Tarmo Nurmi

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Date of birth: 23.4.1994

CV
9.12.2025

Education

2019–2025 **D.Sc. (Tech.), Aalto University, Finland**
Supervising professor: Mikko Kivelä
Thesis: **Multilayer networks: phenomena, theory, and practice**
https://urn.fi/URN:ISBN:978-952-642585-6

2017–2019 **M.Sc. (Tech.), Aalto University**
Master's degree programme in Life Science Technologies. Graduated with excellence (GPA 4.47 out of 5).
Major: **Complex Systems**, minor: International minor (EPFL, below).
Master's Thesis: Construction and multilayer motif analysis of temporal fMRI brain networks.

2013–2017 **B.Sc. (Tech.), Aalto University**
Bachelor's degree programme in Electrical Engineering. Graduated with excellence (GPA 4.81 out of 5).
Major: **Bioinformation Technology**, minor: **Molecular Biosciences (University of Helsinki)**.
Bachelor's Thesis: Microfluidic organ models as tools for drug discovery.

Autumn 2017 **International exchange at École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland**
Courses in applied data analysis, machine learning, Markov chains theory and applications, neurosciences and stem cell biology for a total of 25 ECTS, plus a 3 ECTS language course in French (level B2). Exchange studies included in my M.Sc. degree as an international minor.

Summer 2016 **International Honors Program, Stanford University, California, USA**
Stanford University's summer program, to which I applied through Aalto University's partnership program with Stanford, and received a full stipend. Courses taken included data mining, statistical learning, and cancer biology, with grades A, A, and A+, for a total of 18 ECTS.

Doctoral research — In my research, I have:

► Extensively worked with network (graph) data from many different domains
► Programmed substantial in-depth data analysis pipelines in Python and in other languages, and contributed to a major multilayer network software library *pymnet*
► Created novel hypotheses about phenomena in networks and tested them
► Broadly studied existing literature and research papers in network science
► Developed structural analysis methods for networks (graphlet-based analysis tools for characterizing local structures around nodes within multilayer networks)
► Created algorithms for subnetwork enumeration, implemented in Python and C++
► Created a foundational network framework for handling time-changing dynamic networks in the context of human brain data
► Communicated research outcomes with a wide audience with international journal publications and presentations in international conferences
► Visualized network data and aggregate statistics

Journal publications

Sallmen, S., **Nurmi, T.**, & Kivelä, M. (2022). **Graphlets in multilayer networks**. *Journal of Complex Networks*, 10(2), cnac005, https://doi.org/10.1093/comnet/cnac005.

Nurmi, T., & Kivelä, M. (2024). **Subnetwork Enumeration Algorithms for Multilayer Networks**. *IEEE Transactions on Network Science and Engineering,* 11(6), 5803-5817, https://doi.org/10.1109/TNSE.2024.3447893.

Nurmi, T., De Luca, P., Hakonen, M., Kivelä, M., & Korhonen, O. (2025). **Node-reconfiguring multilayer networks of human brain function**. *ArXiv preprint*, 2410.05972, https://doi.org/10.48550/arXiv.2410.05972.

Nurmi, T., Badie-Modiri, A., Coupette, C., & Kivelä, M. (2024). **pymnet: A Python Library for Multilayer Networks**. *Journal of Open Source Software*, 9(99), 6930, https://doi.org/10.21105/joss.06930.

Ito, F., Kobayashi, K., Spijker, P., Zivanovic, L., Umeda, K., **Nurmi, T.**, ... & Yamada, H. (2016). **Molecular Resolution of the Water Interface at an Alkali Halide with Terraces and Steps**. *The Journal of Physical Chemistry C*, 120(35), 19714-19722, https://doi.org/10.1021/acs.jpcc.6b05651.

Merzon, L., Tauriainen, S., Triana, A., **Nurmi, T.**, Huhdanpää, H., Mannerkoski, M., ... & Salmi, J. (2025). **Real-world goal-directed behavior reveals aberrant functional brain connectivity in children with ADHD**. *PloS one*, 20(3), e0319746, https://doi.org/10.1371/journal.pone.0319746.

Conference presentations

NetSciX 2024, Venice, Italy, **Multilayer edit distance** (regular talk)

Complex Networks 2021, Madrid, Spain, **Efficient enumeration of multilayer subnetworks** (regular talk)

NetSci 2020, Online, **Multilayer brain networks with time-evolving nodes and analyzing network motifs in them** (regular talk)

Complex Networks 2019, Lisbon, Portugal, **Multilayer brain networks with time-evolving nodes and analyzing network motifs in them** (lightning talk)

Personally received funding

Competitive co-funded doctoral student position, 4 years (2019–2023), Department of Computer Science, Aalto University

Service as a peer reviewer

Applied Network Science	PLOS ONE	Journal of Complex Networks
Data Mining and Knowledge Discovery	Annals of Applied Statistics	

Work and teaching experience

2019–2023	**Course assistant**, CS-E5740 Complex Networks *Assistant for the Complex Systems group's course for master's-level students.*
1.4.–31.7.2019 28.5.–31.12.2018	**Master's Thesis worker**, Complex Systems group, Aalto University *Supervisor: professor Mikko Kivelä. Creating a pipeline for motif analysis in multilayer temporal fMRI brain networks.*
15.1.–31.3.2019	**Course assistant**, CS-E5755 Nonlinear Dynamics and Chaos *I was the sole assistant for this master's-level course, grading exercise submissions and leading exercise sessions.*
5.2.–27.5.2018 29.5.–31.7.2017	**Research assistant**, Complex Systems group, Aalto University *Working on network science topics in professor Mikko Kivelä's group. The work period is split in two because of my student exchange in Switzerland.*
1.6.–31.8.2015	**Research assistant**, Computational Chemistry group, Aalto University *Planning and running molecular simulations on CSC supercomputers in professor Kari Laasonen's group.*
7.7.–18.12.2014	**Conscript military service**, Finnish Armored Brigade, scribe *I received a certificate where I was thanked for my independent initiative and conscientiousness.*
5.–14.10.2009	**Video game QA (Alan Wake)**, Remedy Entertainment PLC *Technical and user experience reporting as part of the school work-life orientation*.

Other achievements

14.–21.7.2013	**Bronze Medal at the 24th International Biology Olympiad, Bern, Switzerland** *A total of 240 students from 62 countries participated in the Olympiad, which was organized as an individual competition. I got a place on the Finnish delegation after succeeding in the national biology competition for high school students and in a further training course at the University of Helsinki.*
2001–2014	**Advanced studies in Visual Arts, Espoo School of Art.**
2013	**4th place** in the Finnish national physics competition for high school students *Success in this competition granted me direct admission to Aalto University, exempting me from the standard entrance exams.*
2013	**4th place** in the Finnish national biology competition for high school students
6.–17.6.2011	Participation in a selective Finnish–Russian summer school in mathematics and physics for gifted students, awarded third place in the closing mini-Olympiad for mathematics, Moscow State Regional University, Russia
2011–2013	Awards for success in Finnish national physics and mathematics competitions for high school students (total of four awards in various divisions)

Language proficiencies

Finnish – native **English** – full professional **French** – limited working
Swedish – limited working **German** – elementary

Software skills

Python – excellent **Git** – good **LaTeX** – good **SLURM** – fair **C++** – fair **Shell** – fair **R** – basics
MATLAB – basics **Inkscape** – basics **Adobe Illustrator** – basics

Hobbies and interests

Visual arts (drawing and painting), playing the guitar in a band, snowboarding, gym, literature

References are available on request.