Brijesh Modi

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Gender: Male **Date of birth:** 12/05/1994 **Nationality:** Indian

ABOUT ME

A Computer Engineer and a Neuroscientist.

EDUCATION AND TRAINING

[2018 – Current] **Ph.D in Neuroscience**

Sapienza University of Rome, Italy

[2012 – 2016] **Bachelor of Computer Engineering**

University of Mumbai, India

[2010 – 2012] **Higher Secondary Certificate (H.S.C)**

Maharashtra State Board, India

WORK EXPERIENCE

[01/2020 – 06/2020] **Visiting Research Fellow**

Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Main activities and responsibilities:
Supervisor: Dr. Francesco Battaglia
Project: Intrinsic organization of hippocampal oscillations
- Developed advanced analysis pipelines to study the co-organization of hippocampal network oscillations.
- Learned new techniques for in-vivo electrophysiology recordings in freely moving mice.
- Funded by EMBO short term fellowship.

[01/2018 – Current] **Ph.D Student**

European Brain Research Institute, Rome, Italy

Main activities and responsibilities:
Supervisors: Dr. Enrico Cherubini and Dr. Marilena Griguoli
Project 1: Altered CCK mediated GABAergic currents and hippocampal network oscillations in an animal model of Autism
- Prepared acute brain slices, performed patch clamping to study synaptic transmission in CA2 of mice hippocampus
- In-vivo experiments from awake head restrained mice
- MATLAB scripts to analyze the data.
- PCR to assess genotype.

Project 2: Intrinsic organization of hippocampal oscillations.
- Designed and developed advanced analysis pipelines for end-to-end processing of multi-dimensional neural datasets.
- Analyzed datasets from in-vivo freely moving rats and mice.
- Extracted organizing principles of network oscillations during sleep and awake using network state space approach.
- In collaboration with Dr. Francesco Battaglia's Lab.

Project 3: Network and oopulation state dependent nature of hippocampal sub-population recruitment
- Designed novel framework to study oscillations and neural population simultaneously.
- Utilized publicly available datasets from freely moving and sleeping rats.
- Extracted principles by which neuronal population are recruited during various oscillatory and behavioral states.

Project 4: Spatial point patterns of synaptic markers in a murine model of microglia depletion.
- Analyzed 2D confocal images
- Identified limitations of current appoaches for quantifying localization of synaptic markers
- Designed and developed novel methods to extract furhter information on the same.
- In collaboration with Dr. Silvia Marinelli's Lab.

[09/2016 – 08/2017] **Research Intern**

Max Planck Institute for Brain Research, Frankfurt am Main, Germany

Main activities and responsibilities:
Supervisor: Dr. Hiroshi Ito
Project: Role of retrosplenial cortex in spatial navigation.
- Built tetrode drive and performed surgery on rat for implantation.
- Trained rats and conducted electrophysiological recordings in freely behaving rats.
- Wrote MATLAB scripts to analyze the data.
- Performed perfusion to extract brain and brain slicing to confirm implant locations

[09/2014 – 05/2016] **Founder and Lead Developer**

Nuclei Technologies, Mumbai, India

Main activities and responsibilities:
- Organized and conducted developer oriented workshops on PHP.
- Built and managed a team of 12 marketing Interns from multiple colleges
- Product - **Cloud Concessions**. - An online portal that allows students to apply for railway concession. The first software of its kind is currently (as of Jan 2019) being used by more than 2000 students to get railway concession.
- Web: vesitrail.ves.ac.in

[05/2013 – 05/2015] **Volunteer and Appilcation Developer**

Vivekanand Seva Mandal (NGO), Dombivli, India

Main activities and responsibilities:
- Voluteered in NGO's activity
- Involved in developing application for an engineering library governed by Vivekanand Seva Mandal
- Workshop on LAN technologies and setting up of LAN for around 40 students.
- Project: Library management system based on HTML, CSS, jQuery, AJAX, JavaScript, PHP and MySQL is now running in an Vivekanand's Engineering library. All the records of students, transactions, calculation of late fees, registering a new member etc in library is now managed on this web application

[01/2014 – 07/2014] **Software Engineering Intern**

Tantra Gyan India Business Solutions, Dombivli, India

Main activities and responsibilities:
- Developed web applications using CodeIgniter framework in PHP.
- Designed database in MySQL
- Projects includes Virtual office [Enterprise Resource Plan] and Online Test System.

[09/2013 – 04/2014] **Web Editor**

Computer Society of India, Mumbai, India

Main activities and responsibilities:
- Involved in designing the wireframes for the website of CSI-VESIT (student chapter).
- Assisting in all events conducted by the council. The council conducted 23 events throughout the academic year.
- Conducted workshops on PHP/MySQL and PC Assembling
- Teaching Assistance in workshop on FLASH and .NET Framework.
- Participated in sponsorship drives to various locations in Mumbai to get sponsorship for events.

[01/2014 – 07/2014] **Technical Advisor**

Notemybook, Mumbai, India

Main activities and responsibilities:
- Involved in sharing technical ideas with a startup 'notemybook.com'.
- Developed the user interface for the notemybook.com
- Involved in monitoring the technical requirements of the company and providing appropriate solutions for it.

PUBLICATIONS

Journal and Conference Papers

- **Modi B**, Guardamagna M, Stella F, Griguoli M, Cherubini E, Battaglia F. Intrinsic organization of hippocampal oscillations. (manuscript in preparation)

- **Modi B**, Cherubini E. Network and Population State Dependent Nature of Hippocampal Sub-Population Recruitment (manuscript in preparation)

- **Modi B*,** Pimpinella D*, Pazienti A, Zacchi P, Cherubini E, Griguoli M (2019) Possible implication of the CA2 hippocampal circuit in social cognition deficits observed in the neuroligin 3 knock-out mouse, a non-syndromic animal model of Autism. Frontiers in Psychiatry (* = equal contribution) [Link]

- Basilico B, Ferrucci L, Ratano P, Golia M. T, Grimaldi A, Rosito M, Ferretti V, Reverte I, Sanchini C, Marrone M. C, Giubettini M, De Turris V, Salerno D, Garofalo S, St-Pierre M.-K, Carrier M, Renzi M, Pagani F, **Modi B,** Raspa M, Scavizzi F, Gross CT, Marinelli S, Tremblay M, Caprioli D, Maggi L, Limatola C, Angelantonio S, Ragozzino D. (2021) Microglia control glutamatergic synapses in the adult mouse hippocampus. Glia. [Link]

- A. Tandel, **B. Modi**, P. Gupta, S. Wagle and S. Khedkar, Multi-document text summarization - a survey, *2016 International Conference on Data Mining and Advanced Computing (SAPIENCE)*, 2016, pp. 331-334, .[Link]

HONOURS AND AWARDS

Fellowships

- EMBO – Short Term Fellowship (Host PI: Dr. Francesco Battaglia) [2020]
- European Brain Research Institute Fellowship, Rome, Italy [Jan 2018 - Dec 2019]

SKILLS

Programming and Experimental Neuroscience

- *Programming*: MATLAB, Python, PHP, HTML, CSS, MySQL
- *Ex-vivo electrophysiology*: Preparation of healthy hippocampal slices, whole cell patch clamp, immunohistochemistry, PCR for genotyping.
- *In-vivo electrophysiology (head-restrained)*: Implanting head bar, training mouse for head fixation, recordings in anesthetized and awake conditions.
- *In-vivo electrophysiology (freely moving)*: Building tetrode drive, surgical implantation of drive for chronic recordings, animal handling and behavioral training, electrolytic lesion and brain extraction for reconstruction of tetrode tracks.

ACHIEVEMENTS

Competitive Coding

- Finished in top 10 amongst 25000 in C and Python Competition by University of Mumbai.
- 1st Runner Up at *Algorithms 1.0* intercollegiate hackathon organized by AIKTC - Programmers club

TEACHING ACTIVITIES

Workshops

- PHP and MySQL Workshop (16 hours) - Nuclei Technologies
- Establishing Local Area Network (LAN) for 40 students- Vivekanand Seva Mandal (NGO).
- Workshop on PC Assembly and PHP/MySQL -- Computer Society of India (CSI)-VESIT
- Teaching Assistant -- JAVA and Android Programming - notemybook.com