

Nabin Koirala

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Academic education

- 2019 Ph.D Neuroscience, Johannes Gutenberg University, Mainz, Germany
Dissertation: Structural brain network characteristics in Parkinson's disease patients.
Chairs: Professors - Heiko Luhmann, Muthuraman Muthuraman. Oliver Tüscher, Raffael Kalisch, Sergiu Groppa.
- 2014 M.Sc Signal processing and communication, Christian Albrecht University, Kiel, Germany
Thesis: Structural brain connectivity using diffusion tensor imaging.
Chairs: Professors - Gerhard Schmidt, Muthuraman Muthuraman, Sergiu Groppa.
- 2010 Bachelor of Engineering, Tribhuvan University, Kathmandu, Nepal

Research experience

- 2020 – Present Adjunct research scientist in Nepal Applied Mathematics and Informatics Institute for research (NAAMI)
- 2019 – Present Postdoctoral researcher in Haskins Laboratories, Yale University, New Haven, USA
- 2015 – 2019 PhD student in Johannes Gutenberg University, Mainz, Germany
- 2013 – 2014 Research assistant in Christian Albrechts University, Kiel, Germany

Grants, fellowships and academic awards

- 2022 - 2024 Co-Investigator, *Identification of the brain and behavior changes post cochlear implantation to predict early developmental milestones in speech and language as a precursor to the development of literacy.*
[Funding Source: Oberkotter Foundation, Principal Investigator - Vincent L. Gracco, Total Amount: \$1.6 million]
- 2018 Editor's choice article of the issue in Brain: A journal of neurology
"Cerebello-cortical network fingerprints differ between essential, Parkinson's and mimicked tremors"
- 2015 - 2019 Focus Program Translational Neurosciences Research Fellowship

[Funding Source: German research foundation (DFG), Total Amount: €1480/month for 4 years]

- 2015 - 2019 Travel Grant and Research expenses
[Funding Source: German research foundation (DFG), Total Amount: €5000/year for 4 years]
- 2014 Student Merit Scholarship, Christian Albrecht University, Kiel, Germany
2000 Euros
- 2006 Student Merit Scholarship, Tribhuvan University, Kathmandu, Nepal
64000 NPR

Current Projects

- Since 2020 Neural Correlates of Stuttering and its subtypes
[*Collaboration: Dr. Michael Milham, Child Mind Institute, New York, USA; Dr. Suok Jun Hong, Sungkyunkwan University, Seoul South Korea; Dr. Vincent Gracco, Haskins Laboratories, New Haven, USA*]
- Since 2020 Impact of Cochlear implant in brain structure in infants
[*Collaboration: Dr. Vincent Gracco, Haskins Laboratories, New Haven, USA; Dr. Mikael Deroche, McGill University, Montreal, Canada; Dr. Jace Wolfe, Hearts forHearing, Oklahoma, USA*]
- Since 2019 Imaging genetics in children with specific reading disability
[*Postdoctoral researcher in NIH GRANT for Florida Learning Disabilities Research Center with PIs Dr. Nicole Landi, University of Connecticut & Yale University, Connecticut, USA and Dr. Elena Grigorenko, University of Houston, Texas, USA*]
- Since 2018 Structural brain network characterization in Migraine patients
[*Collaboration: Dr. Lars Michels, University of Zurich, Switzerland*]
- Since 2015 Neuroimaging brain network markers for neurodegenerative and neuroinflammatory diseases
[*Collaboration: Dr. Muthuraman Muthuraman, Johannes Gutenberg university, Mainz, Germany; Dr. Gertrud Tamas, Semmelweis University, Budapest, Hungary*]

Professional academic experience

Since 2020	Official member of communication committee and blog contributor for Organization for human brain mapping (OHBM)
Since 2020	Member - Organization for human brain mapping (OHBM); Society for the Neurobiology of Language (SNL)
Since 2020	Ad hoc Reviewer - Brain Sciences; Electronics: Circuit and Signal Processing; New Directions for Child and Adolescent Development; Entropy
Since 2019	Ad hoc Reviewer - Human brain mapping; Frontiers in aging Neuroscience; Frontiers in Human Neuroscience; Frontiers in Neurology: Movement disorders

Invited Colloquia and Talks

2020	Connecticut Institute for Brain & cognitive sciences, University of Connecticut, Storrs, USA – <i>“Imaging Genetics in Specific reading disability”</i> .
2019	Haskins staff talks, New Haven, USA – <i>“Structural network characteristics in Parkinson’s disease patients”</i> .
2018	Introductory course on methods for designing and analyzing human MRI studies, Mainz, Germany – <i>“Network analysis in human brain”</i> .
2017	FTN retreat, Mainz, Germany – <i>“Structural network architecture predicts the clinical outcome of deep brain stimulation in Parkinson’s disease patients”</i> .
2016	1 st Seminar on invasive and non-invasive neurostimulation methods, Mainz, Germany – <i>“Network effects in deep brain stimulation”</i> .
2016	38 th Annual international conference of Engineering in Medicine and Biology Society, Florida, USA – <i>“Network effect and pathways in deep brain stimulation in Parkinson’s disease”</i> .

Poster presentations

2020	Society for the Neurobiology of Language (SNL), 12 th meeting, Philadelphia, USA (Virtual) – <i>“Neurite orientation dispersion is associated with reading skills”</i> .
2020	Organization for Human brain mapping (OHBM) conference, Montreal, Canada (Virtual) – <i>“Effect of dMRI data quality on diffusion measures in children”</i> .
2019	Florida learning disabilities research center (FLDRC) annual meeting, Florida, USA – <i>“Quantifying imaging quality for Multi-Center Data Analysis”</i> .
2018	German society of Neurology (DGN) congress, Berlin, Germany – <i>“Structural network architecture predicts the clinical outcome of deep brain stimulation in Parkinson’s patients”</i> .

- 2017 Organization for Human brain mapping (OHBM) conference, Vancouver, Canada – “*Structural network architecture predicts the clinical outcome of deep brain stimulation in Parkinson’s patients*”.
- 2017 Ernst Strüngmann Institute – Systems Neuroscience Conference (ESIsync), Frankfurt, Germany – “*Network analysis for the prediction of the outcome of subthalamic nucleus deep brain stimulation in patients with Parkinson’s disease*”.
- 2017 Rhein Main Neuroimaging retreat, Hohensolms, Germany – “*Grey matter network and its implications in Parkinson’s patients*”.
- 2016 Organization for Human brain mapping (OHBM) conference, Geneva, Switzerland – “*Increased structural network connectivity compensates functional decline in early multiple sclerosis*”.
- 2016 FTN retreat, Mainz, Germany – “*Connectivity analysis using community structure in Deep Brain Stimulation for Parkinson’s disease patients*”.
- 2016 Rhein Main Neuroscience Network seminar, Oberwesel, Germany – “*Connectivity analysis of network targets for deep brain stimulation patients with Parkinson’s disease*”.
- 2015 37th Annual international conference of Engineering in Medicine and Biology Society, Milan, Italy – “*Differentiating tremor patients using spiral analyses*”.

Teaching experiences

- 2021 1-day Workshop on “*Diffusion weighted Images: Data Processing and analyses*”, Brain Imaging Research Center, University of Connecticut, Storrs, USA
- 2021 1-day Workshop on “*Diffusion weighted Images: Principles and Data Acquisitions*”, Brain Imaging Research Center, University of Connecticut, Storrs, USA
- 2020 Weekly course on “*MRI: from basics to advance analytical techniques*”, Haskins Laboratories, Yale University; LandiLab, University of Connecticut, Storrs, USA.
- 2020 1-day Seminar for Graduate students on “*Neuroimaging and its application*”, Connecticut Institute for Brain & cognitive sciences, University of Connecticut, Storrs, USA.
- 2020 8 weeks course completed in *Advancing Learning Through Evidence-Based Teaching*, with distinction at the Center for the Integration of Research Teaching and Learning (CIRTL) network Massive Open Online Courses (MOOCs).
- 2020 Certificate of college teaching preparation (CCTP) for postdocs, Yale center for teaching and learning (ongoing), New Haven, USA.
- 2018 1-day Computational Workshop on “*Machine Learning and neuroimaging analysis*”, Johannes Gutenberg university, Mainz, Germany.

- 2018 1-day Workshop on “*MRI connectivity analysis*”, Johannes Gutenberg university, Mainz, Germany.
- 2017 - 2020 Tutor for the lecture “*Medical Signal Processing - Time frequency analysis*” by Prof. Muthuraman Muthuraman at University of Kiel, Germany.

Student supervision

- Sushant Gautam Co-Supervisor for master’s project “Deep Learning based pose estimation for Dystonia score prediction”, Institute of Engineering, Tribhuvan University, Kathmandu, Nepal. (2022)
- Kasidy Quiles Research mentor for McNair Fellows program, UConn center for Academic programs, University of Connecticut, Storrs, USA. (2021)
- Kelly Mahaffy Co-Supervisor for research project “*Impact of hippocampal structure in specific reading disability*”, University of Connecticut, Storrs, USA. (2021-2022)
- Tina Thomas Co-Supervisor for master’s thesis “*Genetic influence in brain imaging biomarkers for children with family history of dyslexia*”, University of Houston, Texas, USA. (2021)
- Saugat Bhattarai Supervisor for research project “*Real time movement detection in dystonia patients using computer vision and machine learning algorithm*”, Nepal Applied Mathematics and Informatics Institute for research (NAAMI), Kathmandu, Nepal. (2020 - 2021)
- Sanil Shrestha Supervisor for research internship “*Neuroimaging biomarkers using machine learning algorithm for Parkinson’s disease patients*”, Nepal Applied Mathematics and Informatics Institute for research (NAAMI), Kathmandu, Nepal. (2020)
- Sagar Shah Supervisor for research project “*Effectiveness of Mindfulness based therapy for symptom relief in movement disorder patients*”, New York University, New York, USA. (2020)
- Ashish Subedi Supervisor for research project “*Automatic Spasmodic dysphonia (Laryngeal Dystonia) classification using deep learning algorithms*”, Kathmandu University, Kavre, Nepal. (2020)
- Tamara Bonertz Co-Supervisor for the MD thesis “*TMS-EEG measurements to characterize neuronal excitability in the prefrontal cortex under pain conditioning*”, University Medical Center of Johannes Gutenberg university, Mainz, Germany. (2018)

Tabea Marquardt Co-Supervisor for the MD thesis “*Studies of effective cerebral connectivity and hand motor function in patients with Parkinson's disease and healthy subjects*”, University Medical Center of Johannes Gutenberg university, Mainz, Germany. (2017)

Scientific Publications (Peer reviewed published manuscripts)

(Publication Access: [Google Scholar Profile](#), Full text availability: [ResearchGate Profile](#))

33. Gouveris H[§], **Koirala N[§]**, Anwar A.R, Ding H, Bahr K, et al. (2022) *Reduced cross-frequency coupling and daytime sleepiness in sleep apnea patients*. (§ – Equal contribution). *Biology*.
32. Bitar L, Uphaus T, Thalman C, Muthuraman M. et al. (2022) *Inhibition of the enzyme autotaxin reduces cortical excitability and ameliorates the outcome in stroke*. *Science Translational Medicine*.
31. Gracco V.L, Sares A.G, **Koirala N**. (2022) *Structural brain network topological alterations in stuttering adults*. *Brain Communications*.
30. Gonzalez-Escamilla G, **Koirala N**, Bange M, Glaser M, Pintea B, et al. (2022) *Deciphering the network effects of deep brain stimulation in Parkinson's disease*. *Neurology and Therapy*.
29. **Koirala N**, Kleinman D, Perdue M.V, Su X, Villa M, et al. (2021) *Widespread effect of dMRI data quality on diffusion measures in children*. *Human Brain Mapping*
28. Muthuraman M, Palotai M, Jávör-Duray B, Kelemen A, **Koirala N**, et al. (2021) *Frequency-specific network activity predicts bradykinesia severity in Parkinson's disease*. *Neuroimage Clinical*
27. **Koirala N**, Perdue M.V, Su X, Grigorenko E.L, Landi N. (2021) *Neurite density and arborization is associated with reading skill and phonological processing in children*. *NeuroImage*
26. Lars M[§], **Koirala N[§]**, Groppa S, Luechinger R, Gantenbein AR, et al. (2021) *Structural brain network characteristics in patients with episodic and chronic migraine*. *The journal of headache and pain* (§ - **Equal contribution**).
25. Cerina M, Muthuraman M, Gallus M, **Koirala N**, Dik A, et al. (2020) *Myelination-and immune-mediated MR-based brain network correlates*. *Journal of neuroinflammation*.
24. **Koirala N**, Serrano L, Paschen S, Falk Daniela, Anwar AR, et al. (2020) *Mapping of subthalamic nucleus using microelectrode recordings during deep brain stimulation*. *Scientific reports*.
23. Muthuraman M, Bange M, **Koirala N**, Ciolac D, Pintea B, et al. (2020) *Cross-frequency coupling between gamma oscillations and deep brain stimulation frequency in Parkinson's disease*. *Brain: a journal of neurology*.

22. Muthuraman M, Fleischer V, Kroth J, Ciolac D, Radetz A, **Koirala N**, et al. (2020) *Covarying patterns of white matter lesions and cortical atrophy predict progression in early MS*. *Neurology, Neuroimmunology & Neuroinflammation*.
21. Radetz A, **Koirala N**, Krämer J, Johnen A, Fleischer V, et al. (2020) *Gray matter integrity predicts white matter network reorganization in multiple sclerosis*. *Human Brain Mapping*.
20. Michels L, Villanueva J, O’Gorman R, Muthuraman M, **Koirala N**, et al. (2019). *Interictal hyperperfusion in the higher visual cortex in patients with episodic migraine*. *Headache – The journal of head and face pain*.
19. Chirumamilla V.C, Dresel C, **Koirala N**, Gonzalez-Escamilla G, Deuschl G, et al. (2019). *Structural brain network fingerprints of focal dystonia*. *Therapeutic Advances in Neurological Disorders*.
18. **Koirala N**, Anwar AR, Ciolac D, Glaser M, Pinteá B, et al. (2019). *Alterations in White Matter Network and Microstructural Integrity Differentiate Parkinson’s Disease Patients and Healthy Subjects*. *Frontiers in Aging Neuroscience*.
17. Fleischer V[§], **Koirala N**[§], Droby A, Gracien R, Deichmann R, et al. (2019). *Longitudinal cortical network reorganization in early relapsing-remitting multiple sclerosis*. *Therapeutic Advances in Neurological Disorders*. (§ - Equal contribution).
16. Ciolac D, Luessi F, Gonzalez-Escamilla G, **Koirala N**, Riedel C, et al. (2019). *Selective Brain Network and Cellular Responses Upon Dimethyl Fumarate Immunomodulation in Multiple Sclerosis*. *Frontiers in Immunology*.
15. Gonzalez-Escamilla G, Muthuraman M, Reich M, **Koirala N**, Riedel, et al. (2019). *Cortical network fingerprints predict deep brain stimulation outcome in dystonia*. *Movement disorders*.
14. Chiosa V, Ciolac D, Groppa St, **Koirala N**, Pinteá B, et al. (2019). *Large-scale network architecture and associated structural cortico-subcortical abnormalities in patients with sleep/awake-related seizures*. *Sleep – The journal of sleep research society*.
13. Chirumamilla V.C, Gonzalez-Escamilla G, **Koirala N**, Bonertz T, Grothus S, et al. (2019). *Cortical Excitability Dynamics During Fear Processing*. *Frontiers in Neuroscience*.
12. Muthuraman M, Raethjen J, **Koirala N**, Anwar A, Mideksa K, et al. (2018). *Cerebello-cortical network fingerprints differ among essential, Parkinson and mimicked tremors*. *Brain: a journal of neurology*.
11. Muthuraman M[§], **Koirala N**[§], Ciolac D, Pinteá B, Glaser M, et al. (2018). *Deep Brain Stimulation and L-DOPA Therapy: Concepts of Action and Clinical Applications in Parkinson’s disease*. *Frontiers in Neurology*. (§ - Equal contribution).

10. **Koirala N**, Fleischer V, Glaser M, Zeuner KE, Deuschl G, et al. (2017). *Frontal Lobe Connectivity and Network Community Characteristics are Associated with the Outcome of Subthalamic Nucleus Deep Brain Stimulation in Patients with Parkinson's Disease*. Brain Topography.
9. Muthuraman M, Deuschl G, **Koirala N**, Riedel C, Volkmann J, et al. (2017). *Effects of DBS in parkinsonian patients depend on the structural integrity of frontal cortex*. Scientific Reports.
8. Chirumamilla VC, **Koirala N**, Groppa S. (2017). *Combining transcranial magnetic stimulation and subdural electrodes for pain modulation*. Clinical Neurophysiology.
7. Kroth J, Ciolac D, Fleischer V, **Koirala N**, Kramer J, et al. (2017). *Increased cerebrospinal fluid albumin and immunoglobulin A fractions forecast cortical atrophy and longitudinal functional deterioration in relapsing-remitting multiple sclerosis*. Multiple Sclerosis Journal.
6. Chiosa V, Groppa SA, Ciolac D, **Koirala N**, Misina L, et al. (2017). *Breakdown of Thalamo-Cortical Connectivity Precedes Spike Generation in Focal Epilepsies*. Brain Connectivity.
5. **Koirala N**, Fleischer V, Granert O, Deuschl G, Muthuraman M, et al. (2016). *Network effects and pathways in Deep brain stimulation in Parkinson's disease*. Conference proceedings: IEEE Engineering in Medicine and Biology Society.
4. Fleischer V, Groger A, **Koirala N**, Droby A, Muthuraman M, et al. (2016). *Increased structural white and grey matter network connectivity compensates for functional decline in early multiple sclerosis*. Multiple Sclerosis Journal.
3. Alexandru H, Muthuraman M, Chirumamilla V.C, **Koirala N**, Paktas B, et al. (2016). *Grey Matter Microstructural Integrity Alterations in Blepharospasm Are Partially Reversed by Botulinum Neurotoxin Therapy*. PLoS One.
2. Chirumamilla V.C, **Koirala N**, Mideksa KG, Anwar AR, Schmidt G, et al. (2015). *Testing the effects of pre-processing on voxel based morphometry analysis*. Conference proceedings: IEEE Engineering in Medicine and Biology Society.
1. **Koirala N**, Muthuraman M, Anjum T, Chaitanya CV, Helmolt VF, et al. (2015). *Differentiating tremor patients using spiral analyses*. Conference proceedings: IEEE Engineering in Medicine and Biology Society.

Organizational and professional experiences

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| 2017 – 2018 | Organizer of Focus program for Translational Neuroscience (FTN) retreat, Mainz, Germany |
| 2017 – 2018 | Committee member for poster and talks evaluation for Focus program for Translational Neuroscience (FTN) retreat, Mainz, Germany |

2016 – 2018	Representative of PhD students and Post-Docs in translational neuroscience, Mainz, Germany
2016	Organizer for seminar on ‘Invasive and non-invasive neurostimulation methods’, Mainz, Germany.
2010 – 2012	Radio frequency planning and optimization Engineer in Mobicon Tele Networks, Kathmandu, Nepal
2009 – 2010	Biomedical Engineer in Kantipur Hospital, Kathmandu, Nepal
2009 – 2010	Technical Engineer in AECG Traders, Kathmandu, Nepal
2008 – 2010	Organizer for seminars in Embedded System Design, Tribhuvan University, Kathmandu, Nepal
2004 – 2010	Coordinator in annual engineering exhibition, Tribhuvan University, Kathmandu, Nepal