

ALI DANISH ZAIDI

Neuroscience | Data Science | Neurotechnology

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Data scientist / neuroscientist with expertise in the acquisition and hypothesis driven analysis of complex, multi-modal datasets, as well as communication of complex scientific insights to both experts and the general public. Also experienced with setting up data-acquisition systems for wearable medical electronics, and developing and implementing novel neural decoding paradigms that leverage modern machine learning techniques. Mentored by the founding fathers of the field of brain-computer interfaces. Experience working with patients suffering from various neurological disorders such as ALS, stroke, depression, Parkinson's, tinnitus, etc. Interested in attacking challenging problems in the fields of healthcare and medical technology

EXPERIENCE

- Jun 2019 - MPI FOR BIOLOGICAL CYBERNETICS**
Postdoctoral Researcher / Scientist
- Nov 2018 - ICU COCKPIT, UNIVERSITY OF ZURICH**
Data Scientist (collaboration / guest position)
- Dec 2016 - WYSS CENTER FOR NEUROTECHNOLOGY, GENEVA, SWITZERLAND**
Dec 2018 Wyss Research Associate
- Dec 2011 - MPI FOR BIOLOGICAL CYBERNETICS, TUEBINGEN, GERMANY**
Dec 2016 PhD student / Researcher under Prof. Nikos Logothetis
- Sep 2010 - CENTER FOR INTEGRATIVE NEUROSCIENCE, TUEBINGEN, GERMANY**
Sep 2011 Graduate Student / Researcher under Prof. Ziad Hafed

SCIENTIFIC PUBLICATIONS

- Zaidi, Ali Danish, et al. "[Simultaneous epidural functional near-infrared spectroscopy and cortical electrophysiology as a tool for studying local neurovascular coupling in primates.](#)" Neuroimage 120 (2015): 394-399.
- Robinson, N., Zaidi, A. D., et al. "[Real-time subject-independent pattern classification of overt and covert movements from fNIRS signals.](#)" PloS one, 11 (2016). e0159959.
- Zaidi, Ali Danish, et al. "[The hemodynamic initial-dip consists of both volumetric and oxymetric changes correlated to localized spiking activity.](#)" bioRxiv (2018): 259895. (under review: iScience).
- Zaidi, Ali Danish, et al. "[The timing of hemodynamic changes reliably reflects spiking activity.](#)" bioRxiv (2018): 269696 (under review: Nature Communications Biology).

EDUCATION

- 2012- 2018 PHD SYSTEMS/COGNITIVE NEUROSCIENCE** (Submitted Nov 2018)
Max Planck Institute for Biological Cybernetics, Tuebingen
Department of Computer Science, University of Tuebingen, Germany
Institute for Medical Psychology, University of Tuebingen, Germany
- 2008 - 2010 MSC (GENETICS/GENOMICS)** University of Delhi, Delhi, India
- 2005 - 2008 BSC (BIOTECHNOLOGY)**, JMI, Delhi, India

ACADEMIC SKILLS

BASIC SCIENCE: Neural / biophysical basis of perception, cognition and action; neural mechanisms of abstract skill learning; neural decoding

TRANSLATIONAL: Brain-computer / brain-machine interfaces, epilepsy monitoring for seizure prediction and forecasting; cortical stroke monitoring; brain-state classification and neurofeedback based communication and neurorehabilitation; minimally invasive implantable systems

TECHNICAL SKILLS

- **Data science:** Machine learning, Tensorflow, PyTorch, data modeling, visualization, scientific communication, creative problem solving
- **Development**
Languages: MATLAB, Python, PyQt, C/ C++, bash, HTML, Javascript (Node.js)
IDEs: Qt Creator, Eclipse, VSCode, Vim
DevOps: Vagrant, Ansible, Docker, SourceTree (git/gitflow)
Others: LaTeX, Adobe Illustrator, InDesign, Photoshop, Inventor
- **Project Management:** Jira, Bitbucket, Agile and Waterfall development and analysis methodologies
- **Methods:** Bio-electrical signal acquisition, optical imaging, electrophysiology, functional neuroimaging: fMRI, fNIRS, EEG, neurofeedback, human psychophysics.
- **Molecular Biology:** Electrophoresis, DNA/ RNA extraction/prep, SDS-PAGE, antibody staining, confocal imaging, cell-line establishment and maintenance, vector transfections
- **Languages:** English (native), German (A2), Hindi/Urdu (native)

REFERENCES

Please ask before contacting referees

Prof. Niels Birbaumer, Director
Institute for Medical Psychology,
University of Tuebingen, Germany

Prof. Nikos Logothetis, Director
MPI for Biological Cybernetics,
Tuebingen, Germany

Prof. Ranganatha Sitaram, Director
Department of Biomedical Engineering,
University of Santiago, Chile

Prof. John Donoghue, Director
Wyss Center, Geneva, Switzerland

PROJECTS AND ROLES: BRIEF OVERVIEW

Nov 2018 - Scientist / Researcher MPI FOR BIOLOGICAL CYBERNETICS, TUEBINGEN, GERMANY
Supervisor: Prof. Nikos Logothetis

Project 1: Unsupervised (non-parametric) approaches towards identifying neural events

- Implemented a manifold-learning based approach towards event-detection in neural timeseries data (EEG and intra-cortical electrophysiology).
- Currently testing bayesian non-parametric approaches (particle-Gibbs HMM) towards automated identification, discretization and modeling of neural events and their dynamics.

Nov 2018 - Data Scientist ICU COCKPIT, UNIVERSITY OF ZURICH (COLLABORATION / GUEST POSITION)
Project Leader: Prof. Emmanuela Keller

Project 1: Forecasting seizure occurrence based on neural and environmental factors

- Implemented a novel spectral feature engineering technique based on spectral decomposition enabling an SVM classifier to detect seizures from EEG data. The algorithm beat IBM Watson on a randomized subset of data.
- Currently mining features in the neural data that will enable reliable forecasting of upcoming seizures.

2017 -2019 Wyss Research Associate WYSS CENTER FOR NEUROTECHNOLOGY, GENEVA, SWITZERLAND
Supervisors: Prof. Niels Birbaumer, Prof. John Donoghue

Project 1: Implantable subcutaneous EEG/fNIRS system for long-term epilepsy and stroke monitoring

Role: Project Coordinator, Programmer

- Collected user needs for the project and translated them to system design specifications.
- Adapted system for neurofeedback based neurorehabilitation.
- Designed and developed prototype of implantable fNIRS/EEG sensors with charge-balancing system.
- Programmed graphical interface for controlling the prototype system.
- Submitted patent based on the developed prototype (provisional patent currently being filed).

Project 2: fMRI neurofeedback for chronic tinnitus.

Role: Coordinator, fMRI neurofeedback

- Setup experimental paradigm for fMRI neurofeedback for training tinnitus patients.
- Co-supervised PhD student working on the project. Initiated them into working with patients in the scanner.
- Helped establish EEG neurofeedback paradigm at another site, based on the fMRI paradigm.
- Collected and analysed fMRI/EEG data.

Project 3: Communication in the completely locked-in state using an intracortical microelectrode array

Role: Scientist, Programmer

- Helped establish paradigm for evaluating communication in completely locked-in patients.
- Developed software testing paradigm for regulatory submission (based on IEC 62304 Class A standards).
- Developed data acquisition and real-time decoding modules, as well as the state-machine for the BCI.
- Developed Vagrant/Ansible configurable virtual machines to facilitate software development across multiple sites.
- Analysed EEG/fNIRS data collected from locked-in patients to mine features for non-invasive BCIs.

2011 - 2016 PhD Student MAX PLANCK INSTITUTE FOR BIOLOGICAL CYBERNETICS, TUEBINGEN, GERMANY
Supervisors: Prof. Niels Birbaumer, Prof. Nikos Logothetis, Prof. Ranganatha Sitaram, Professor Eberhard Fetz

Project 1: Neuronal correlates of volitionally regulated hemodynamic signals

- Conceptualized and executed experiments to understand the neuronal correlates of volitionally regulated hemodynamic signals.
- Developed and evaluated novel technique for studying neurovascular coupling in primates.
- Trained monkeys to perform complex tasks.
- Performed simultaneous epidural fNIRS and intracortical electrophysiology in anesthetized and awake monkeys.
- Successfully wrote a grant to fund my PhD stipend for two years.
- Wrote DFG grant which was accepted but withdrawn due to primate work being discontinued in the lab.

Project 2: Real-time subject independent brain-state classification using fNIRS

- Programmed real-time fNIRS system for SVM based classification of brain states.
- Collected and analysed the data.
- Worked with patients suffering from various diseases such as Parkinson's, Stroke, Depression, ALS.

MPI for Biological Cybernetics ♦ Max-Planck-Ring, 8 ♦

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Physiology of Cognitive Processes
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Wednesday, March 13, 2019

To whom it may concern

I'm delighted to recommend Ali Zaidi for a position in your institution. I have known Ali since the time he started his PhD in my department at the Max Planck Institute from 2012 to 2016. It was a true pleasure to interact with him!

Ali has been a very curious, and very sharp, motivated and hardworking student. During his PhD, he was interested in investigating the neurovascular coupling (NVC) in primates. He decided to combine epidural functional near-infrared spectroscopy and intra-cortical electrophysiology (a completely novel approach). He designed the experimental setup and standardized the technique, the use of which led to very interesting and promising results, offering further novel insights into the nature NVC.

Ali has convincingly demonstrated that he is capable of working independently. He conceptualized and performed all his experiments (along with the surgeries and craniotomies), and collected and analyzed the data independently and with minimal supervision. He was also involved in the behavioral training of monkeys for a project that did not come to fruition due to the very unfortunate discontinuation of primate research in my department.

Ali was also pro-active in utilizing the diverse scientific expertise in our group, frequently engaging in discussions with - and learning from - the senior scientists, post-docs and PhD students in the lab. During project presentations, Ali was capable of presenting his ideas and insights clearly, and defending his results and conclusions. Strikingly, Ali wrote his papers himself, requiring minimal input from his advisors. He has managed to discover interesting and novel insights from a relatively small amount of data, a great example of his scientific ability. Ali also supervised two master's students while they were doing their master's thesis in the lab, both of which have gone on to pursue a PhD in systems neuroscience.

During the second part of his PhD, Ali – very, very unfortunately – has suffered from significant setbacks in his research due to the insane attacks on our lab eventually leading to the discontinuation of his project (along with many others scientists). Yet, to his credit,

Ali demonstrated a remarkable strength and he managed to move on during those times as well, continuing with data analysis and writing of papers.

Ali is a quick learner, driven by his passion and curiosity, and is willing to constantly push himself to learn and improve. He has a very kind and pleasant personality, something that made him quite popular among the scientists, technicians and animal care-takers in the lab. He is always ready to help others whenever the opportunity presents itself. During his stay in the lab, Ali volunteered to assist during numerous surgeries, or anesthetized/terminal experiments, some of which required long hours and overnight stays.

All in all, Ali is an outstanding young scientist, and I have enjoyed having him here in my laboratory. I am sure Ali will be a great addition to your group, adding value and insights to whichever projects he decides to work on. I wish him the very best for his future endeavors.

With kind regards,

A handwritten signature in black ink, reading 'Nikothetis'.

Nikos K. Logothetis