Dr. Subhadip Paul

The Mind RESEARCH NETWORK
For Neurodiagnostic Discovery

RESEARCH INTERESTS

1) Investigation of the organization principles of human brain circuits in health and diseases using computational/mathematical modeling of large-scale multi-modal neuroimaging signals.

2) Development of multi-modal neuroimaging data analysis methods/tools for diagnosis of brain diseases.

3) How the genetic influence network of human brain is related to non-invasive neuroimaging (MRI)-based structural and functional phenotypes of human brain?

4) How the differences in the structural and functional brain network organization of the people relate to the differences in human cognition?

RESEARCH EXPERIENCES/ WORK EXPERIENCES

Post-doctoral Fellow
The Mind Research Network (Formerly MIND Institute), USA
2019 -

Newton International Fellow (Post-doctoral)
Institute of Psychiatry, Psychology & Neuroscience
King's College London, United Kingdom.
2016 – 2018.

Research Fellow (Post-doctoral)
National Neuroimaging Facility, National Brain Research Centre (NBRC),
Manesar, Gurgaon, India.
2015- 2016

Visiting Research Fellow (Pre-Ph.D)
7 Tesla MRI Team, Image Sciences Institute,
University Medical Centre, Utrecht University,
The Netherlands 2008- 2009

Research Fellow (Pre-Ph.D)
Department of Biomedical Engineering, University of Modena and Reggio Emilia,
Modena, Italy
2007- 2008

EDUCATION

Ph.D (Computational Neuroscience and Neuroimaging) June, **2015**
National Brain Research Centre (NBRC), (Institute under Department of Biotechnology, Govt. of India), Gurgaon, India

*Thesis Title***:** Higher order Diffusion Tensor Imaging and Stochastic Perturbation Response in Brain Tumour.

Thesis Advisor: Professor Prasun K. Roy, NBRC, India (Now at IIT-BHU, Varanasi)

M.Sc in Physics, 2004 (Specialization: Biophysics): 62.6%
Department of Physics, University of Pune, Pune, India

Bachelor of Science, 2002 (Honours in Physics): 55.125%
Scottish Church College, University of Calcutta, Calcutta, India

Higher Secondary Examination, 1998 (10+2 / XII): 86.3%
West Bengal Council of Higher Secondary Education, West Bengal, India

Secondary Examination, 1996 (10 / X): 89.0%
West Bengal Board of Secondary Education, West Bengal, India

RESEARCH FUNDING / GRANT

Awarded GBP 99,000 (approximately Rs. 9324377/-) by the **Newton Fund (UK)** and the **Academy of Medical Sciences (UK)** for the study of "Investigating the role of altered brain network dynamics and connectivity in Schizophrenia" (2016 – 2018). Principal Investigator/ Award holder: **Dr. Subhadip Paul**

FELLOWSHIPS / AWARDS / HONOURS/ SCHOLARSHIPS

1. **Newton International Fellowship** from the **Newton Fund (UK)** and **the Academy of Medical Sciences (UK)** to perform post-doctoral research at King's College London (2016-2018) (selected).

2. One of the publications (Subhadip Paul et al, J. Neural Engineering 2019) was selected as **one of the featured articles in the journal during 2018-2019**.

3. **Research Fellowship** from the **Ministry of University Studies and Research (Republic of Italy)** to perform research for one year at University of Modena, Italy (2007-2008) (selected).

4. **Research Fellowship** from the **Utrecht University (The Netherlands)** to perform research at Image Sciences Institute, University Medical Centre, Utrecht University, The Netherlands (2008) (selected).

5. **Travel Grant** from the **International Brain Research Organization (IBRO)** and **the Society for Neuroscience (SFN)** to present at Society for Neuroscience annual meeting (2014) (selected).

6. **Travel Award** from the Scholarship Committee, Stochastic Resonance 2008, **University of Perugia, Italy** (2008) (selected).

7. **International travel grant** from **Department of Biotechnology, Government of India** to present at Society for Neuroscience annual meeting (2012) (selected)

8. **National Scholarship** from **Ministry of Human Resource Development (MHRD)**, Government of India for **securing rank** in Secondary Examination (1996-1998) (selected).

9. **Certificate of appreciation** from the District Council, **Government of West Bengal** for securing rank in the district in Secondary Examination (1996) (selected).

10. Received **National Scholarship** at the Secondary stage based on merit in National Scholarship Examination of **Government of West Bengal, India** (1993-1996) (selected).

INTERNATIONAL PATENTS

Prasun K. Roy, **Subhadip Paul**. Technique to enhance the clinical efficiency of radiotherapy and radiosurgery using perturbative beaming and tissue-specific radiobiology.

1. **U.S. Patent:** US8804906 B2 **(Status: patent granted/issued)**
https://patents.google.com/patent/US8804906B2/en

2. **Canadian Patent:** CA2778337C **(Status: patent granted/issued)**
https://patents.google.com/patent/CA2778337A1/en

INTERNATIONAL PUBLICATIONS (Refereed)

1. Subhadip Paul, Arora A, Midha R, Vu D, Roy PK, Belmonte MK. Autistic traits and individual brain differences: Functional network efficiency reflects attentional and social impairments, structural nodal efficiencies index systemising and theory-of-mind skills. *Molecular Autism*, in press, vol 12, 2020.

2. Velayudhan L, Francis S, Dury R, **Subhadip Paul**, Bestwn S, Gowland P, Bhattacharyya S. Hippocampal functional connectivity in Alzheimer's disease: a resting state 7T fMRI study. *International Psychogeriatrics*, in press, 2020.

3. Subhadip Paul, Satyam Mukherjee, Sagnik, Bhattacharyya. Network organization of co-opetitive genetic influences on morphologies of the human cerebral cortex. *Journal of Neural Engineering*, 16 (2) 026028-38 2019. (**Selected as one of the featured articles published in this journal during 2018-19**)

4. J. M Maurer, **Subhadip Paul**, Nathaniel Anderson, P. Nyalakanti, Kent A. Kiehl. Youth with elevated psychopathic traits exhibit structural integrity deficits in the uncinate fasciculus. *Neuroimage: Clinical*, 26 102236, 2020.

5. Subhadip Paul, Sagnik Bhattacharyya. Does thinner right entorhinal cortex underlie genetic liability to cannabis use? *Psychological Medicine*, 48 (16) 2766-2775, 2018.

6. V. Pareek, **Subhadip Paul**, V. P. S. Rallabandi, Prasun K. Roy. Patterning of corpus callosum integrity in glioma observed by MRI: effect of 2D bi-axial lamellar brain architecture. *Journal of Neuro-Oncology* (144) 1, 165-177 2019.

7. Otte WM, van Diessen E, **Subhadip Paul**, Ramaswamy R, Subramanyam RVP, Stam CJ, Roy Prasun Kumar. Aging alterations in whole-brain networks during adulthood mapped with the minimum spanning tree indices: the interplay of density, connectivity cost and life-time trajectory. *Neuroimage*, 109 (1) 171-189, 2015.

8. Subhadip Paul, Prasun Kumar Roy. Strategy for stochastic dose-rate induced enhanced elimination of malignant tumour without dose escalation. *Mathematical Medicine and Biology*, 33(3) 319-328, 2016.

9. Subhadip Paul, Prasun Kumar Roy. The consequence of day-to-day stochastic dose deviation from the planned dose in fractionated radiation therapy. *Mathematical Biosciences & Engineering*, 13(1) 159-170, 2016.

10. Subhadip Paul, Prasun Kumar Roy. The effect of stochastic fluctuation in radiation dose-rate on cell survival following fractionated radiation therapy. *Physics in Medicine & Biology*, 57(6) 1561-1573, 2012.

Manuscripts under revision at peer-reviewed international journals

1. **Subhadip Paul,** S**.** Bhattacharyya. Cannabis use related working memory deficit is mediated by lower left hippocampus volume.

2. **Subhadip Paul**, J. M Maurer, N. Anderson, P. Nyalakanti, Kent A. Kiehl. Machine learning detects chronic traumatic brain injury in the incarcerated male offenders using diffusion tensor imaging.

3. Vikas Pareek, **Subhadip Paul**, Prasun Kumar Roy. Corpus callosum remodeling in glioma: constancy of fiber density and anisotropy in MRI.

4. J. M Maurer, **Subhadip Paul**, B. Edwards, N. Anderson, P. Nyalakanti, C. Haranski, J. Decety, Kent A. Kiehl. Reduced uncinate fasciculus structural integrity in incarcerated adult females with elevated psychopathic traits.

5. Vikas Pareek, **Subhadip Paul**, Prasun Kumar Roy. Alterations of Trans-callosal fiber integrity and its connectivity in high grade gliomas: Whole Brain and Hemisphere Specific Analyses.

6. J. M Maurer, **Subhadip Paul**, N. Anderson, G. Clarke, P. Nyalakanti, Kent A. Kiehl. The relationship between self-report youth psychopathy measures and structural integrity in the uncinate fasciculus.

Presentations/ Abstracts in International Conferences (Refereed)

1. Subhadip Paul, A. Arora, R. Midha, D. Vu, P. K. Roy and M. Belmonte. Autistic traits are both distributed and localised within structural and functional brain networks. International Society for Autism Research, Montreal, Canada, 2019

2. M. K. Belmonte, D. Vu, **Subhadip Paul**, A. Arora, R. Midha, P. K. Roy. Individual variations in autistic traits are reflected in brain network topologies: behavioural, psychometric and neuroimaging assays. *Experimental Psychology Society Meeting*, Leicester, UK. 2018.

3. **Subhadip Paul** and Sagnik Bhattacharyya. Genetic liability of right entorhinal cortex to cannabis use. *Winter Science Meeting of Academy of Medical Sciences,* London, UK, 2017.

4. S. Sen, **Subhadip Paul**, P. Parisar, P. Raghunathan, S. Kumaran, S. Iyenger. A three-dimensional stereotaxic MRI brain atlas of house crow (*Corvus splendens*). *Society for Neuroscience Annual Meeting,* San Diego, USA, 2016.

5. **Subhadip Paul,** V. S. Mehta, P. K. Roy. Alteration of small world anatomical networks in the patients with brain lesions. *Society for Neuroscience Annual Meeting,* Washington DC, USA, 2014.

6. **Subhadip Paul,** K. Durgaprasad, J. Vadlamudi, S. Kondra, S. Rallabandi and P. K. Roy. Construction of Indian MRI brain template. *Society for Neuroscience Annual Meeting,* New Orleans, USA, 2012.

7. **Subhadip Paul,** V. S. Mehta and P. K. Roy. Higher rank diffusion tensor imaging of brain tumours. *Annual Meeting of the Organization on Human Brain Mapping,* Quebec City, Canada, 2011.

8. **Subhadip Paul** and Prasun K. Roy. Correlated noise induced modification of DNA single strand break by environmental radiation. Stochastic Resonance 2008 (1998SR2008), Perugia, Italy, 2008.

9. Vani Kashyap, Tanuj Gulati, **Subhadip Paul**, Prasun Roy. Stochastic approach to diagnostic characterization of MRI using fractal morphometry: An initial study. *Neuroscience Research*. Kyoto, Japan, 55S, S72, 2006.

Presentations/ Abstracts in National Conferences (Non-refereed)

1. **Subhadip Paul**, Daniel Polders, Veer S. Mehta, Pater Luijten, Hans Hoogduin and P. K. Roy. Tumourigenic field model of neoplastic growth. *Indian Academy of Neurosciences Annual Meeting*, New Delhi, 2011.

2. **Subhadip Paul**, Veer Singh Mehta and Prasun K. Roy. In vivo non-invasive characterization of brain tumour tissue using higher (fourth) order DTI. *Indian Academy of Neurosciences Annual Meeting*, Jaipur, 2009.

3. **Subhadip Paul** and Prasun K. Roy. Diffusion tensor imaging and its application to brain tumor margin delineation. *National Workshop cum Training Programme on Advanced Numerical Techniques and Applications*, BHU (Varanasi), 2009.

4. **Subhadip Paul,** Kanad Basu and Prasun K. Roy. Radiation therapy planning of brain tumours using stochastic perturbation. *NBRC International Conference*, New Delhi, 2006.

ONGOING COLLABORATIVE PROJECTS

Project 1: Understanding the relationships between graph-theoretical structural and functional brain network organizations with individual differences in autistic traits.

Collaborator: Dr. Matthew Belmonte, Nottingham Trent University, U.K.

Project 2: Construction of MRI based three-dimensional brain atlas of house crow (*Corvus splendens*).

Collaborator: Dr. Soumya Iyenger, National Brain Research Centre, Manesar, Gurgaon, India.

SUPERVISION OF M.Sc. STUDENTS AT KING'S COLLEGE LONDON

M.Sc. students: Sana Bestwn, Camille Meze, Dominic Burrows.

RESEARCH SKILLS

Mathematical/Computational modelling of large-scale multi-modal neuro-imaging signals, Structural and functional MRI (Magnetic Resonance Imaging) of Brain, Advanced Graph theory-based network analyses, Genetic, structural, functional and behavioral data analyses, Machine learning for data classification, Quantitative genetic analyses under twin study design, Heritability estimation of complex phenotypes, Brain atlas construction, Stochastic dynamical modeling of biological systems, Multi-variate statistical analyses and Neuroscience.

Programming skill: I have extensive experiences of developing computational tools for analyzing large-scale datasets.

INVOLVEMENTS WITH INDUSTRIES

1) I developed a new brain image analyses methodology in a collaborative project between the **Philips Healthcare** and the National Brain Research Centre, India.
2) I provided intellectual inputs and developed brain image analyses tools for **MINDSET** (an expert forensic consulting group of The MIND Research Network, U.S.A) that offers brain-imaging based consultancies and expert medical imaging solutions.

PERSONAL DETAILS

Nationality: Indian (by birth), Gender: Male. DOB: 26th November, 1980

Address for communication:

Dr. Subhadip Paul, The Mind Research Network, 1101 Yale Blvd NE, Albuquerque, New Mexico 87106, U.S.A. Mobile phone number: +1-505-721-0984, emails: subhadippaul@gmail.com, subpaul@mrn.org

Permanent address:
Subhadip Paul, C/O Madhab Chandra Paul, Opposite UCO Bank, Falakata Road, Madhyapara, Dhupguri, P.O. Bairatiguri, Dist. Jalpaiguri, West Bengal, PIN 735210, India

REFEREES

Professor Prasun Kumar Roy (**PhD Supervisor**)
School of Biomedical Engineering,
Indian Institute of Technology (B.H.U.)
Banaras Hindu University Campus, Varanasi – 221005, India.
Email: pkroy.bme@iitbhu.ac.in Phone: 9910831172

Professor Sagnik Bhattacharyya (**Post-doctoral Supervisor**)
Institute of Psychiatry, Psychology & Neurosciences,
King's College London,
De Crespigny Park, London SE58AF, U.K.
Email: sagnik.2.bhattacharyya@kcl.ac.uk Phone: +44 7904248727

Professor Soumya Iyenger
National Brain Research Centre (NBRC),
NH-8, Nainwal Mode, Near NSG Campus,
Gurgaon District, Haryana, India-122052
Email: soumya@nbrc.ac.in Phone: 9818373025