



Sergei Tugin

Curriculum Vitae

I am a first-year postdoctoral researcher at Stanford University. Throughout my career in neuroscience, I have been primarily focused on the investigation of the human brain using noninvasive methods such as TMS and EEG. I am interested in the mechanisms of decision-making, attention, voluntary movement preparation, the excitability of the cortex, as well as in the investigation of neurophysiological disorders. I pay respect to the importance of mathematics, physics, and programming in neuroscience research by applying state-of-the-art methodologies and tools in my work.

Education

2016 – 2022
January June

Ph.D., *Aalto University*, Espoo, Finland

Engineering Physics, Biomedical Engineering

Thesis: "TMS and EEG in the study of human brain dynamics".

Supervisor: Prof. Risto Ilmoniemi

Advisors: Dr. Vadim V. Nikulin, Dr. Julio C. Hernandez Pavon, Dr. Pantelis Lioumis

2008 – 2010
September December

M.Sc., *Saint Petersburg State University*, Saint Petersburg, Russia

Neuroscience

Thesis: "Study of the effect of movements and movements watching on mu-rhythm in human EEG".

Supervisors: Prof. Alexander Alexandrov, Dr. Anna Shestakova

2003 – 2007
September June

B.Sc., *Saint Petersburg State University*, Saint Petersburg, Russia

Higher Nervous Activity and Psychophysiology

Supervisor: Prof. Alexander Alexandrov

Research and Professional Experience

2022 – Now
July

Postdoctoral Researcher, *Stanford University, Departments of Neurology and Neurological Sciences / Departments of Psychiatry & Behavioral Sciences*, Stanford, USA

Investigation and treatment of epilepsy and depression with TMS–EEG.

Supervisors: Prof. Corey Keller, Prof. Fiona Baumer

2023 – Now
January

Review Editor, *Frontiers in Human Neuroscience, Brain Imaging and Stimulation*

Providing an expert review of articles in a rigorous, constructive and efficient manner.

2023 – Now
January

Academic Editor, *PLOS ONE Editorial Board*, San Francisco, USA

Oversee the peer review process from beginning to end.

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- 2022 – Now
July
Visitor Researcher, *Aalto University*, Espoo, Finland
Motor cortex research consultant.
- 2014 – 2022
June July
Researcher, *BioMag Laboratory, HUS Medical Imaging Center, University of Helsinki and Helsinki University Hospital*, Helsinki, Finland
- 2014 – 2016
June January
Researcher, *Aalto University*, Espoo, Finland
Development of protocols and analysis methods for neuroimaging studies.
- 2011 – 2014
June October
Junior Researcher, *Saint Petersburg State University*, Saint Petersburg, Russia
Recording, processing, analyzing, and visualization of EEG data.
- 2011 – 2011
June October
International internship, Researcher, *University of Helsinki*, Helsinki, Finland
Optical Imaging: visualization of BOLD signal spread over the cortex and estimation of visual acuity in animals.
- 2007 – 2009
June September
Laboratory assistant, *Saint Petersburg State University*, Saint Petersburg, Russia
General scientific support of teaching and research activities in the neuroscience department.
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Teaching Experience

- 2019 – 2021 **NBE-E4210 – Structure and operation of the human brain**, 5 ECTS credits, Aalto University, Espoo, Finland
Coach assistant.
- 2018 – 2019 **MatLab Workshop**, *Science Factory: TMS–EEG summer school*, Espoo, Finland, Lecturer

Organization Experience

- 2018 – Now
October
ConnectToBrain project, *Member of Aalto University team in EU-funded ERC Synergy project.*
Participation in science dissemination and clinical groups. Organization of group events, preparation of materials for TMS-based review aimed at stroke evaluation and recovery, Finland, Italy, and Germany
- 2016 – 2022 **TMS–EEG science factory**, *Preparation and participation in seven science factories (summer schools) with approx. 40 participants.*
Management of events, scheduling, student evaluation, miscellaneous tasks, Espoo, Finland
- 2010 – 2012 **Biotechnology of Neurosciences (BioN) Postgraduate Training Network**, *Student and member of the project team, Saint Petersburg, Russia*
- 2008 – 2010 **Tempus Master's Programme in Neuroscience**, *Student and member of the project team, Saint Petersburg, Russia*

Personal grants

- 2012 – 2013 **CIMO fellowship/TM-12-8217**
- 2011 – 2012 **Study of the Psychophysiological Mechanisms of Cognitive Functions and Emotional States performed at the premises of the magnetoencephalography laboratory, Moscow State Pedagogical University**

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Expertise and Skills

- **Neuroimaging instrumentation:** TMS, TMS–EEG, multi-locus TMS, rodent TMS, EMG, EEG, PAS, MEG
- **Signal processing:** ERP, Spectral analysis of spontaneous EEG/MEG, Wavelet analysis, oscillation analysis (Hilbert, ITC, ERSP)
- **Programming:** MATLAB, R, Python, C++
- **IT skills:** L^AT_EX, Git, E-Prime, NBS Presentation in Neuroscience, SPSS
- **Animal research:** neurosurgery, behavioral studies, long-term experiments, TMS, invasive optical imaging
- **General scientific skills:** Design, organization, and summarization of research with the application of TMS and/or EEG, team-oriented and independent teaching

Languages

- English (advanced)
- Russian (native)
- Finnish (intermediate)

Hobbies

- 2020 – Now **Diving**, *PADI*, Open Water Scuba Instructor (437364)
August
- 2018 – Now **Kayaking**, *Euro Paddle Pass (EPP) 2*, group leadership
September
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References

- Corey Keller** Asst. Prof., *Stanford University*, Stanford, USA
Email: ckeller1@stanford.edu
Phone: +1 802 578 62 92
LinkedIn: Corey Keller
- Fiona Baumer** Asst. Prof., *Stanford University*, Stanford, USA
Email: fbaumer@stanford.edu
Phone: +1 650 723 09 93
- Risto Ilmoniemi** Prof., Head of the Dept. of Neuroscience and Biomedical Engineering, *Aalto University*, Espoo, Finland
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LinkedIn: Risto Ilmoniemi
- Vadim Nikulin** Dr., Research Group Leader, Principal Investigator, *Max Planck Institute for Human Cognitive and Brain Sciences*, Leipzig, Germany
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LinkedIn: Vadim Nikulin

- Ulf Ziemann** Prof., Medical Director of the Department of Neurology, *Eberhard Karls University*, Tübingen, Germany
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LinkedIn: Ulf Ziemann
- Anna Shestakova** Dr., Director, Chief Research Fellow, *National Research University Higher School of Economics*, Moscow, Russia
Email: a.shestakova@hse.ru
Phone: +7 495 772 95 90, +7 911 992 55 19
- Pantelis Lioumis** Dr., Research Fellow, *Aalto University*, Espoo, Finland
Email: pantelis.lioumis@aalto.fi
Phone: +358 45 133 05 92
LinkedIn: Pantelis Lioumis
- Julio C. Hernandez Pavon** Dr., Post-Doctoral Fellow, *Feinberg School of Medicine*, Chicago, USA
Email: julio.hpavon@northwestern.edu
Phone: +1 312 975 7632

Publications in Peer-Reviewed Journals

- Souza, V. H., Nieminen, J. O., **Tugin, S.**, Koponen, L. M., Baffa, O., & Ilmoniemi, R. J. (2022). TMS with fast and accurate electronic control: Measuring the orientation sensitivity of corticomotor pathways. *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*.
- Tugin, S.**, Souza, V. H., Nazarova, M. A., Novikov, P. A., Tervo, A. E., Nieminen, J. O., Lioumis, P., Ziemann, U., Nikulin, V. V., & Ilmoniemi, R. J. (2021). Effect of stimulus orientation and intensity on short-interval intracortical inhibition (SICI) and facilitation (SICF): A multi-channel transcranial magnetic stimulation study. *PLoS one*, 16.
- Sathyan, S., Tolmacheva, A., **Tugin, S.**, Mäkelä, J. P., Shulga, A., & Lioumis, P. (2021). A new paired associative stimulation protocol with high-frequency peripheral component and high-intensity 20 Hz repetitive transcranial magnetic stimulation – A pilot study. *International Journal of Environmental Research and Public Health*, 18(21), 11224.
- Souza, V. H., Nieminen, J. O., **Tugin, S.**, Koponen, L., Baffa, O., & Ilmoniemi, R. J. (2021). Probing the orientation specificity of excitatory and inhibitory circuitries in the primary motor cortex with multi-channel TMS. *bioRxiv*.
- Tugin, S.**, Hernandez-Pavon, J. C., Ilmoniemi, R. J., & Nikulin, V. V. (2016). Visual deviant stimuli produce mismatch responses in the amplitude dynamics of neuronal oscillations. *NeuroImage*, 142, 645–655.
- Tugin, S.**, Gorin, A., Kanunikov, I. E., & Shestakova, A. (2015). Hyperscanning of social attunement: An FRN study. *Psychology. Journal of the Higher School of Economics*, 12, 48–63.
- Shtyrov, Y., Goryainova, G., **Tugin, S.**, Ossadtchi, A., & Shestakova, A. (2013). Automatic processing of unattended lexical information in visual oddball presentation: Neurophysiological evidence. *Frontiers in Human Neuroscience*, 7, 421.
- Shestakova, A., Rieskamp, J., **Tugin, S.**, Ossadtchi, A., Krutitskaya, J., & Klucharev, V. (2013). Electrophysiological precursors of social conformity. *Social Cognitive and Affective Neuroscience*, 8, 756–63.
- Aleksandrov, A. A., & **Tugin, S.** (2012). Changes in the mu rhythm in different types of motor activity and on observation of movements. *Neurosci Behav Physi*, 42, 302–307.

Conference Publications

- Tugin S.**, Souza, V., Nazarova, M., Nieminen, J., Novikov, P., Tervo, A., Lioumis, P., Nikulin, V., & Ilmoniemi, R. Effect of stimulus orientation and intensity on short-interval intracortical inhibition (SICI) and facilitation (SICF). In: *Clinical Neurophysiology*. 131. (4). 2020, e41.
- Novikov, P., **Tugin, S.**, Nazarova, M., Nieminen, J., Nikulin, V., & Ilmoniemi, R. Fast motor mapping with 2-channel multi-locus TMS. In: *BrainStim*. 2020.
- Tugin, S.**, Nazarova, M., Novikov, P., Tervo, T., Souza, V., Lioumis, P., Nieminen, J., Nikulin, V., & Ilmoniemi, R. Probing interhemispheric inhibition for lower limbs with multi-locus TMS. In: *FENS*. 2020.
- Souza, V., Nieminen, J., **Tugin, S.**, Koponen, L., Baffa, O., & Ilmoniemi, R. Multi-locus TMS transducer for probing orientation dependency of mechanisms in the primary motor cortex. In: *Brain Stimulation*. 12. (2). 2019, 467.
- Tugin, S.**, Nieminen, J., Souza, V., Casarotto, S., & Ilmoniemi, R. Mismatch negativity in motor cortex revealed by combining multi-locus TMS and EEG. In: *The 38th Annual Scientific Meeting of the Australasian Neuroscience Society*. 2018.

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- Kalmykova, M., **Tugin, S.**, Krugliakova, E., Shestakova, A., & Klucharev, V. ERP study of brands associations. In: In *The 11th Annual Meeting of Society for Neuroeconomics*. 2013.
- Tugin, S.**, Shestakova, A., Ossadtchi, A., Kislyuk, D., Krutitskaya, J., & Klucharev, V. Electrophysiological precursors of social conformity. In: In *Neuroscience*. 2011.
- Shestakova, A., Rieskamp, J., **Tugin, S.**, Krutitskaya, J., Klucharev, V., & Ossadtchi, A. Electrophysiological precursors of social conformity. In: In *Neuroeconomics: Decision Making and the Brain*. 2011.
- Goryainova, G., **Tugin, S.**, Shestakova, A., & Shtyrov, Y. Automatic processing of linguistic information in the virtual input: Visual mismatch negativity to lexical material. In: In *The 11th International Conference on Cognitive Neuroscience (ICON XI)*. 2011.
- Tugin, S.**, Shestakova, A., & Klucharev, V. Reinforcement learning signal predicts social conformity. In: In *International Life Science Student Conference*. 2010.