

Dmitrii Altukhov

DATA SCIENTIST · PHD (COMPUTER SCIENCE)

Amsterdam, The Netherlands

✉ dmalt

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Profile

I specialize in data science and applied mathematics with 8-years experience analyzing challenging basic research datasets (EEG/MEG). This involves using existing **machine learning**, **statistical analysis** and **linear algebra** techniques, as well as developing in-house tools and algorithms.

Technologies: **Python**, **Docker**, **Linux**, **SQL**, **Latex**, occasionally **MATLAB**, **C/C++** and **Java**.

Experience

Artificial Intelligence Research Institute (AIRI)

Moscow, Russia

RESEARCH FELLOW

Feb. 2022 – Apr. 2023

- Developed real-time EEG neurofeedback pipeline in **Python**
- Built deep learning model to predict speech from MEG data in **PyTorch**

Higher School of Economics, Centre for Cognition and Decision Making

Moscow, Russia

JUNIOR RESEARCH FELLOW

Feb. 2017 – Dec. 2021

- Curated and published MEG dataset for metacognition research using BIDS and OpenNeuro
- Led 4-people group developing software for real-time feature extraction and 3D visualization of brain activity from EEG in **Python**
- Sped up by a factor of 10 the beamformer inverse solver in MNE-python by modifying the algorithm for vectorized computations

Higher School of Economics, Faculty of Computer Science

Moscow, Russia

SENIOR LECTURER

Aug. 2019 – Dec. 2021

- Developed and taught a course “**MATLAB** for data analysis” to undergraduate students

University of Montreal, CERNEC lab.

Montreal, Canada

VISITING RESEARCHER, TEMPORARY POSITION

Oct. – Dec. 2015, May 2016 – Dec. 2016

- Built a classifier for ASD patients vs. Controls with 75% accuracy using classical ML and information geometry in **Python**
- Co-developed an open-source **Python** package for heavy neuroimaging data processing, Neuropycon, Meunier et al. [2020]

Moscow State University for Pedagogics and Education, MEG Center

Moscow, Russia

JUNIOR RESEARCH FELLOW

Feb 2015 – Dec 2018

- Published two papers in international collaboration with the University of Montreal, see Alamian et al. [2017a,b]

Scientific Research Institute of System Analysis

Moscow, Russia

RESEARCH ASSISTANT, PROMOTED TO JUNIOR RESEARCH FELLOW

Jun. 2011 – Jan. 2015

- Validated commercial software for simulations of flow in jet engines by comparing simulated vs. theoretical shock wave parameters

Education

Ph.D. in Computer Science

Moscow, Russia

HIGHER SCHOOL OF ECONOMICS, FACULTY OF COMPUTER SCIENCE

Jan. 2016 – Nov. 2021

- Thesis: “Optimal methods for functional connectivity estimation in magnetoencephalography.”
- Published a paper in a leading neuroscientific journal (see Ossadtchi et al. [2018]) by proposing a method for signal leakage suppression when measuring brain areas interaction from EEG/MEG data. Programmed the algorithm and validation scripts in **MATLAB**

Ph.D. in Computational Fluid Dynamics (*unfinished, transferred to CS program*)

Moscow, Russia

LOMONOSOV MOSCOW STATE UNIVERSITY, DEPARTMENT OF MECHANICS AND MATHEMATICS

Sep. 2013 – Jan. 2016

- Thesis: “Numerical simulations of reactive gas flows.”

Specialist degree in Mechanics (*Masters equivalent*)

Moscow, Russia

LOMONOSOV MOSCOW STATE UNIVERSITY, DEPARTMENT OF MECHANICS AND MATHEMATICS

Sep. 2008 – Jun. 2013

- Thesis: “Enhancement and validation of LOGOS software for simulations of the reactive fluid flows.”

Honors & Awards

- Selected together with other 178 people across the university for 2-year *Higher School of Economics Academic Scholarship* for publishing a paper in a high-impact journal Moscow, Russia
2019
- Selected 1-st out of 5 teams together with 2 teammates in *IEEE Brain Data Bank Challenge* for building a competitive 2-players drinking game based on brain-computer interface St. Petersburg, Russia
2017

Conference contributions

POSTER PRESENTATIONS

- Biomag 2022** Birmingham, UK
2022
OVERT SPEECH DECODING FROM MEG DATA DECONTAMINATED FROM ARTICULATION ARTIFACTS
- Biomag 2018** Philadelphia, USA
2018
OBLIQUE PROJECTION FOR PHASE SHIFT INVARIANT IMAGING OF COHERENT SOURCES
- Biomag 2018** Philadelphia, USA
2018
NEUROPYCON: A PYTHON PACKAGE FOR EFFICIENT MULTI-MODAL BRAIN NETWORK ANALYSIS
- 5th Workshop on Optically-Pumped Magnetometers** Freiburg, Switzerland
2017
OPM VS. SQUID ARRAYS IN MEG FUNCTIONAL CONNECTIVITY ESTIMATION
- Biomag 2016** Seoul, South Korea
2016
POWER AND SHIFT INVARIANT IMAGING OF COHERENT SOURCES BY MEG DATA
- Brain Connectivity Workshop 2015** San Diego, USA
2015
GLOBALLY-OPTIMIZED POWER AND SHIFT INVARIANT IMAGING OF COHERENT SOURCES

TALKS

- International conference “Brain-Computer Interface: Science and Practice”** Samara, Russia
2019
COGNIGRAPH: A REAL-TIME EEG-BASED SOURCE IMAGING SOFTWARE
- Comprehensive training “MEG at McGill”** Montreal, Canada
2015
MEG RESTING-STATE IN AUTISM. APPROACH TO ANALYSIS.

Publications

- Dmitrii Altukhov, Daria Kleeva, and Alexei Ossadtchi. PSIICOS projection optimality for EEG and MEG based functional coupling detection. *BioRxiv*, 2023
- V. Manyukhina et al. Globally elevated excitation-inhibition ratio in children with autism spectrum disorder and below-average intelligence. *Molecular Autism*, 2022
- B. Martín-Luengo et al. Retrospective confidence judgements in general-knowledge questions. *PsyArXiv*, 2021
- D. Meunier et al. NeuroPycon: An open-source python toolbox for fast multi-modal and reproducible brain connectivity pipelines. *NeuroImage*, 2020
- E. Combrisson et al. Visbrain: A multi-purpose GPU-accelerated open-source suite for multimodal brain data visualization. *Frontiers in Neuroinformatics*, 13, 2019
- A. Ossadtchi, D. Altukhov, and K. Jerbi. Phase shift invariant imaging of coherent sources (PSIICOS) from MEG data. *NeuroImage*, 183, 2018
- Z. Yapple et al. Power of feedback-induced beta oscillations reflect omission of rewards: evidence from an EEG gambling study. *Frontiers in Neuroscience*, 12, 2018
- G. Alamian et al. Alterations of Intrinsic Brain Connectivity Patterns in Depression and Bipolar Disorders: A Critical Assessment of Magnetoencephalography-Based Evidence. *Frontiers in Psychiatry*, 8(March), 2017a
- G. Alamian et al. Measuring alterations in oscillatory brain networks in schizophrenia with resting-state MEG: State-of-the-art and methodological challenges. *Clinical Neurophysiology*, 128(9), 2017b
- N. Smirnov et al. Supercomputer simulations of detonation of hydrogen-air mixtures. *International Journal of Hydrogen Energy*, 2015a
- N. Smirnov et al. Accumulation of errors in numerical simulations of chemically reacting gas dynamics. *Acta Astronautica*, 2015b
- V. Betelin et al. Supercomputer modeling of hydrogen combustion in rocket engines. *Acta Astronautica*, 2012