Amir-Homayun Hallajian — PhD Candidate

Donders Institute for Brain, Cognition, and Behaviour – Nijmegen, Netherlands
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Profile

PhD candidate in Cognitive Neuroscience at the Donders Institute, specializing in experimental semiotics, and social neuroscience. Leveraging advanced computational models (e.g., Transformers) and dual fMRI to explore how humans coordinate meaning in communication, with expertise in machine learning, statistical modeling, and dynamical systems analysis.

Research Interests

Experimental Semiotics and Referential Coordination, Computational Modeling of Human Communication, Cognitive Mechanisms of Conceptual Alignment, Social Neuroscience of Interaction, Statistical and Dynamical Systems Analysis, Non-invasive Brain Stimulation

Education

Donders Institute for Brain, Cognition, and Behaviour **Nijmegen, Netherlands**
PhD in Cognitive Neuroscience *2024–Present*
Focus: Experimental semiotics, social neuroscience, dual fMRI analysis
Supervisors: Dr. Arjen Stolk and Prof. Ivan Toni

University of Tehran **Tehran, Iran**
Master's in Clinical Psychology, Tuition Fee Waiver Scholarship *2018–2021*

- **Thesis**: Role of temporo-parietal junction on implicit mentalizing in autism via theta-burst stimulation
- GPA: 4.0/4.0 (Summa cum laude)

University of Isfahan **Isfahan, Iran**
Bachelor's in Biomedical Engineering (Bioelectric), Tuition Fee Waiver Scholarship *2013–2017*

- **Thesis**: Brain-computer interface application for neurofeedback treatment in children with autism
- GPA: 3.4/4.0 (Last 2 years: 3.8/4.0)

Professional Experience

Donders Institute for Brain, Cognition, & Behaviour **Nijmegen, Netherlands**
PhD Student *Mar 2024–Present*

- Leading research on human communication and experimental semiotics
- Dual fMRI analysis, deep learning modeling, complex system analysis
- Writing blog posts for *Donders Wonders*, communicating neuroscience research to the public

Convergent Technologies Research Center **Tehran, Iran**
Graduate Student Researcher *Dec 2020–Dec 2023*

- Collaborated internationally on EEG/fMRI analyses
- Conducted meta-analyses on neurodevelopmental disorders and TMS/tES studies

Atieh Clinical Neuroscience Center **Tehran, Iran**
Manager, Children & Adolescent Clinic *Jul 2019–Aug 2021*

- Oversaw 30+ specialists and provided EEG/cognitive assessments
- Neurotherapy – Performing TES and TMS sessions

Publications

Published

- Salehinejad, M. A., Abdi, M., Dadashi, M., **Hallajian, A.-H.**, Sharifi, K., Khadem, A., et al. (2025). Efficacy of optimized multichannel vs conventional tDCS for clinical use in major depression: A randomized controlled trial. *medRxiv*, 2025-02.
- Alizadehgoradel, J., **Hallajian, A.-H.**, et al. (2024). Targeting the prefrontal-supplementary motor network in OCD with intensified electrical stimulation: A randomized, controlled trial. *Transl. Psychiatry*, 14, 78.
- Azarkolah, A., Noorbala, A., Ansari, S., **Hallajian, A.-H.**, et al. (2024). Transcranial direct current stimulation for fibromyalgia pain and disability: A systematic review. *Brain Sci.*, 14(1), 26.
- Dehghani-Arani, F., Kazemi, R., **Hallajian, A.-H.**, Sima, S., Boutimaz, S., Hedayati, S., et al. (2024). Meta-analysis of repetitive transcranial magnetic stimulation (rTMS) efficacy for OCD treatment: The impact of stimulation parameters, symptom subtype, and rTMS-induced electrical field. *J. Clin. Med.*, 13(18), 5358.
- **Hallajian, A.-H.**, Sharifi, K., Rostami, R., Saeed, F., Mokarian Rajabi, S., Zangenehnia, N., et al. (2024). Neurocognitive effects of 3 mA prefrontal electrical stimulation in schizophrenia: A randomized sham-controlled tDCS-fMRI study protocol. *PLOS ONE*, 19(8), e0306422.
- Salehinejad, M. A., Ghanavati, E., Glinski, B., **Hallajian, A.-H.**, et al. (2022). Efficacy and safety of transcranial direct current stimulation in major neurodevelopmental disorders: A systematic review. *Brain Behav.*, e2724.
- **Hallajian, A.-H.**, Dehghani-Arani, F., Rostami, R., et al. (2022). Temporoparietal junction and implicit mentalizing in autism: A theta-burst stimulation study. *J. Cogn. Psychol.*, 9(4), 35–53.
- Jafari, E., Alizadehgoradel, J., **Hallajian, A.-H.**, et al. (2021). Intensified stimulation targeting lateral/medial PFC for social anxiety disorder: A dose-comparison study. *Brain Stimul.*, 14(4), 974–986.
- Zabihi, A., Mazaheri, M. A., Rostami, R., **Hallajian, A.-H.**, et al. (in press). Relational impact of emotional stimuli on putative mirror neuron activity: A TMS study. *Basic Clin. Neurosci.*

Under Review or Revision

- Zabihi, A., **Hallajian, A.-H.**, et al. Mother mirror neurons in borderline personality disorder: Insights from TMS. (Under Review at *Scientific Reports*)
- Salehinejad, M. A., **Hallajian, A.-H.**, et al. Transcranial electrical stimulation for the treatment of obsessive-compulsive disorder: A triple metaanalysis (Under Review at *Nature Mental Health*)
- Salehinejad, M. A., **Hallajian, A.-H.**, et al. Efficacy of optimized multichannel vs conventional tDCS for clinical use in depression (Under Review at *Nature Mental Health*)

Conference Presentations

- **Poster Presentation**: "Meta-analysis of rTMS efficacy for OCD treatment: The impact of stimulation parameters, symptom subtype, and rTMS-induced electrical field." BRST2025, Kobe, Japan (February 23–26, 2025). Published in: *Brain Stimulation*, 18(1): 581, 2025.
- **Poster Presentation**: "Causal evidence for the role of right temporoparietal junction in implicit theory of mind in autism: A theta-burst stimulation study." BRST2025, Kobe, Japan (February 23–26, 2025). Published in: *Brain Stimulation*, 18(1): 447, 2025.
- **Oral Presentation**: "Alignment of Representational Complexity as a Latent Control Parameter in Referential Communication." COGSCY2025, San Francisco, US (July 30–Aug 2, 2025)
- **Poster Presentation**: "Understanding the dynamics of Shared Context generation during referential communication – a neural network approach." HILS2024, Nijmegen, NL (July 8–11, 2024)

Teaching Experience

University of Tehran **Tehran, Iran**
Teaching Assistant *Oct 2019–Sep 2022*

- Statistical Methods in Cognitive Neuroscience
- Advanced Psychopathology

Honors and Awards

- **Iran's National Elites Foundation Scholarship** (2022): Graduate student with outstanding performance
- **Ministry of Science, Research and Technology** (2018): Ranked 2nd among 60,000+ in master's entrance
- **Best Undergraduate Dissertation in Engineering** (2018): Isfahan University - Issued by the International conference on "Computer Games; Challenges and Opportunities (CGCO)
- **Ministry of Science, Research and Technology** (2013): Top 1% among 250,000+ participants in university entrance

Skills

Programming & Software

- **Python**: Machine Learning, Transformers, PyTorch, Dynamical Systems, NLP
- **R**: Multilevel Models, GAMs, ggplot2
- **Matlab**: EEGLAB, FieldTrip, Psychtoolbox
- **NIBS Modeling**: SIMNIBS, ROAST
- **Other**: FSL, LaTeX

Statistical & Analytical

- Neural Network Modeling (Transformers, RNNs, LSTMs), Bayesian Statistics, Dynamical Systems Analysis, Multilevel Modeling

Neuroscience

- Dual fMRI, Non-invasive Brain Stimulation (tES, TMS), Experimental Semiotics, Social Neuroscience of Communication, Neuropsychological and Cognitive Assessments

Languages

Persian: Native proficiency

English: Full professional proficiency

Dutch: Elementary proficiency

References

Prof. Ivan Toni: Donders Institute for Brain, Cognition, and Behaviour, Nijmegen, Netherlands
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Dr. Arjen Stolk: Department of Psychological and Brain Sciences, Dartmouth College, Hanover, NH, USA
Arjen.Stolk@dartmouth.edu

Dr. Mohammad Ali Salehinejad: Leibniz Research Centre for Working Environment and Human Factors, Dortmund, Germany
salehinejad@ifado.de