Curriculum Vitae

Anwesha Bhattacharyya
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Educational Qualifications

03/2009 – 03/2013	**Doctorate student (PhD)** at the Department of Medicine (Unit of Physiology), University of Fribourg, Fribourg, Switzerland Mentor: **Prof. Gregor Rainer** Field of specialization: **Medical Sciences / Neurophysiology** **Thesis title:** Cholinergic modulation of sensory representations in the primary visual cortex of tree shrew (*TUPAIA BELANGERI*)
05/2008 – 02/2009	**Doctorate student (PhD)** at the Max Planck Institute for Biological Cybernetics, Tuebingen, Germany Mentor: **Prof. Gregor Rainer**
04/2007 – 04/2008	**Research student** at the Department of Medicine (Unit of Anatomy), University of Fribourg, Fribourg, Switzerland Supervisor: **Prof. Marco Celio**
06/2004 – 06/2006	**Master of Science (M.Sc.)** in Animal Biotechnology University of Hyderabad, Andhra Pradesh, India **M.Sc. dissertation title-** Role of Calcium binding proteins in Cerebral Ischemia Supervisor: **Prof. P. Prakash Babu**
04/2000 – 04/2004	**Bachelor of Science (B.Sc.)** (Chemistry, Botany, Zoology), Regional Institute of Education, Bhubaneswar, Odisha, India
06/2000 – 04/2004	**Bachelor of Education (B.Ed.)** Regional Institute of Education, Bhubaneswar, Odisha, India

Positions held

11/2017 – 02/2020	Marie Curie/Marie Heim Vogtlin Postdoctoral Research Fellow at the Department of Medicine, Institute for Physiology, University of Bern, Bern, Switzerland Mentor: **Dr. Sonja Kleinlogel**
02/2014 – 04/2015	Postdoctoral Research Fellow at the Center for Neuroscience Children's National Health System, Washington, DC 20010 Mentor: **Prof. Jason Triplett**

Awards/Honours

03/2013	Passed **BENEFRI** (Combined Doctoral program in Neuroscience of three Universities of Switzerland; University of **Be**rn, University of **Ne**uchatel, University of **Fri**bourg) exams in Neuromorphology and Neurophysiology/Neurobiochemistry with excellent grades.
01/2005 – 01/2006	Merit Scholarship in Masters Curriculum from Shantha Biotech Company, Hyderabad, Telangana, India
01/2004 – 01/2005	Merit Scholarship in Masters Curriculum from State Government of Tripura, India

Research Grants awarded

- Marie Sklodowska-Curie Individual Fellowship (H2020 framework) from European Commission, February 2017 (2017 - 2019)
  Project title: The downstream ipRGC thalamocortical visual pathway and its potential role in movement detection
  Grant Nr. 748119; Grant amount: **€187,418.00**

- Marie Heim-Vögtlin grant from Swiss National Science Foundation (SNSF), Bern, Switzerland, December 2016 (2016 - 2018)
  Project title: The downstream ipRGC thalamocortical visual pathway and its potential role in movement detection
  Grant Nr. PMPDP3_171265; Grant amount: **CHF 251,200.00**

Publications

1. On the relation between receptive field structure and stimulus selectivity in the tree shrew primary visual cortex
   Veit J, **Bhattacharyya A**, Kretz R, Rainer G.
   Cereb Cortex. 2014 Oct;24(10):2761-71

2. Basal forebrain activation controls contrast sensitivity in primary visual cortex
   Bhattacharyya A, Veit J, Kretz R, Bondar I, Rainer G.
   BMC Neurosci. 2013 May 16; 14:55

3. Neuropeptide alterations in the tree shrew hypothalamus during volatile anesthesia
   Fouillen L, Petruzziello F, Veit J, **Bhattacharyya A**, Kretz R, Rainer G, Zhang X.
   J Proteomics. 2013 Mar 27;80:311-9

4. Functional and laminar dissociations between muscarinic and nicotinic cholinergic neuromodulation in the tree shrew primary visual cortex
   Bhattacharyya A, Bießmann F, Veit J, Kretz R, Rainer G.
   Eur J Neurosci. 2012 Apr; 35(8):1270-80

5. Neural response dynamics of spiking and local field potential activity depend on CRT monitor refresh rate in the tree shrew primary visual cortex
   Veit J, **Bhattacharyya A**, Kretz R, Rainer G.
   J Neurophysiol. 2011 Nov;106(5):2303-13

6. Functional evaluation of next generation optogenetic toolkit for vision restoration (Manuscript submitted)
   Jakub Kralik, **Anwesha Bhattacharyya**, Michiel Van Wyk, Sonja Kleinlogel

Book Chapter

1. Lipidomics to study the role of lipid droplets in host-pathogen interactions
   Anwesha Bhattacharyya and Vineet Choudhary
   Integrated-omics approaches to infectious disease, 2021 (*in press*)

Scientific Conferences Abstract

10/2019 Society for Neuroscience (SFN) meeting, Chicago, USA
Poster Title: *Luminance and pattern discrimination in visual cortex (V1) of transgenic Opto-mGluR6*
Anwesha Bhattacharyya, Sonja Kleinlogel

06/2019 Clinical Neuroscience Bern, Bern, Switzerland
Poster Title: *Luminance and pattern discrimination in visual cortex (V1) of transgenic Opto-mGluR6*

02/2019 Swiss Society for Neuroscience (SSN), Geneva, Switzerland
Poster Title: *Luminance and pattern discrimination in visual cortex (V1) of transgenic Opto-mGluR6*
Anwesha Bhattacharyya, Sonja Kleinlogel

02/2018 Swiss Society for Neuroscience (SSN), Zurich, Switzerland

11/2014 Society for Neuroscience (SFN) meeting, Washington DC, USA

10/2012 Society for Neuroscience (SFN) meeting, New Orleans, USA
Poster Title: *Effects of Basal Forebrain activation on contrast response and orientation tuning in tree shrew primary visual cortex*
Anwesha Bhattacharyya, Julia Veit, Robert Kretz, Gregor Rainer

02/2012 Swiss Society for Neuroscience (SSN) meeting, Zurich, Switzerland
Poster Title: *Effects of Basal Forebrain activation on orientation tuning and contrast sensitivity in tree shrew primary visual cortex*
Anwesha Bhattacharyya, Julia Veit, Robert Kretz, Gregor Rainer

11/2011 Society for Neuroscience (SFN) meeting, Washington D.C., USA
Poster Title: *Layer specific cholinergic modulation in the tree shrew primary visual cortex*
Anwesha Bhattacharyya, Felix Biessmann, Julia Veit, Robert Kretz, Gregor Rainer

03/2011 Swiss Society for Neuroscience (SSN) meeting, Basel, Switzerland
Poster Title: *Layer specific cholinergic modulation in the tree shrew primary visual cortex*
Anwesha Bhattacharyya, Felix Biessmann, Julia Veit, Robert Kretz, Gregor Rainer

Invited talk

14/06/19 Clinical Neuroscience Bern, Bern, Switzerland
Title: *Luminance and pattern discrimination in visual cortex (V1) of transgenic Opto-mGlur6*

Research work

I have an expertise of 8 years in the field of visual neuroscience. During my PhD I focused on studying how modulation of cholinergic receptors affects the computations within the cortical microcircuit (primary visual

cortex (V1)). I investigated the effects of activation of specific cholinergic receptors such as nicotinic and muscarinic receptors on information processing in V1. I demonstrated that laminar position in V1 plays a critical role in determining the functional consequences of cholinergic stimulation. While the nicotinic receptors enhance the sensory representations, the muscarinic receptors act to boost the cortical computation (Bhattacharyya et al., 2012). Next, I investigated how activation of basal forebrain (BF) using the technique of deep brain stimulation (DBS) affects neural activity in V1. I demonstrated that BF activation results in strong influence on the contrast response properties of V1. The results from the study showed that in addition to cholinergic modulation, the gaba amino butyric acid (GABA) projections in the BF region plays a crucial role in the impact of BF deep brain stimulation of cortical activity (Bhattacharyya et al., 2013).

The major cause of blindness in inherited and age-related retinal degeneration is the death of photoreceptors such as rods and cones. Although the photoreceptors degenerate, there are other neurons in the downstream retina such as bipolar cells and retinal ganglion cells (RGCs) that survive and have potential targets to endow vision. These neurons are targeted for "optogenetic" gene-therapy where a modified virus is injected intravitreally into retina to introduce light sensing into the surviving photoreceptors. Remarkably, these photoreceptors subsequently become functional and have the potential to restore vision. Since the neural responses in V1 correlate to visual perception, it is important to decipher how the neurons in V1 interpret the signals carried by optogenetically restored retinal neurons. Recently I have performed a systematic evaluation of cortical responses from transgenic mice that express the Opto-mGluR6 construct. Opto-mGluR6 is designed for retinal ON-bipolar cells and is a chimeric protein composed of the light sensing domain of a vertebrate opsin and the intracellular G protein coupling domain of the ON-bipolar cell specific glutamate receptor, mGluR6. Interestingly, I found that RGCs in the blind treated mice was able to regain its natural signaling pattern and can transmit the signals from the retina to downstream visual center.

In my future research I would like to investigate the cortical output as a function of retinal degeneration that has not been studied so far. The findings of from my proposed research will bring novel insights about the alterations in cortical signaling that occur during the course of retinal degeneration.