. **A brief overview of the project:**

This research project takes note of the gap between science, technology and social science research and the need to synergize them. It suggests that science and technology play an instrumental role in the functioning of modern democracies. In a liberal democracy, scientific knowledge through its claim to objectivity and impartiality, is seen as helping the state to present itself as neutral. By labelling its action as being scientifically endorsed and therefore, supposedly, free from prejudices or biases, the state is able to claim official action as being in best public

interest. From a technological standpoint, not only are technologies the silent partner in the scientific process, they also play a mediating role in the relationship between the state and its residents so that different designs and systems open out and close different *social* possibilities. This project attempts to combine sociological research with the development of techno scientific systems.

11. **Infrastructure created from the project:**

Computer, Camera, Hard drive 3tb, Mobile-3, ipad,

12. **Project outcomes:**

We are in the process of completing study in the Jamia neighbourhood; the software development is going on in parallel.

Creation of informational model (done)

- Creation of website
- Pilot study on
 - Effectiveness of Computer Literacy program at Shikhar (local NGO)
 - Usage of Technology (Computers/Internet, Mobile and Television) in the local neighbourhood
- Interaction with the local community
 - Setting up and establishing links (done)
 - Interviewing and documentation/transcribing (in progress)
- Creation of mobile interface for responding to questions (in progress)
- Workshop to share information and experiences with industry and academic institutions (in September)
- Analysis of data from pilot study and workshop (To be done)

13. **Benefit from the project to the society:** (max 100 words)

The project aims at exploring possible and effective ways for governance. The idea behind this project is to study how interactive technology can shape on everyday life for local governance.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Synthesis, Characterization and Biological Activity of Heterocyclic Compounds
3. **Principal Investigator:** Dr. Fareeda Athar



4. **Co-Investigator:** None
5. **Funding Agency:** University Grants Commission
6. **Amount funding:** INR 9,30,000
7. **Duration of the Project:** 3 years
8. **Starting date of the Project:** July 1, 2012 to June 30, 2015
9. **Project objectives:**
 - a) Synthesis of novel thiadiazoles-heterocyclic molecules. The molecules will be characterized using different spectroscopic techniques and purity will be decided based on the elemental analysis data.
 - b) Synthesis of novel triazines-heterocyclic molecules. The molecules will be characterized using different spectroscopic techniques and purity will be decided based on the elemental analysis data.
 - c) Synthesize of novel tetrazoles-heterocyclic molecules. The molecules will be characterized using different spectroscopic techniques and purity will be decided based on the elemental analysis data.
 - d) Study of *in vitro* growth of gram positive and gram negative microorganisms causing microbial infection.
 - e) Cytotoxicity study of compounds using H9c2 rat cardiac myoblast cell line.
10. **A brief Overview of the project:**

In this project we have synthesized thiadiazole, tetrazoloquinolones, hydrazones, pyrazoles, triazines and sulphonamides derivatives. Nearly hundred compounds have been synthesized. These compounds have been characterized by IR, UV, NMR and mass spectroscopic methods. The *in vitro* antibacterial screening of the all the compounds has been done. Besides, the cytotoxicity of these compounds has been checked using MTT assay
11. **Infrastructure created from the project:** N/A
12. **Project outcomes:**

Mohammad Arshad, Abdul Roouf Bhat, Smritee Pokharel, Ji-Eun Kim, Eun Ju Lee, Fareeda Athar*, Inho Choi, Synthesis, characterization and anticancer screening of some novel piperonyl-tetrazole derivatives, *Eur. J. Med. Chem.*, 71, 2014

Characterization and anticancer screening of some novel piperonyl–tetrazole derivatives, *Eur. J. Med. Chem.*, 71, 2014, 229-236.

Thesis awarded- Two

Name of the student: Tazeem

Title of the thesis: Diverse Interdisciplinary Applications of Synthetically Obtained Heterocyclic Compounds.

Name of the student: Mohd. Arshad

Title of the thesis: Novel Heterocyclic Compounds as potential therapeutic agents: Synthesis and characterization.

13. **Benefits from the project to the society:**

Antimicrobial resistant constitutes a major threat to the mankind's health status. United States Department of Health and Human Services declares that each year approximately two million people acquire severe infections and 23,000 people die due to antibiotic-resistant infections. According to Public Health Foundation of India five million Indian children suffer with pneumonia or sepsis and 215,000 children die annually. The use of antibiotics is the leading factor to antibiotic resistance. Up to 50% of all the antibiotics prescribed for people are not needed. Hence, need for the discovery of new lead compounds which would be effective against pathogenic microorganisms.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** The critical role of five N-terminal residues in the folding and stability of Yeast iso-1 cytochrome c
3. **Principal Investigator:** Prof. Faizan Ahmad



4. **Co-Investigator:** Nil
5. **Funding Agency:** DST
6. **Amount funding:** INR 50,00,000
7. **Duration of the Project:** 3 years
8. **Starting date of the Project:** December 1, 2011 to November 30, 2014
9. **Project objectives:**
 - a) To investigate the effect of sequential deletion of each of the five N-terminal residues on the structure of the yeast iso-1-cyt c. The first objective will encompass understanding the structural insights of the deleted mutants $\Delta(-5/-1)$, $\Delta(-5/-2)$, $\Delta(-5/-3)$, $\Delta(-5/-2)$ and $\Delta(-5/-1)$.
 - b) To investigate the effect of mutation on the conformational stability of deleted yeast iso-1-cyt c with respect to the wild type yeast iso-1-cyt c.

10. **A brief overview of the project:**

We successfully made the N-terminal variants of the yeast iso-1-cytochrome c and each variant as well as the wild type protein was expressed in *E.Coli* (BL21) cells and purified. Our *in silico* studies predicted the order of stability as; $\Delta(-5/-4) > WT > \Delta(-5/-3) > \Delta(-5/-5) > \Delta(-5/-1) \sim \Delta(-5/-2)$. To confirm this we carried out *in vitro* studies which involved (i) measurements of thermodynamic stability of all proteins by differential scanning calorimetry and from sigmoidal curves of two different structural properties ($[\theta]_{222}$, a probe for detecting change in secondary structure, and $\Delta\epsilon_{405}$, a probe for detecting alteration in the heme environment), and (ii) characterization of all proteins by various spectral properties. The main conclusions of the *in vitro* studies are: (i) the order of thermodynamic stability of all proteins is in excellent agreement with that predicted by *in silico* studies, and (ii) a sequential deletion of the N-terminal extension has no effects on protein structure and folding.

11. **Infrastructure created from the project:**

Gradient based fraction collector, Centrifuge, PCR, Incubator cum Shaker, Deep Freezer (-80 °C), Sonicator, Autoclave. Laminar hood

12. **Project outcomes:**

- a) Shah Ubaid-ullah, Md. Anzarul Haque, Sobia Zaidi, Md. Imtiyaz Hassan, Asimul Islam, JK Batra, Faizan Ahmad “Existence of Pre-molten Globule State on the Folding Pathway of yeast iso-1-cytochrome c” *Journal of Proteins and Proteomics* 3(2), JPP 40, 2012 [ISSN : 0975-8151]
- b) Shah Ubaid-ullah, Md. Imtiyaz Hassan, and Faizan Ahmad “Unfolded Protein Response (UPR) – Its impact on Human Diseases”
- c) Sobia Zaidi, Md. Anzarul Haque, Shah Ubaid-ullah, , Md. Imtiyaz Hassan, Asimul, JK Batra & Faizan Ahmad “Investigating the effect of deletion of extra N-terminal residues of yeast iso-1-cytochrome c on its stability” *Journal of Proteins and Proteomics* 3(2), JPP 17, 2012 [ISSN : 0975-8151]
- d) Haque M, Ubaid-ullah S, Zaidi S, Hassan M, Batra JK, Ahmad F. Effect of sequential deletion of five extra N-terminal residues on the stability of *yeast iso-1-cytochrome c*. *J Nat Sc Biol Med* 2011;2:128 [ISSN: Print -0976-9668, Online - 2229-7707]
- e) Zaidi S, Ubaid-ullah S, Haque M, Hassan M, Batra JK, Ahmad F. Spectral properties of the N-terminal variants of yeast ISO-1-cytochrome c. *J Nat Sc Biol Med* 2011;2:144-5 [ISSN: Print -0976-9668, Online - 2229-7707].

Papers published in Conference Proceedings, Popular Journals etc.

- a) Oral presentation “Role of Extra N-terminal residues on the folding and stability of the Yeast iso-1-cytochrome c” at the 37th Annual Meeting of Indian Biophysical society – 2013(Jan 13 – 17) held University of Mumbai, Mumbai.
- b) Abstract/Poster “Urea Vs GdmCl-induced denaturation of yeast iso-1-cytochrome c studied by absorption and CD spectroscopy” at the 37th Annual Meeting of Indian Biophysical society – 2013(Jan 13 – 17) held University of Mumbai, Mumbai.
- c) Presented poster/abstract on “Existence of Pre-molten Globule State on the Folding Pathway of yeast iso-1-cytochrome c” at International Interdisciplinary Science Conference-2012 (Dec 8 – 10) on Protein folding and Diseases organized by CIRBSc, JMI.
- d) Oral presentation “PROTEIN STABILITY: Effect of the Deletion of Five Extra N-terminal residues on the Stability of the Yeast iso-1-cytochrome c” at the Annual Meeting of Indian Biophysical society – 2012 (Jan 19 – 21) held University of Madras, Chennai
- e) Poster/Abstract on “Role of the Five Extra N-terminal Residues in the Stability of the *Yeast iso-1-cytochrome c*” at the Annual Meeting of Indian Biophysical society – 2012 (Jan 19 – 21) held University of Madras, Chennai
- f) Poster/Abstract on “Effect of sequential deletion of extra N-terminal residues of yeast iso-1-cytochrome c on the spectral properties and stability of the protein” at 5th International symposium on Recent Trends in Macromolecular structure & Function ISRTMSF-2012 Jan23-25,2012 held at University of Madras, Chennai
- g) Poster/Abstract on “Role of Extra N-terminal Residues in the Stability and Folding of *Yeast iso-1-cytochrome c*” in the Proceedings of 7th Asian Biophysical Association & Indian Biophysical Society Meeting-2011 (Jan 30 – 2 Feb 2011) held at New Delhi

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Mechanism of Survival of Ethanol Producing Organisms: Role of Cellular Compatible Osmolytes in Counteracting the Deleterious Effects of Ethanol on Structure, Stability and Function of Proteins
3. **Principal Investigator:** Prof. Faizan Ahmad



4. **Co-Investigator:** None
5. **Funding Agency:** CSIR
6. **Amount funding:** INR24, 00,000
7. **Duration of the Project:** 3 years
8. **Starting date of the Project:** October 01, 2013 to September 30, 2016
9. **Project objectives:**

The first objective of this research proposal is to investigate the following:

EFFECT OF ETHANO-GLYCEROL MIXTURE ON PROTEINS

- a) Effect of various concentrations of glycerol on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- b) effect of various concentration of ethanol on the heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- c) combined effect of various concentration of glycerol and ethanol on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.

EFFECT OF ETHANOL-GLUCOSE MIXTURE ON PROTEINS

- a) Effect of various concentrations of glucose on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- b) effect of various concentration of ethanol on the heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- c) combined effect of various concentration of glucose and ethanol on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.

EFFECT OF ETHANOL-TREHALOSE MIXTURE ON PROTEINS

- a) Effect of various concentrations of trehalose on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- b) Effect of various concentration of ethanol on the heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- c) combined effect of various concentration of trehalose and ethanol on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.

EFFECT OF ETHANOL-PROLINE MIXTURE ON PROTEINS

- a) Effect of various concentrations of proline on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- b) effect of various concentration of ethanol on the heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.

- c) combined effect of various concentration of proline and ethanol on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.

EFFECT OF ETHANOL-GLYCINE MIXTURE ON PROTEINS

- a) Effect of various concentrations of glycine on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- b) effect of various concentration of ethanol on the heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values.
- c) Combined effect of various concentration of glycine and ethanol on heat-induced denaturation of lysozyme, α -LA and RNase-A at different pH values

10. A brief overview of the project:

Yeasts have been exploited by mankind for thousands of years in the production of alcoholic beverages and leavened bread. In modern times, yeast applications cover a diverse range of operations including the food and chemical industries, health care and biological, biomedical and environmental research. In particular, bio-ethanol production can make a significant contribution towards securing the long-term supply of renewable fuels and the containment of greenhouse gas emissions, providing local employment and new markets for the agricultural industry and reduced security concerns over national energy supplies.

Ethanol is a final product of anaerobic fermentation of sugars by yeast. Various groups have reported that intracellular accumulation of ethanol occurs during fermentation. Ethanol accumulation in the cultural broth can become a significant stress factor during fermentation. The intracellular accumulation of ethanol in *Saccharomyces cerevisiae* cells and its potential effects on growth and fermentation have been topics of controversy for several years. It is well known that ethanol is toxic to yeast cells even in ethanol-producing species. Ethanol is an inhibitor of yeast growth at relatively low concentrations, inhibiting cell division, decreasing cell volume and specific growth rate, while high ethanol concentrations reduced cell vitality and increase cell death. Ethanol induces water stress in the cell, and it decreases water activity, a_w (availability of water to cell). This decrease in a_w causes the inhibition of key glycolytic enzymes which may get denatured. Some of *S. cerevisiae* strains produce or tolerate up to 19.8 % (w/v) ethanol concentration. This is sufficient concentration of ethanol for cell death. Enzymes are denatured between 10 to 20 % ethanol (w/v). High ethanol concentrations have adverse effects on proteins, phospholipids bilayers and other hydrated cell components. The main sites for ethanol effects on yeast are cellular membranes, hydrophobic and hydrophilic proteins and the endoplasmic reticulum. Membrane structure and function appear to be a predominant target of ethanol. Exposure of yeast to ethanol results in increased membrane fluidity and consequential decrease in membrane integrity. Nagodawithana and Steinkraus reported that when ethanol was added to *S. cerevisiae* culture it was less toxic to the yeast cells than was ethanol produced by the yeast cells themselves. Reasons for this phenomenon are build-up of toxic by-products, the depletion of nutrients and the intracellular accumulation of ethanol during fermentation.

11. Infrastructure created from the project:

We are waiting for the funds to be released.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Quantum Dots as novel probes for Fluorescence Resonance Energy Transfer to understand molecular interactions and reaction path ways
3. **Principal Investigator:** Prof. Zubaida A Ansari



4. **Co-Investigator:** Prof. Shafique Ahmad Ansari
5. **Funding Agency:** DST
6. **Amount funding:** INR 49,00,000
7. **Duration of the Project:** 3 year
8. **Starting date of the Project:** June 27, 2013 to June 26, 2016
9. **Project objectives:**
 - a) To design and synthesize the QDs to be used as donor and acceptor probes for energy transfer.
 - b) To couple QDs with substrate, e.g. urease and glucose oxidase and other molecules, for enzyme catalytic bond cleavage.
 - c) To couple the QDs with enzyme - chromophore as FRET acceptor.
 - d) Structural and elemental characterization of synthesized QDs and To characterize the receptor-QDs and analyte-QDs systems individually using electrochemical techniques.
 - e) Ascan measure the timing and location of intermolecular interactions inside living cells, FRET study of the system at ultra low concentration to study interaction sites and energies involved.
 - f) The concentration of the receptor and analyte will be reduced to nanomolar and subnanomolar scales to identify the interactions and interaction sites which are responsible for functional consequences.
 - g) Electrochemical characterizations of analyte e.g. urea/glucose at different corresponding receptor/substrate concentration both being at nanomolar and further ultra low concentrations using electrochemical techniques. This step will be the guide to hypothesis.
 - h) Thiol group will be used as QD ligand for substrate linkage. The enzyme, which is in close proximity of the probe, is then expected to be covalently attached to donor QD. Emission spectra will be observed during the reaction to monitor the catalytic activity.

10. A brief Overview of the project:

Fluorescence resonance energy transfer (FRET) is a powerful tool used extensively to study molecular interactions and reaction pathways to determine changes in molecular proximity. So far, molecular dyes and fluorescence proteins are used as probe for FRET but use of quantum dots (QDs) as fluorescence probes made FRET more powerful over traditional end point techniques like real-time PCR, HPLC etc. The goal of this proposed research is to develop a novel type of biosensor that allows real-time enzyme activity monitoring via Förster-type FRET between QDs and organic fluorophores. Urease that hydrolyses urea and glucose-glucose oxidase will be used as a model system. The focus will be on two aspects: (1) To demonstrate FRET-based QD sensor for enzyme-substrate bonding and achieve a better sensitivity at ultralow concentration (nM). (2) To establish a methodology for real-time fluorescence analysis of enzyme catalytic kinetics and fluorescence efficiency

11. **Infrastructure created from the project:**

Spectrofluorometer, Digital Oscilloscope

12. **Project outcomes:**

Proposed work has just started, equipments are purchased and work is in progress.

13. **Benefits from the project to the society:**

It will help in understanding the bio compatibility, protein conformation changes and ultra low level detection of biomolecules

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Photoanode preparation using nanostructured composite metal oxides for dye sensitized solar cells
3. **Principal Investigator:** Prof Shafeeque Ahmad Ansari.



4. **Co-Investigator:** Prof Zubaida Ansari



5. **Funding Agency:** CSIR
6. **Amount funding:** INR 15,50,000
7. **Duration of the Project:** 3 Year
8. **Starting date of the Project:** May 01, 2012
9. **Project objectives:**
 - a) Preparation of photoanode based on nanostructured composite metal oxide for better photo-conversion properties.
 - b) Synthesize nanomaterials of composite metal oxide with TiO_2 using hydrothermal and solution based techniques.
 - c) Electrode preparation on FTO substrates using screen printing or doctor blade technique.
 - d) DSSC fabrication by using conventional sandwich technique.
 - e) Material characterization in term of their chemical identification, structural and morphological observations.
 - f) DSSC characterization for photo-conversion efficiency, quantum efficiency, fill factor; ICPE, impedance spectroscopy etc.
 - g) Improve the performance of TiO_2 based DSSC using semiconductor nanostructured composite materials to about 8-10% conversion efficiency.
10. **A brief overview of the project:**

Formation of space charge via recombination of photo-injected electrons is a difficult task in DSSCs indicating higher recombination rate due to the absence of an energy barrier at the electrode/electrolyte interface. The high recombination rate can therefore be reduced by use of bilayer electrode, composite semiconductor (metal oxide) electrode, therefore investigation on use of composite materials such as ZnO ,

TiO₂, SnO₂, NiO, CdS, MgO, CdO etc. will be critically needed. The recent trend in the development of DSSC therefore focuses on the use of composite materials such as ZnO/TiO₂, ZnO/SnO₂, CdS/MgO etc. Even though, nanocrystalline TiO₂ reduces the recombination rate by forming an energy barrier at the electrode/electrolyte interface, still the conversion efficiency needs to be improved. Due to the lower charge transfer resistance, a larger electron injection driving force and consequently a large photocurrent (I_{sc}) can be obtained. The material parameters such as grain size, porosity, surface area, amount of dye absorption etc. affects the overall cell performance. Therefore the synthesis of composite becomes the key issue in such DSSC based on composites for, further improvements in the performance

11. Infrastructure created from the project:

Equipment:

Hydraulic Press, Box Furnace, Convection Oven, Probe station, Lath/drill machine

12. Project outcomes:

In first step, commercially available nanoparticles of TiO₂ (P25) were purchased from EVONIK Industries, Germany and used for Calcination and doping with Cd, Cu, Zn etc. As-purchased commercial nanopowder of TiO₂ was calcined in air ambient using a tubular furnace in cycle of five hours at 200^o C, 400^o C, 500^oC and 600^oC with natural cooling to room temperature. The calcined powder was finely ground using agate-mortar and pestle and then used for film preparation along with seven natural colour pigments. The colour pigments were extracted using ethanol as extracting solvent from different flower species namely *Calandula Yellow (CY)*, *Calandula Orange (CO)*, *Sweet Poppy (SP)*, *Sweet William (SW)*, *Rabbit Flower (RF)*, *Aster Flower (AF)*, *Dahelia Yellow (DY)* and *Dahelia Violet (DV)*. To study the effect of these flower extracts on calcined powder, extracts were drop casted thick films of calcined and doped TiO₂ powder. The thick films of the calcined powder were prepared using conventional screen printing technique on FTO substrate. These films were used to study the effect of photon irradiation on their electrical properties. For all samples initially a fixed amount of N719 dye (60µL, prepared in 0.3m Mruthenium (II) 535 bis-TBA. N-719, Solaronix) was drop casted and left for drying overnight in dark. Then each flower extract (60µL) was drop casted on this and left for soaking (natural drying) in dark.

The colour pigments were extracted using ethanol as extracting solvent from different flower species namely *Calandula Yellow (CY)*, *Calandula Orange (CO)*, *Sweet Poppy (SP)*, *Sweet William (SW)*, *Rabbit Flower (RF)*, *Aster Flower (AF)*, *Dahelia Yellow (DY)* and *Dahelia Violet (DV)*. To study the effect of these flower extracts on calcined powder, extracts were drop casted thick films of calcined and doped TiO₂ powder. The thick films of the calcined powder were prepared using conventional screen printing technique on FTO substrate. These films were used to study the effect of photon irradiation on their electrical properties. For all samples initially a fixed amount of N719 dye (60µL, prepared in 0.3m Mruthenium (II) 535 bis-TBA. N-719, Solaronix) was drop casted and left for drying overnight in dark. Then each flower extract (60µL) was drop casted on this and left for soaking (natural drying) in dark.

Five research papers have been already published based on these work addressing different aspects of the proposed research work

List of Publications

- a) Manoj Kumar Patel, Md. Azahar Ali, Ved Varun Agrawal, Z. A. Ansari, S. G. Ansari, Bansi D. Malhotra, Nanostructured Magnesium Oxide biosensing platform for cholera detection, *Applied Physics Letters*, 102 (2013), 144106.
 - b) Manoj Kumar Patel, Md. Azahar Ali, Md. Zafaryab, Ved Varun Agrawal, M. Moshahid Alam Rizvi, Z. A. Ansari, S. G. Ansari, Bansi D. Malhotra, Biocompatible nanostructured magnesium oxide-chitosan platform for genosensing applications, *Biosensors and Bioelectronics*, 45, (2013), 181-188.
 - c) Amit Kumar, Shabihur Rahman, S. N. Kazim, Z. A. Ansari, S. G. Ansari, Application of glutathione coated ZnO nanoparticles to study the oxidative stress in bacterial cells, *Material Focus*, 2, (2013), 148-154.
 - d) Amit Kumar, Sumitra Arora, Navin Mogha, Salem S. Al-Deyab, Z. A. Ansari, S. G. Ansari, Glutathione coated Zinc oxide nanoparticles: a promising material for pesticide detection, *Energy and Environment Focus*, In press.
 - e) Manoj K. Patel, Md. Zafaryab, M. Moshahid Alam Rizvi, Ved Varun Agrawal, Z. A. Ansari, B. D. Malhotra, S. G. Ansari, Antibacterial and Cytotoxic effect of Magnesium Oxide nanoparticles on bacterial and human cells, *Journal of Nanoengineering and Nanomanufacturing*, 3, (2013) 162-166.
 - f) S. G. Ansari, Fatima Tuz-Zehra, Z. A. Ansari, Effect of calcination temperature and flower extracts on the photo conducting properties of Titanium dioxide, *Journal of Nanoengineering and Nanomanufacturing*, 3, (2013), 131-137.
 - g) Manoj K. Patel, Jay Singh, Manish K. Singh, Ved Varun Agrawal, S.G. Ansari and B. D. Malhotra, Tin Oxide Quantum Dots Based DNA Sensor for Pathogen Detection, *Journal of Nanoscience and Nanotechnology*, 12, (2012), 1-8.
 - h) S. G. Ansari, Laitka Bhayana, Ahmad Umar, A. Al-Hajry, Salem S. Al-Deyab, Z. A. Ansari, Understanding the effect of flower extracts on the photoconducting properties of nanostructured TiO₂, *Journal of Nanoscience and Nanotechnology*, 12, (2012) 7860-7868.
 - i) Hyung-Kee Seo, C. Michael Elliott, S. G. Ansari, Enhanced Photocatalytic Properties of Nanoclustered P-Doped TiO₂ Films Deposited by Advanced Atmospheric Plasma Jet, *Journal of Nanoscience and Nanotechnology*, 12, (2012) 6996-7001.
 - j) S. G. Ansari, Ahmad Umar, A. Al-Hajry, Salem S. Al-Deyab, Z. A. Ansari, Effect of Flower Extracts on the Optoelectronic Properties of Cd and Sn Doped TiO₂ Nanopowder, *Science of Advanced Materials*, 4, (2012) 763-770.
 - k) Atul Kulkarni, Rizwan Wahab, S. G. Ansari, Tae-Sung Kim, Salem S. Al-Deyab, Z. A. Ansari, *Photoconducting properties of a unit nanostructure of ZnO assembled.*
13. **Benefits from the project to the society:**
The proposed material for DSSC will help in producing cheaper solar cells and hence it will benefit the society as a cheap and alternate energy source

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Study the effect of Synthesized Ionic Liquid on the Stability of Membrane Proteins in presence/ absence of Water
3. **Project Investigator:** Dr. Rajan Patel



4. **Co-Investigator:** Dr. Prashant Singh, A.R.S.D College, University of Delhi



5. **Funding Agency:** DST
6. **Amount funding:** INR 33,70,000
7. **Duration of the Project:** 3 Year
8. **Starting date of the Project:** September 01, 2012 to September 31, 2015
9. **Project objectives:**
 - a) Design a new class of ionic liquids based on pyrrolidone and morpholine rings and their characterization using NMR and FT-IR techniques. Also their purity will be determined using HPLC.
 - b) Evaluate physical properties of synthesized ionic liquids like viscosity, surface tension conductivity.
 - c) Determine the interaction of ionic liquid with membrane proteins.
 - d) Optimization of stability and behaviour of membrane proteins in ionic liquid using
 - e) Circular Dichroism (CD), Fluorescence, UV-Visible spectroscopy, transmission electron microcopy (TEM) techniques.
10. **A brief overview of the project:**

A membrane protein is a protein molecule that is attached to, or associated with the membrane of a cell or an organelle. Membrane Proteins commonly function as complexes. These complexes are vital to cellular function. Reoccurring in recent literature are the ideas that membrane protein complexes assemble in an orderly fashion, chaperones aide assembly by preventing unfavourable interactions, and

membrane proteins can be interchanged in existing complexes. Membrane protein complexes assemble through the orderly assembly of intermediates.

The structures of membrane proteins are stabilized by weak interactions and influenced by additional interactions with the solubilizing environment. The influence of the environment on membrane protein structures is especially significant. Thus, stability of membrane protein is a crucial step in the fabrication of protein based devices. Also the characterization of the interactions and structure of membrane proteins is extremely important in order to understand their physiology, facilitate the rationale of effective drug design and develop new therapies. There are number of solvent system to stabilize the membrane proteins like surfactants, osmolytes, sugars, buffers etc. as compared to ionic liquid.

This is due in part to the less knowledge of ionic liquid as solvent system to stabilize the membrane proteins. Thus to study diverse membrane proteins, it is very crucial to select the right solvent system to stabilize and solubilize them for analysis. A very few studies have examined how various ionic liquids can stabilize membrane proteins out of their native membrane environment. However, there is still no single ionic liquid that can be universally employed for all membrane proteins. Because of the lack of knowledge on the interaction between ionic liquid and membrane proteins, the choice of a ionic liquid for a specific membrane protein remains purely empirical

11. Infrastructure created from the project:

- a) Dynamic Tensiometer,
- b) -800 (deep freezer),
- c) Vacuum oven

12. Project outcomes:

- a) Role of 1-methyl-3-octylimidazolium chloride in the micellization behavior of amphiphilic drug amitriptyline hydrochloride Colloids and Surfaces B: Biointerfaces, 112. 2013.
- b) Spectroscopic and docking studies on the interaction between pyrrolidinium based ionic liquid and bovine serum albumin, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 124. 2014.
- c) Recent advances in the applications of ionic liquids in protein stability and activity: A Review, Applied biochemistry and biotechnology, In press 2014.
- d) Micellization behaviour of the amphiphilic drug phenothiazine hydrochloride with 1-decyl-3-methylimidazolium chloride and its thermodynamic characteristics, Journal of Molecular Liquids, Revised and submitted 2014.
- e) Probing HSA-Ionic Liquid Interaction by Spectroscopic and Molecular Docking Method, Biochemical and Biophysical Communication, Communicated.

Conference participation

- a) Interaction Of N,N-Dimethyl Pyrrolidinium Iodide Ionic Liquid With Bovine Serum Albumin Aqueous Medium: A Thermodynamic Approach, National Symposium On Frontier Of Biophysics, Biotechnology & Bioinformatics, Department Of Biophysics & Centre For Excellence In Basic Sciences, University of Mumbai, January 13-16, 2013

b) Mapping of interacting behaviour of N,N-Dimethyl Pyrrolidinium Iodide Ionic Liquid with human serum albumin: fluorescence & time resolved spectroscopic study, IISC, JMI, December 2012

13. [Benefits from the project to the society](#): N/A

14. [Any other information you may think is important in this regard](#):

This project will greatly help in research activity and further it provides necessary impetus for organizing and executing high quality research and teaching among the faculty in our research centre. Presence of good research atmosphere in the centre inspires many young students and attracts them to take up research as their career.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Study the effect of Synthesized Gemini Surfactants having different spacer group on the stability of Membrane Proteins in aqueous medium
3. **Project Investigator:** Dr. Rajan Patel



4. **Co-Investigator:** None.
5. **Funding Agency:** DST
6. **Amount funding:** INR 12,00,000
7. **Duration of the Project:** 3 Year
8. **Starting date of the Project:** December 01, 2013
9. **Project objectives:**

Extensive studies have revealed that after being taken out of their native membrane environment membrane proteins are not stable and are extremely prone to structural deformation and loss of activity. Some surfactants show promise in the stabilization of membrane proteins but there are no general rules for the selection of surfactants for an individual membrane protein. This selection remains purely empirical because we are far from complete understanding of the interaction between surfactants and membrane proteins. In this context, the major objective of the project is to select the better surfactant for long term stability of the membrane protein, which is highly useful in purification and crystallization of membrane proteins. Thus to achieve our goals, we will synthesised the novel cationic Gemini surfactants and used for stabilizing the membrane proteins not only under ordinal condition but also at high temperatures.

10. **A brief overview of the project:**

Stability of membrane protein is a crucial step during protein purification and crystallization as well as in the fabrication of protein based devices. Also the characterization of the interactions and structure of membrane proteins is extremely important in order to understand their physiology, facilitate the rationale of effective drug design and develop new therapies. The number of available structures is increasing rapidly, but very few membrane protein structures are still known as compared with soluble proteins. This is due in part to the low natural abundance and/or low over-expression rate of membrane proteins, and to the difficulties presented by their extraction from the lipid environment and their handling in solution. Thus to study diverse membrane proteins, it is very crucial to select the right surfactants to stabilize and solubilize them for analysis. Several recent studies have

examined how various surfactants can stabilize membrane proteins out of their native membrane environment. However, there is still no single surfactant that can be universally employed for all membrane proteins. Because of the lack of knowledge on the interaction between surfactants and membrane proteins, the choice of a surfactant for a specific membrane protein remains purely empirical.

11. **Infrastructure created from the project:**

- a) Dynamic Tensiometer,
- b) -800 (deep freezer),
- c) Vacuum oven

12. **Project outcomes:**

The project started and work is progressing. Research paper writing is in progress.

13. **Benefits from the project to the society:**

The characterization of the interactions and structure of membrane proteins is extremely important in order to understand their physiology, facilitate the rationale of effective drug design and develop new therapies.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Folding and stability of naturally truncated photosynthetic pigment, C-phycoerythrin from cyanobacteria *Phormidium tenue*
3. **Project Investigator:** Dr. Imtaiyaz Hassan



4. **Co-Investigator:** Prof Faizan Ahmad.



5. **Funding Agency:** DST
6. **Amount funding:** INR 39,20,000
7. **Duration of the Project:** 3 Year
8. **Starting date of the Project:** September 01, 2012 to October 30, 2015
9. **Project objectives:**

The following objectives are set to be achieved during the tenure of this proposal:

A. To investigate the effect of deletion of the 31 N-terminal residues on the structure of the C-PE using:

- a) Far-UV CD (a probe for secondary structural contents).
- b) Near-UV and Soret CD (a probe for tertiary structural element).
- c) Bilin chromophore fluorescence (a probe to elucidate the tertiary structure details near the fluorophore).

B. To investigate the effect of deletion on the conformational stability and folding mechanism of WT (wild-type) and α -CPE

- a) Studies of guanidinium chloride (GdmCl)-, urea- and weak salts-induced denaturations of WT protein and deleted protein.
- b) Study of physic-chemical characterization of all equilibrium states of both WT and deleted proteins, using CD, fluorescence absorption and dynamic light scattering techniques.
- c) To determine stability parameters (enthalpy change, entropy change, constant pressure, heat capacity change), from the effect of temperature on the equilibrium of the WT protein and the deleted protein between various states

10. **A brief overview of the project:**

FL- α C-PE and naturally truncated Tr- α C-PE devoid of 31 N-terminal residues were successfully isolated and purified. Truncation does not affect the interaction of PEBs with these proteins. Four different probes, $\Delta\epsilon_{565}$, F_{350} , F_{573} and $[\theta]_{222}$ were used to monitor the effect of urea on FL- α C-PE and Tr- α C-PE to compare their stability. A very small difference in the values of ΔG_D^0 between FL- α C-PE and Tr- α C-PE was observed, for the full length protein is only ~ 1 kcal mol⁻¹ more stable than the truncated protein. The 31-residue long N-terminal segment in the FL- α C-PE does not perturb the function of FL- α C-PE. Truncation has no effect on the mechanism of folding, for both proteins undergo a two-state transition between N and D states. Our MD simulation results show the stable nature of both variants (FL- α C-PE and Tr- α C-PE) and support the experimental observations that the biological activity is retained in the absence of these residues. This study of the structure, function and stability of FL- α C-PE and the naturally truncated Tr- α C-PE could be helpful for a better understanding of the mechanism of energy transfer in photosynthetic blue-green algae and other lower organisms.

11. [Infrastructure created from the project](#): Akta Purifier Chromatography System

12. [Project outcomes](#):

- a) Anwer K, Sonani R, Madamwar D, Singh P, Khan F, Bisetty K, Islam A, Ahmad F and Hassan MI (2013) Folding and stability of C-phycoerythrin: Molecular dynamics simulation and urea-induced denaturation studies. *J Biomolecular Dynamics and Simulation* (In Press).
- b) Anwer K, Rahman S, Parmar A, Sonani R, Madamwar D, Singh P, Islam A, Ahmad F and Hassan MI (2014) Comparative Stability measure of Two Natural variants of Cyanobacterial Phycoerythrin. *Arch Biochem Biophys* (In Press)

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Structure and Functional Analysis of Putative Conserved Proteins from Common Indian Pathogens
3. **Project Investigator:** Dr. Imtaiyaz Hassan



4. **Co-Investigator:** Prof Faizan Ahmad



5. **Funding Agency:** ICMR
6. **Amount funding:** INR 29,96,900
7. **Duration of the Project:** 3 Year
8. **Starting date of the Project:** February 1, 2012 to January 31, 2015
9. **Project objectives:**
 - a) Selection of some critically important pathogens such as, *Candida*, *Rickettsiae*, *Aspergillus*, *Plasmodium*, *Bordetella*, *Mycobacterium*, etc.
 - b) Genome analysis and selection of proteins of 'unknown functions' i.e., Hypothetical Proteins (HPs).
 - c) Gene annotation with special reference to information about HPs and their possible functions in virulence.
 - d) Sequence analysis and prediction of proposed functions.
 - e) Structure prediction through homology modelling.
 - f) Structure analysis and functional assignment.
 - g) Search for possible drug targets and identification of virulent factors in these pathogens.
 - h) Search for future prospective and application
10. **A brief overview of the project:**

In this project we have analyzed the published genome sequence of various common Indian pathogens and collected information for those genes whose functions are still not described. Investigation of sequence-function relationships has become a fundamental necessity. Understanding these relationships will be crucial for moving from an inventory of protein parts to a more profound understanding of the molecular machinery of organisms at a systems level. Here we have combined the latest versions of several protein family databases, protein motifs, intrinsic features from the amino acid sequence, sequence-function relationship, as well as pathway and genome context methods to assign a precise function to hypothetical proteins for which no experimental information is available. This work will be useful for those scientists who are working in the area of bacterial pathogenesis and structure based rational drug design.

11. [Infrastructure created from the project:](#)

Two workstations with UPS and Discovery Studio Suit

12. [Project outcomes:](#)

Shahbaz M, Ahmad F and Hassan MI (2013) Functional Annotation of Conserved Hypothetical Proteins from Haemophilus influenzae Rd KW20 PlosONE 8(12): e84263.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Compilation of Useful Information for Indian Diseases through an Online Database Management: a Useful Resource for Researcher and Public Awareness
3. **Project Investigator:** Dr. Imtaiyaz Hassan



4. **Co-Investigator:** Prof Faizan Ahmad



5. **Funding Agency:** UGC
6. **Amount funding:** INR 12,60,400
7. **Duration of the Project:** 3 Years
8. **Starting date of the Project:** November 01, 2011 to October 30, 2014
9. **Project objectives:**

The following objectives are set to be achieved during the tenure of this proposal:

- a) To collect important information about common Indian diseases.
- b) To create an organized and user friendly website, which can be very useful resource for researcher as well as general Indian population.
- c) Sharing scientific research information about all the identified human diseases.
- d) To offer users easy access to database content and to retrieve the data in a downloadable form that are stored in a relational database management system.
- e) Development and implementation of various biological tools that enable comparison and relationship between diseases to answer a specific biological question.
- f) To provide statistical information on disease prevalence in certain geographical population.
- g) To minimize the chances of "false discovery" by focusing on all types of information concerning a disease.
- h) Increase the public awareness of neglected and tropical diseases.
- i) Setting targets for constantly updating the database for up to date information on diseases and evaluation of information.

Here our aim is to collect important information about common Indian diseases in order to create an organized and user friendly website which can be very useful resource for researcher as well as general Indian population. Sharing scientific research information about all the identified human diseases. This online portal will offer users easy access to database content and to retrieve the data in a downloadable form that are stored in a relational database management system. This work also involves the development and implementation of various biological tools that enable comparison and relationship between diseases to answer a specific biological question. We will also provide statistical information on disease prevalence in certain geographical population to minimize the chances of "false discovery" by focusing on all types of information concerning a disease.

10. [A brief overview of the project:](#)

The online resources will be helpful to increase the public awareness of neglected and tropical diseases and setting targets for constantly updating the database for up to date information on diseases and evaluation of information

11. [Infrastructure created from the project:](#)

Three workstation and UPS

12. [Project outcomes:](#)

Tasleem M, Ahmad F and Hassan MI (2013) Structure–function analysis of an evolutionary conserved protein, MYH8, which mediates Trismus-pseudocamptodactyly syndrome. *J Protein and Proteomics* 4: 40

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** An in vitro study of the role of hepatitis B virus X protein in the development of hepatocellular carcinoma by investigating its involvement in expression of cyclin A1/A2 and associated proteins
3. **Principal Investigator:** Dr. Syed Naqui Kazim



4. **Co-Investigator:** None
5. **Funding Agency:** DST
6. **Amount funding:** INR 46,83,000
7. **Duration of the Project:** 3 year
8. **Starting date of the Project:** January 22, 2013
9. **Project objectives:**
 - a) To study and compare the expression profile of cyclin A1/ cyclin A2 in hepatic cell lines transfected with w/m HBx.
 - b) To study the expression of E2F1, myb, p21, p27, CDK1 and CDK2 in association with cyclin A1/A2 in hepatic cell lines in presence of w/m HBx.
 - c) To study the interaction between cyclin A1/A2 and w/m HBx. To study the effects of HBx mutations on its intracellular localization

10. **A brief overview of the project:**

Cyclin A1/A2 is most important and central protein of cell cycle, expressed in late G1, S, G2 and early M phases of cell cycle, and its expression is deregulated in HCC and other cancers. The reason for over expression of cyclin A1 in HCC, and in untransformed hepatic cell lines expressing HBx, is not known till date. Further, which one, cyclin A1 or cyclin A2, to implicate in HCC development is also not clear. We strongly suspect HBx for its role in cyclin A1 over expression in HCC. A lot of research is needed to understand the pathway of HBx induced cyclin A1/A2 over expression in HCC cell lines and untransformed hepatic cell lines. Further, studies of key cell-cycle regulators (E2F1, myb, p21, p27, CDK1 (CDC2) and CDK2) involved in cyclin A1/A2 over expression/over functioning/inhibition will provide better insights into the mechanism of HCC development by HBx.

The following salient points have been the prime reason in order to undertake the proposed study:

- a) Study of the effects of different HBx mutations on expression of cyclin A1/A2.
- b) Investigations to find the implications of either or both of cyclin A1/A2 in hepatocyte transformation.

- c) . Study of the implications of key cell cycle proteins E2F1, myb, p21, p27, CDK1 and CDK2 in hepatocyte transformation, and the effect of HBx mutations on expression and functioning of these proteins.

11. **Infrastructure created from the project:**

The project till now has contributed to develop the facilities of protein analysis studies with the help of Western blotting. The major expected contribution by the project is yet to be established in terms of infrastructure. It would be Fluorescent microscopy facility for the laboratory which will immensely help in localization studies in the cells. For this grant has been given in this project, the facility is to be procured very soon.

12. **Project outcomes:**

Real time PCR based preliminary data of gene expression for the transcriptional factors and cell cycle regulatory proteins have come up with encouraging results (unpublished). Further studies are being continued to reach at concrete and definitive publishable results and conclusions.

13. **Benefits from the project to the society:**

Generated data from the studies of the project are expected to contribute substantially to the available scientific literatures with respect to the precise role of cyclin A1/A2 in HCC development through HBV. Further, we may be able to understand if cyclin A1 and/or cyclin A2 are involved in HCC development. We strongly suspect HBx for its role in cyclin A1 over expression in HCC. Our experiments committed in the project would also throw light to unravel the pathway of HBx induced cyclin A1/A2 over expression in HCC cell lines and untransformed hepatic cell lines. Further studies of cell-cycle regulators (E2F1, myb, p21, p27, CDK1, and CDK2) are expected to provide better insights into the mechanism of hepatocarcinogenesis.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Molecular Epidemiology of Dengue and Chikungunya Viruses in Delhi
3. **Principal Investigator:** Dr. Shama Parveen



4. **Co-Investigator:** Prof. Shobha Broor



5. **Funding Agency:** UGC
6. **Amount funding:** INR 10,15,000
7. **Duration of the Project:** 3 Years
8. **Starting date of the Project:** July 01, 2013 to June 30, 2016
9. **Project objectives:**

To detect dengue and chikungunya viruses in suspected patients from a local Health Centre, Delhi by ELISA and/or RT-PCR and/or virus isolation.

Molecular characterization of dengue and chikungunya strains obtained from patients by DNA sequencing followed by phylogenetic analysis.

To correlate the severity of disease with single and mixed viral infection with multiple dengue serotypes and/or chikungunya viruses.

10. A brief overview of the project:

A total of 540 suspected samples were collected from September 2011 to November 2013. Diagnosis of dengue virus infection was done by RT-PCR on 540 samples using published primers. Chikungunya virus detection was carried out by RT-PCR on 400 samples. Dengue virus was detected in 380 (70%) of the samples tested by RT-PCR while chikungunya virus was detected in 25 (6.25%) samples. Dengue virus type 2 was detected in most of the samples (82%) whereas dengue virus type 1 was detected in 18%, dengue virus type 3 in 17% and dengue virus type 4 in 7% samples. CoCo-infection with both dengue and chikungunya viruses was detected in 9 (2.25%) samples. Molecular characterization of dengue and chikungunyavirus strains was done by DNA sequencing and phylogenetic analysis of the envelope protein genes. A total of 79 DENV strains were sequenced for partial envelope gene. Phylogenetic analysis grouped DENV-1 strains in American African genotype, DENV-2 in Cosmopolitan genotype and DENV-3 strains in Genotype III. A 612bp of the E1 protein gene of 20 CHIKV was analysed in the present study. All the twenty strains clustered within the ECSA genotype of Chikungunya virus.

Dengue NS1 antigen was detected in 9 (16%) of the 57 samples (≤ 4 days of illness) tested by ELISA. IgM ELISA and IgG ELISA for DENV were done on 47 samples (≥ 3 days of illness) and 8 samples (17%) were found positive for each test. Four out of forty samples tested were found to be positive by IgM capture ELISA for CHIKV infection

11. Infrastructure created from the project: Polymerase chain reaction machine and its accessories (PCR workstation, horizontal electrophoresis and pippets

12. Project outcomes:

Ph. D Enrolled details

Farah Deeba: Molecular Characterization of E1 Protein gene of Chikungunya virus strains from Delhi.

Nazia Afreen: Genetic variability in E protein gene of circulating dengue virus strains from Delhi

Details of the Publications

Molecular Characterization of Dengue and Chikungunya virus Strains Circulating in new Delhi, India (submitted to Infection genetics and evolution in December 2013)

The 2013 Dengue fever outbreak of Delhi, India: dominant circulation of dengue virus type 2 and high rate of co-infection of serotypes (Manuscript under preparation)

13. Benefits from the project to the society:

Thousands of cases of DENV and CHIKV infections are reported from Delhi every year. Dengue and Chikungunya are arbo-viral infections which are spread mainly by *Aedes aegypti* mosquitos. Because of the common vector, chikungunya fever spreads most commonly in dengue endemic regions and has been under-reported. In the present study serological and molecular investigations are being carried out on blood samples of suspected dengue and chikungunya patients from Delhi. Molecular characterization of circulating DENV and CHIKV strains is important for tracking the movement and evolution of these viruses so as to assist in design and implementation of control strategies.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Cloning and expression of wild type and mutant envelope proteins of chikungunya virus in bacterial system and there biophysical characterization.
3. **Project Investigator:** Dr. Shama Parveen



4. **Co-Investigator:** Dr. Asimul Islam



5. **Funding Agency:** CSIR
6. **Amount funding:** INR 24,00,000
7. **Duration of the Project:** 3 Year
8. **Starting date of the Project:** November 01, 2012
9. **Project objectives:**
 - a) To clone and express wild type E1 and E2 protein genes of chikungunya virus from prototype strain and mutant genes from characterized laboratory strains in bacterial system.
 - b) Expression and purification of the wild type and mutant E1 and E2 proteins from the bacterial system.
 - c) Structural characterization of the wild type and mutant E1 and E2 protein by biophysical methods.
 - d) Determination of stability parameters like ΔG_D , ΔH_m and T_m of the wild type and mutant proteins under various conditions like temperature and pH
10. **A brief overview of the project:**

A number of studies have investigated the molecular epidemiology of chikungunya virus from different parts of the world including India by phylogenetic analysis of different genes. A few investigations have attempted cloning and expression of chikungunya virus envelope genes in bacterial system for in insect cell systems for cell fusion studies and diagnosis. No information is available about cloning and expression of the two envelope protein genes individually in bacterial system along with their

biophysical characterization. Further no data is available on cloning and expression of envelope genes from Indian laboratory strains/isolates. The present study is thus planned to clone and express the wild type and mutant envelope protein genes of chikungunya virus in bacterial system. In addition, biophysical techniques will be used to determine the secondary, tertiary and quaternary structures of the proteins. Biophysical characterization of E1 and E2 proteins of chikungunya virus will have implications for vaccine development because both E1 and E2 proteins are the vaccine candidates. Besides this large amount of proteins generated can be used for development of diagnostic assays based on Indian strains.

11. **Infrastructure created from the project:**

Laminar flow, incubator cum shaker, ice machine, weighing balance.

12. **Project outcomes:**

The envelope protein genes of chikungunya virus (E1 and E2) have been codon optimized and synthesized by commercially (Biolink). The two genes have been successfully cloned in PET vector. We are now working on expression of these genes in the bacterial system.

One CSIR SRF and one ICMR JRF have been working on this project

13. **Benefits from the project to the society:**

Biophysical characterization of envelope proteins of chikungunya virus will have implications for vaccine development because both E1 and E2 proteins are the vaccine candidates. Besides this large amount of proteins generated can be used for development of diagnostic assays based on Indian strains.

Centre for Interdisciplinary Research in Basic Sciences

1. Name of the Centre: Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Relation between Stability and Functional Activity of Proteins in the Presence of Different Sizes of Sugar Osmolytes
3. **Project Investigator:** Dr. Asimul Islam



4. **Co-Investigator:** None
5. **Funding Agency:** CSIR
6. **Amount funding:** INR 24,00,000
7. **Duration of the Project:** 3 year
8. **Starting date of the Project:** October 1, 2013 to September 30, 2016
9. **Project objectives:**

During the last three decades extensive studies have done to investigate the effect of osmolytes on the stability and function of proteins. The general conclusions from these studies have been that osmolytes with the exception of urea are preferentially excluded from protein-water interfaces to different extents. There are at least two reasons for the origin of this project. (i) Osmolytes effect on protein stability is not universal rather depend on the type of solution condition, and (ii) Some osmolytes perturb enzyme function while some do not even when the protein stability is increased to a large extent. In order to test the relationship between the function and stability of proteins in the presence of sugars, we plan to measure enzyme activity and thermodynamics stability (ΔG_D^0) of a model proteins which may be lysozyme and β -lactalbumin, in the absence and presence of different concentrations of sugars of various sizes (mono-, di-, tri-, and tetrasaccharides) at near physiological pH and 25 °C. To understand the role of sugar polyols in terms of their sizes as well as of their mixtures on protein folding, crowding agents of sugars of different sizes are used. Such experiments allow conclusions about the influence of molecular crowding of osmolytes on biochemical processes occurring in the cells

10. **A brief overview of the project:**

Many organisms survive in various stresses by synthesizing and accumulating low molecular weight organic compound called osmolytes that arose by natural selection and have the ability to stabilize intracellular proteins against the environmental stress. It is well known that osmolytes stabilizes proteins and induce folding of aberrant

proteins and therefore, it is of therapeutic use for a large number of protein misfolding diseases. Osmolytes may be divided into four groups on the basis of their chemical structure. These are sugars (glucose, fructose, sucrose, trehalose, raffinose, stachyose), polyols (mannitol, glycerol, sorbitol, inositol, pinitol), free amino acids (glycine, alanine, proline) and their derivatives (taurine, octopine, β -alanine), methylated ammonium and sulphur compounds. They impart protection and stabilization to the macromolecule. During the last three decades extensive studies had been done to investigate the effect of osmolytes on the stability and function of proteins. The general conclusions from these studies have been that osmolytes with the exception of urea are preferentially excluded from protein-water interfaces to different extents. Solutes with such properties will displace protein equilibrium towards states with low surface area (i.e., they will stabilize the folded (native) state over denature forms). Even though it is generally accepted that stabilizing osmolytes are the selective advantage for organism to adapt to environmental stresses, less is known about the interrelationship between the stability provided by most of the common osmolytes and the effect of enzyme activity. There are at least two reasons for the origin of this project. (i) Osmolytes effect on protein stability is not universal rather depend on the type of solution condition, and (ii) some osmolytes perturb enzyme function while some do not even when the protein stability is increased to a large extent. For example, osmolyte like sugars and methylamines change both the thermodynamics stability and functional activity. There are osmolytes that increase thermodynamics stability without perturbing the functional activity of the proteins. Studies of protection against activity loss/gain associated with the naturally occurring osmolytes have generally focused on the characterization of enzyme activity and stability in the presence of protecting osmolytes when the system is subjected to heat stress or denaturing stress such as the presence of urea. Such studies appear to support the premise that osmolytes stabilize proteins against denaturing stresses and suggest that a more quantitative and detailed investigation would be useful in establishing the scope and character of the phenomena.

Among stabilizing osmolytes, sugars are usually dominant solute accumulated in organism to protect the proteins in terms of loss of activity and chemical and thermal denaturations. They have also been found to be effective stabilizers of proteins and biological assemblies when added at high concentrations. Moreover, it has also been observed that stability of the protein is also increased as function of sugar size. Sugars are also useful in modulating the pathway of protein folding. In some *in vitro* studies, it has been shown that acid-denatured cytochrome *c* collapses in a variety of sugar solutions to a form that resembles the native state in size as well as structure. In other study, it has been observed that glucose at high concentration does not affect the size of native cytochrome *c* but does cause the collapse of acid-denature cytochrome *c*, which is random coil in dilute solution, to species with the same size and structure as the native protein. Moreover, Bolen and coworkers showed that reduced carboxyamidated ribonuclease A (RCAM) exists in the unfolded state and refolds in the presence of sucrose osmolyte. Very interestingly, recent study of refolding kinetics of carbonic anhydrase II

shows that sucrose significantly accelerate the rate of refolding of carbonic anhydrase to the native or compact near-native conformations, but decrease the fraction of

catalytically active enzyme recovered. Thus they are also an important refolder. Sugars are also described to modulate enzyme activity. Glycerol, sucrose and trehalose were found to decrease the activity (K_{cat}) of H^+ plasma membrane from *Kluyveromyces lactis*. They have shown that polyol sugars increase the viscosity and water activity of the solutions which are the consequences of affecting the kinetic properties of protein. Similarly, various measurements have shown that variety of sugars polyols changed one or more solution properties of the protein and this may be a cause of non-compatibility with the protein function.

A review of literature suggests that refolding by osmolytes may not always lead to catalytically active molecule. In order to test the relationship between the function and stability of proteins in the presence of sugars, we plan to measure enzyme activity and thermodynamics stability (ΔG_D^0) of model proteins which may be lysozyme and α - lactalbumin, in the absence and presence of different concentrations of sugars of various sizes (mono-, di-, tri-, and tetrasaccharides) at near physiological pH & 25 °C.

11. **Infrastructure created from the project:**

Weighing Balance, Electrophoresis Unit, (Horizontal and Vertical with Western Blot Apparatus), Microwave Oven, Refrigerator, Media Filtration Unit, Computer with Printer and UPS

12. **Project outcomes:** Nil

13. **Benefits from the project to the society:**

The outcome of this project may help in increasing the shelf life of proteins. We may propose right combination of mixtures of osmolytes to increase shelf life of proteins.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Effect of Macromolecular Crowding Agent on Protein in the Presence of Sugar Osmolytes
3. **Principal Investigator:** Dr. Asimul Islam



4. **Co-Investigator:** None
5. **Funding Agency:** DST
6. **Amount funding:** INR 24,00,000
7. **Duration of the Project:** 3 Years
8. **Starting date of the Project:** May 01, 2012
9. **Project objectives:**

Crowding agents were found to increase the T_m of many proteins. Crowding agents may increase the abundance of conformational states, which are poorly populated in the dilute solutions. Although a cell compartment can contain microregions that might be more or less crowded than suggested by cell-average concentrations, there will be conditions under which the effects of crowding must be taken into account when analyzing the equilibria and dynamics of macromolecular reactions in physiological environments. Moreover, crowding must also be considered in total genome and proteome analyses to develop quantitative global models of intracellular processes.

10. **A brief overview of the project:**

The process of protein refolding *in vitro* has been studied extensively as a mean of understanding how proteins fold inside cells (Du et al., 2006). These experiments are, mainly for practical reasons, commonly carried out in simple buffer system of 20-50 mM with low concentrations of protein (~ 1-2 mg/ml) in order to avoid aggregation during the refolding reactions (Du et al., 2006). A major difference between these idealized conditions and those encountered within cells is that the intracellular environment is highly crowded due to the presence of high concentrations of soluble and insoluble macromolecules in the cytoplasm which include proteins, nucleic acids, ribosomes, and carbohydrates, (Fulton, 1982; Zimmerman and Trach, 1991). It has been estimated that all the macromolecules in physiological fluid media collectively occupy a lower limit of about 10 % and upper limit of about 40 % of total fluid volume (Fulton, 1982; Record et al., 1998). Therefore, a significant fraction of intracellular space is inaccessible to other macromolecules (Zimmerman and Trach, 1991; Minton, 1992; 1995; Zimmerman, 1993; Medalia et al., 2002; Ellis and Minton, 2003; Zhou et

al., 2004). This has major thermodynamic and kinetic consequences on the properties of macromolecules present in the cell. These effects can be orders of magnitude different from those in the typical dilute solution used to study proteins in vitro (Ellis, 2001). An idea of the magnitude of the excluded volume effect can be obtained from the fact that, if 30% of the volume of a cube is filled with macromolecules of a given size, uniformly distributed, then there is virtually no volume available for additional molecules of a similar size (Minton, 2001); this leads to highly non linear concentration effects of the crowding agent on reaction equilibria and kinetics. Biochemical rates and equilibria in a living cell may be quite different from those under idealized conditions (Zimmerman, 1993). It is therefore surprising that the effects of macromolecular crowding on protein refolding have been mostly neglected with a few exceptions (Martin and Hartl, 1997). The term macromolecular crowding was coined to connote the influence of mutual volume exclusion upon the energetics and transport properties of macromolecules within a crowded, or highly volume-occupied, medium (Minton, 2006). Because of steric repulsion, no part of any two macromolecules can be in the same place at the same time. That part of the total volume which cannot be occupied by the center of mass of a particular solute species at a particular instant is called the excluded volume, and the part of total volume that may be occupied is called the available volume. As the fraction of volume occupied by macromolecules of a given size increases, the fraction of volume available to an additional macromolecule of comparable size decreases rapidly, and becomes much less than the fraction of volume available to solvent (Minton, 2006). So, it is important to note that within a cell a significant volume is occupied by molecules. These molecules (proteins, RNA, sugars and others) are said to provide a crowded environment for any molecule of interest. Hence, this crowding can drastically alter the kinetics or biophysical properties molecules. For example, an *Escherichia coli* cell is only about 2 μm long and 0.5 μm in diameter, with a cell volume of 0.6-0.7 μm^3 (Kubitschek, 1990). However, *E. coli* can contain up to 4,288 different types of proteins, and about 1,000 of these types are produced at a high enough level to be easily detected (Blattner et al., 1997). Added to this mix are various forms of RNA and the cell's DNA chromosome, giving a total concentration of macromolecules of between 300 to 400 mg/ml. In eukaryotes the cell's interior is further crowded by the protein filaments that make up the cytoskeleton, this meshwork divides the cytosol into a network of narrow pores (Minton, 1992). The size of the crowding effect depends on both the molecular mass and shape of the molecule involved, although mass seems to be the major factor with the effect being stronger with larger molecules (Minton, 2008). Notably, the size of the effect is non-linear, so macromolecules are much more strongly affected than are small molecules such as amino acids or simple sugars. Macromolecular crowding is therefore an effect exerted by large molecules on the properties of other large molecules (Minton, 2008). The increase in the strength of interactions between

proteins and DNA produced by crowding may be of key importance in processes such as transcription and DNA replication (Zimmerman and Harrison, 1987; Zimmerman, 1993). Crowding has also been suggested to be involved in processes as diverse as the aggregation of hemoglobin in sickle-cell disease, and the responses of cells to changes in their volume (Minton, 2006). Other important molecules present in cell are low molecular weight organic compounds called osmolytes which are synthesized and accumulated in various environmental stresses. A review of literature suggests that refolding by osmolytes may not always lead to catalytically active molecule (Monterroso and Minton, 2007).

11. [Infrastructure created from the project:](#)

Lyophilizer, Water Bath, Computer with Printer and Power Back

12. [Project outcomes:](#)

Moin Ishrat, Faizan Ahmad and Asimul Islam (2013) Macromolecular Crowding Environment Stabilizes Ribonuclease-A at National Symposium on Frontiers of Biophysics, Biotechnology & Bioinformatics & 37th Annual Meeting of Indian Biophysical Society

13. [Benefits from the project to the society:](#)

The outcome of this project may help in understanding the problem of protein folding in cell like condition.

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** To strengthen the postgraduate teaching and research facilities.
3. **Project Coordinator:** Prof Faizan Ahmad



4. **Co-PI:** Nil
5. **Funding Agency:** DST (FIST)
6. **Amount funded:** INR. 1,50,00,000.
7. **Duration of the Project:** 5yr
8. **Starting date of the project:** 2013 to 2015

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Quantum Dots as novel probes for Fluorescence Resonance Energy Transfer to understand molecular interactions and reaction path ways
3. **PI:** Prof Zubaida Ameen Ansari



4. **Co-PI:** Nil
5. **Funding Agency:** SERB-DST
6. **Amount funded:** INR. 37,90,000

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Microemulsions of ionic Liquid with amphiphilic drugs and their thermodynamics
3. **PI:** Dr. Abbul Bashar Khan
4. **Co-PI:** Nil
5. **Funding Agency:** SERB
6. **Amount funded:** INR. 25,00,000
7. **Duration of the Project:** 3yr
8. **Startig date of the Project:** 2014 to 2017

Centre for Interdisciplinary Research in Basic Sciences

1. **Name of the Centre:** Centre for Interdisciplinary Research in Basic Sciences
2. **Project Title:** Differential Expression of Hyaluronan binding protein (HABP1) during ovulation: Implication in hyaluronan (HA) matrix formation surrounding.
3. **PI:** Dr. Sonu Chand Thakur



4. **Co-PI:** Nil
5. **Funding Agency:** ICMR
6. **Amount funded:** INR. 10,99,580