Wiete Fehner

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Overview

I am a PhD candidate in Imaging Science at Washington University in St. Louis, specializing in integrating advanced statistical methods, machine learning, and optical imaging for advanced neuroimaging. I am passionate about translating complex scientific challenges into practical technologies that seamlessly integrate into everyday life. My graduate research is inspired by developing Brain-Computer Interfaces (BCIs) that facilitate augmented communication by decoding brain signals for everyday applications. With expertise in MATLAB and Python, I design experimental paradigms, develop sophisticated image-processing pipelines, and apply data science to solve complex problems.

Experience

PhD Research | NeuroPhoto Lab | PI: Dr. Joseph P. Culver *01/2022 – present*
Biophotonics Research Center, MIR, Washington University in St. Louis

- **Advancing Very High-Density Diffuse Optical Tomography (VHD-DOT) for visual semantic encoding and decoding techniques**, crucial for semantic mapping and language BCI applications.
- **Enhancing human brain functional connectivity mapping by applying multivariate analytical methods in High-Density Diffuse Optical Tomography (HD-DOT)**, which significantly improves the precision of brain mapping in task-free settings, crucial for clinical applications.
- Leading data collection, development, and validation of novel neuroimaging methods; optimizing analytical scripts in MATLAB and Python; integrating advanced statistical methods and machine learning algorithms to enhance the analysis of complex neuroimaging data.

Founder & Lead Curriculum Developer, Summer Math Crash Course
Imaging Science Student Council, Washington University in St. Louis *01/2022 – present*

- **Founded and led the annual Summer Math Crash Course to address the diverse mathematical needs of graduate students transitioning from various academic backgrounds or re-entering academia**. Team leader of 14 student curriculum developers and course instructors.
- Lead developer of a 9-week curriculum covering linear algebra, calculus, and signals and systems including programming projects in Google Collab.
- Secured an initial $10k funding, managed the course expansion to a $15k budget, and collaborated closely with faculty to tailor the curriculum, resulting in 120+ student registrations.

Graduate Teaching Assistant | Practicum in Computational Imaging (ESE 5934) *01/2024 – 05/2024*
McKelvey School of Engineering, Washington University in St. Louis

- Mentored engineering graduate students in developing their semester-long computational research projects, focusing on deep learning and machine learning applications in imaging science. Facilitated discussions that guided project formulation and execution. One student published their project at CVPR.

Graduate Research Assistant | Ances Bioimaging Laboratory | PI: Dr. Beau Ances *09/2021 – 01/2022*
Department of Neurology, Washington University in St. Louis

- Conducted comparative analysis of white matter microstructure in Alzheimer's disease versus Down syndrome cohorts using diffusion tensor imaging (DTI).
- Implemented advanced MRI data preprocessing using FSL, bash scripts, and statistical analysis with R.

Graduate Research Assistant | TBMC Optical Imaging Lab | PI: Dr. Teemu Rinne *10/2019 – 05/2021*
University of Turku, Faculty of Medicine

- Developed a novel auditory paradigm utilizing fNIRS to investigate the functional changes in the auditory cortex induced by cochlear implantation. Collected data, processed, and analyzed it in Python.
- Played a pivotal role in establishing the optical imaging lab, which enhanced the university's research infrastructure and experimental capabilities.

Education

Washington University in St. Louis | St. Louis, MO, USA *08/2021 – present*
PhD Candidate in Imaging Science

- Thesis title: Advancing High-Density Diffuse Optical Tomography for Visual Semantic Decoding in Naturalistic Settings
- Advisor: Dr. Joseph P. Culver; Expected graduation date: 05/2026

Washington University in St. Louis | St. Louis, MO, USA *08/2021 – 12/2023*
MS in Electrical Engineering (30 USCS, CGPA: 3.83, graded as A)

University of Turku | Turku, Finland *08/2019 - 05/2021*
MS in Human Neuroscience (120 ECTS, CGPA: 5, graded as 'excellent')

University of Bremen | Bremen, Germany *10/2017 – 07/2019*
Selected Bachelor of Science Courses in Psychology (90 ECTS, CGPA: 1.83, graded as 'good')

Carl von Ossietzky University of Oldenburg | Oldenburg (Oldb), Germany *10/2014 – 06/2017*
BA in Philosophy and Gender Studies (180 ECTS, CGPA: 1.27, graded as 'excellent')

AWARDS & HONORS (SELECTED)

1st Place Poster Award at Imaging Science Pathway Retreat 2024 | St. Louis, USA 04/2024
Imaging Science Outstanding Leadership Award 05/2024
Imaging Science Pathway Fellowship (NIH T32) *01/2023 – 10/2024*
Danforth Scholar | Washington University in St. Louis 09/2021 – *present*
Jane Street Graduate Research Fellowship Workshop, Top Applicant | NYC, USA 04/2024
- Selected as a top applicant and invited to present a poster at this exclusive workshop

McKelvey Engineering Professional Development Award | Washington University in St. Louis 03/2024

LEADERSHIP EXPERIENCE & COMMUNITY SERVICE (SELECTED ACTIVITIES)

President, Association of Graduate Engineering Students (AGES)
Washington University in St. Louis *05/2022 – 05/2023*
- Responsible for leading the executive board, driving strategic initiatives, and collaborating with the engineering school administration to improve student resources and opportunities.

Graduate Ambassador, McKelvey School of Engineering *05/2022 – present*
Washington University in St. Louis
- Support prospective and incoming graduate engineering students with their transition to graduate school and represent WashU McKelvey School of Engineering in recruitment and outreach events.

SKILLS

Languages: German (native), English (fluent);
Programming Languages: MATLAB, Python (including TensorFlow, PyTorch), R, Shell Scripts;
Project Management: Experienced in managing project lifecycles, ensuring timely delivery and adherence to objectives**.**
Leadership & Team Management: Proven ability to lead and manage diverse teams in academic and community settings;

CONFERENCE PROCEEDINGS (SELECTED)

I have presented research accomplishments at over 15 local and international conferences, including OHBM, fNIRS, and SPIE. See here for a full list of conference proceedings.

1. **Fehner, W.,** Fogarty, M., Bajracharya, A., Markow, Z.E., Wilhelm, W., Trobaugh, J., Huth, A. G., Culver, J. P. (2024). "Towards Semantic Encoding of Visual Content in Movies via High-Density Diffuse Optical Tomography." Poster at Society for fNIRS Conference 2024, Birmingham, GB (10 September 2024).
2. **Fehner, W.**, Markow, Z., Fogarty, M., Bajracharya, A., Wilhelm, D., Huth, A. G., Culver, J. P. (2024). "Towards Semantic Visual Decoding of Naturalistic Movies with High-Density Diffuse Optical Tomography." Poster presentation at the Organization for Human Brain Mapping (OHBM) 2024, Seoul, South Korea, June 2024.
3. **Fehner, W.**, Markow, Z., Fogarty, M., Bajracharya, A., Wilhelm, D., Huth, A. G., Culver, J. P. (2024). "Towards Semantic Visual Decoding of Naturalistic Movies with High-Density Diffuse Optical Tomography." Invited talk for the MIR Research Symposium 2024, St. Louis, USA, May 2024.
4. **Fehner, W**., Fogarty, M., Anastasio, M. A., & Culver, J. P. (2023). "Evaluation of multivariate approaches to functional connectivity mapping with fNIRS." In Proceedings of SPIE PC12365, Neural Imaging and Sensing 2023, PC123650C (17 March 2023).
5. **W. Fehner**, M. Fogarty, M.A. Anastasio, J.P. Culver. (2023). "Comparison of Multivariate and Bivariate Functional Connectivity Approaches using High-Density Diffuse Optical Tomography for Human Brain Mapping." Invited talk presented at the Imaging Science Pathway Retreat 2023, St. Louis, USA (30 March 2023).