

Bálint Varga

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Motivated PhD student and aspiring researcher in cognitive computational neuroscience, with experience in neurobiological data analysis, and machine learning. I am particularly interested in the neurobiological basis of cognition and conscious thought.

Current positions

2021- **Junior research fellow, Theoretical Neuroscience and Complex Systems Research Group, Wigner Research Centre for Physics, Budapest**

2020-2025
(expected) **PhD student, Functional Neurosciences Program, Szentágotthai János Doctoral School, Semmelweis University, Budapest**
Supervisors: László Négyessy, PhD and Zoltán Somogyvári, PhD (Theoretical Neuroscience and Complex Systems Research Group, Wigner Research Centre for Physics, Budapest)

Education

2016-2020 **Biophysics MSc, Eötvös Loránd University, Budapest**
Thesis: *Signal flow hierarchy in a multi-scale dynamic network model of the cerebral cortex*
Supervisors: László Négyessy, PhD and Zoltán Somogyvári, PhD (Theoretical Neuroscience and Complex Systems Research Group, Wigner Research Centre for Physics, Budapest)

2017-2018 **Computer Science Specialization, Eötvös Loránd University, Budapest**
Intermediate level courses in programming (Python, Haskell, R), databases (SQL, Excel), web development (HTML, CSS, JavaScript) and machine learning.

2013-2016 **Biology BSc, Eötvös Loránd University, Budapest**
Thesis: *Analysis of cortical tracts and connections* (in Hungarian)
Supervisor: László Négyessy, PhD (Theoretical Neuroscience and Complex Systems Research Group, Wigner Research Centre for Physics, Budapest)

Languages

- Hungarian (native)
- English (advanced/full professional, complex C1)
- Serbian (intermediate)
- German (intermediate)
- French (beginner)

Skills

- Data analysis and modeling in Python and Matlab
 - machine learning
 - parallel computing
 - differential equations
 - network science
 - data visualization
- Scientific writing and presentation
- Research project management

Society memberships

- Federation of European Neuroscience Societies (FENS)
- Hungarian Neuroscience Society
- Scientific Computing Society (Hungary)

Publications

Articles

1: Varga B, Soós B, Jákli B, Bálint E, Somogyvári Z, Négyessy L. *Network Path Convergence Shapes Low-Level Processing in the Visual Cortex*. *Front Syst Neurosci*. 2021 May 24;15:645709. doi: 10.3389/fnsys.2021.645709. PMID: 34108867; PMCID: PMC8181740.

2: Stippinger, M., Varga, B., Benkő, Z., Fabó, D., Erőss, L., Somogyvári, Z., & Telcs, A. (2023). *CCDH: Complexity based Causal Discovery of Hidden common cause in time series*. *Chaos, Solitons & Fractals*, 176, 114054. doi:10.1016/j.chaos.2023.114054

3: Benkő, Z., Varga, B., Stippinger, M., & Somogyvári, Z. (2024). *Detecting Causality in the Frequency Domain with Cross-Mapping Coherence*. arXiv preprint arXiv:2407.20694.

Presentations

1: *Network Path Convergence Shapes Low-Level Processing in the Visual Cortex*. PhD Scientific Days 2021, Semmelweis University, Budapest, Hungary

2: *The Role of Network Structure in Visual Cortical Processing*. Interdisciplinary Doctoral Conference 2021, University of Pécs, Hungary

3: *Fronto-Temporal Interactions in Working Memory with Electroencephalography* (in Hungarian). SciComp Conference 2024, Szeged, Hungary

Posters

1: Varga B, Somogyvári Z, Négyessy L. Network Path Convergence Shapes Low-Level Processing in the Visual Cortex. Current and Future Applications of Network and Control Sciences for Psychiatry Summer School 2021, Tübingen University (online)

2: Varga B, Soós B, Jákli B, Bálint E, Somogyvári Z, Négyessy L. Network Path Convergence Shapes Low-Level Processing in the Visual Cortex. IBRO International Neuroscience Meeting 2022, Budapest, Hungary

3: Varga B, Soós B, Jákli B, Bálint E, Somogyvári Z, Négyessy L. Network Path Convergence Shapes Low-Level Processing in the Visual Cortex. FENS Forum 2022, Paris, France

4: Varga B, Stippinger M, Bazsó F, Bencze A, Somogyvári Z, Négyessy L, Tanigawa H, Kiss T. Fronto-temporal interactions in associative recall explored by multielectrode recordings, IBRO World Congress 2023, Granada, Spain

5: Varga B, Soós B, Jákli B, Bálint E, Somogyvári Z, Négyessy L. Network Path Convergence Shapes Low-Level Processing in the Visual Cortex. Scientific Computing Conference 2023, Budapest, Hungary

6: Varga B, Stippinger M, Bazsó F, Bencze A, Somogyvári Z, Négyessy L, Tanigawa H, Kiss T. Fronto-temporal interactions in associative recall explored by multielectrode recordings. International Neuroscience Conference 2024, Pécs, Hungary

7: Varga B, Stippinger M, Bazsó F, Bencze A, Somogyvári Z, Négyessy L, Tanigawa H, Kiss T. Fronto-temporal interactions in associative recall explored by multielectrode recordings. FENS Forum 2024, Vienna, Austria

8: Varga B, Stippinger M, Bazsó F, Bencze A, Somogyvári Z, Kiss T, Tanigawa H, Négyessy L. Fronto-Temporal Causal Network of Phase-Amplitude Coupling in Working Memory. Annual Meeting of the Hungarian Neuroscience Society 2025, Debrecen, Hungary