

Irina Saranskaia

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Research interests: speech processing, predictive coding, neuroimaging analysis

Education

HSE University
PhD in Cognitive Sciences
Moscow, Russia, 2025 – present

HSE University
M.S., Cognitive Sciences and Technologies
Moscow, Russia, 2023 – 2025
Graduated with excellence

St. Petersburg State University
B.S., Computer Science and Artificial Intelligence
St. Petersburg, Russia, 2019 – 2023
Graduated with excellence

Publications

Vlasenko, D., **Saranskaia, I.**, & Zakharov, D. (2026). Hypergraphs from multivariate connectivity: caCoh-based EEG/MEG representation. [arXiv](#).

Vlasenko, D., **Saranskaia, I.**, & Zakharov, D. (2025). From pairwise to high-order: Hypergraph methods and multivariate connectivity metrics for EEG/MEG. In *Proceedings of the 2025 7th International Conference Neurotechnologies and Neurointerfaces (CNN)*, 142–145, doi.org/10.1109/CNN67635.2025.11177482

Saranskaia, I., Gutkin, B., & Zakharov, D. (2025) Aim-based choice of strategy for MEG-based brain state classification. *European Physical Journal Special Topics*, 234, 4159–4177. doi.org/10.1140/epjs/s11734-025-01587-y

Research experience

HSE University, Institute for Cognitive Neurosciences
Project "AI-based listening diagnostic systems"

Research assistant, February 2025 – present

- Full EEG experiment pipeline execution: experimental design, stimulus set construction, pilot validation, large-scale data acquisition
- Data quality control, trial validation, speech recordings analysis
- EEG preprocessing, time-frequency and spectral analyses, feature analysis
- Scientific writing

Technologies: Python: psycopy, mne, numpy, pandas, scipy, scikit-learn, seaborn and matplotlib, speech/behavioural tooling (JiWER for WER/CER; audio processing with librosa/pyloudnorm/parselmouth/soundfile), Hilbert/PSD/Welch methods; MATLAB: fieldtrip; Praat scripting and .TextGrid annotation

Russian Science Foundation
Grant 24-68-00030 "Next Generation Cognitive Artificial Intelligence"

Research-assistant, December 2024 – present

- EEG/MEG data analysis and feature extraction for graph representation for a classification of brain states

Technologies: Python: numpy, scipy, scikit-learn, pandas, matplotlib, mne, mne-connectivity, jpype, infodynamics; MATLAB: fieldtrip.

HSE University
2023 – 2025

- Master's research dedicated to the MEG-based functional connectivity analysis in anxiety patients utilising Time-Reversed Granger causality for functional connectivity assessment.

Technologies: MEG connectivity analysis, time-reversed Granger causality; python, numpy, pandas, scipy, mne, scikit-learn; MATLAB: eeglab; inverse modelling, LCMV beamforming, statistical analysis, multiple comparison corrections.

St. Petersburg State University

2022 – 2023

- Bachelor's thesis "Reproducibility Study of Different Methods For Brain Networks Comparisons." The thesis served the purpose of formulating recommendations for the use of various correction methods for multiple comparisons.

Technologies: coherency-based EEG analysis; python, numpy, pandas, scipy, multiply; graph-theory, statistical analysis, nonparametric permutation testing, multiple comparison corrections.

Conferences

Architectures and Mechanisms for Language Processing (AMLaP) 2026.

"Lexical Predictability and Speech–Brain Synchrony in Compressed Speech" (poster presentation)

Saarbrücken, Germany. 2 – 4 September 2026

XI International Conference on Cognitive Science.

"Functional brain connectivity and anxiety: An MEG study in the context of decision-making" (poster presentation)

"Pupil size and response accuracy in perceptual decision-making in an ambiguous image classification" (poster presentation)

Nizhny Novgorod, Russia. 24 – 28 August 2026

NeuroAI Meeting 2025.

"ML-based approaches for EEG/MEG classification" (oral presentation).

Moscow, Russia. 24 – 25 November 2025

VII International Conference "Neurotechnologies and Neurointerfaces" as part of the V International Conference "Volga Neuroscience Meeting 2025".

"From Pairwise to High-Order: Hypergraph Methods and Multivariate Connectivity Metrics for EEG/MEG" (poster presentation)

Nizhny Novgorod, Russia. 25 – 29 August 2025

XXXI Scientific School "Nonlinear Days-2025".

"Aim-based choice of strategy for MEG-based brain state classification" (poster presentation).

Saratov, Russia. 26 – 30 May 2025

XXI Scientific School "Nonlinear Waves-2024".

"Methods for assessing functional connectivity based on electromagnetic data of brain activity" (poster presentation).

Nizhny Novgorod, Russia. 5 – 11 November 2024

Scholarships

Ostrogradski Fellowship, Ambassade de France en Fédération de Russie

September – December 2026

Brain Programme Fellowship, Research Center "IDEAS"

January 2026 – present

Academic Scholarship, HSE University

November 2025 – present

Additional Education

Fall School in Computational Neuroscience, EITN EBRAINS

Attended with my husband; both independently selected

Pavia, Italy. 21–30 September 2026

Professional Development Programme "Methods of psycho- and neurolinguistics", HSE University

34 academic hours; professional development certificate awarded

St. Petersburg, Russia. 22–24 June 2026

XIII Summer Neurolinguistics School “*Clinical applications of neurolinguistics in neurosurgery*”, **Center for Language and Brain, HSE University**
Moscow, Russia. 1–3 June 2026

Summer School in NeuroAI, **Neuromatch Academy**
Online. 14 – 25 July 2025

Summer School in Computational Neuroscience, **Neuromatch Academy**
Online. 8 – 26 July 2024

Project “Neural correlates of visual processing and action initiation in mouse decision-making”

Languages

Russian (native), English (C1), French (A2)

Skills

Programming

Python: numpy, pandas, scipy, matplotlib, seaborn, scikit-learn, pytorch, nilearn, networkx, mne, mne-connectivity, infodynamics;
PsychoPy (including custom experiment scripting);
MATLAB: fieldtrip, eeglab;
algorithms and data structures;
version control systems (GitHub);
HTML, CSS, LaTeX.

Data analysis and machine learning

classical data analysis;
analysis of categorical data;
network analysis;
machine learning, deep learning;
numpy, pandas, scipy, matplotlib, scikit-learn, pytorch.

Neuroimaging data processing

Analysis and preprocessing of neurophysiological data, including EEG/MEG (ERP/ERF, time-frequency, connectivity analyses) and intracranial recordings (LFP and spike analysis from Neuropixels probes);

Neuroimaging experiment

EEG (BrainVision), EyeTracking (EyeLink)

Speech and audio processing

Analysis and preprocessing of speech data (Praat scripting for segmentation, annotation, and acoustic feature extraction);
Python-based audio libraries for speech and sound analysis: pyloudnorm, librose, parselmouth, signal.

Mathematics: statistics, probability theory, graph theory, linear algebra, calculus.

References

Dr. Denis Zakharov

Director, Theoretical Neuroscience Group, Centre for Cognition & Decision Making, HSE University, Moscow, Russia
Leading Research Fellow, Centre for Cognition & Decision Making, HSE University, Moscow, Russia
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Dr. Olesia Dogonasheva

Postdoctoral Researcher, Institut de l’Audition (Institut Pasteur / Inserm / CNRS / Université Paris Cité / AP-HP), IHU reConnect, Paris, France
odogonasheva@gmail.com