

MARCELL NAGY

1111 Egry József utca 1, Budapest, Hungary

+36-30-932-1429 \diamond marcessz@math.bme.hu

math.bme.hu/~marcessz/ \diamond github.com/marcessz \diamond Google Scholar

EDUCATION

Budapest University of Technology and Economics, Budapest, Hungary
Doctoral School of Mathematics and Computer Science *2019 - Present*
PhD in Applied Mathematics

- PhD Thesis: *Classification Problems in Network Science and Higher Education*
- Supervisors: Károly Simon, Roland Molontay

Budapest University of Technology and Economics, Budapest, Hungary *2016 - 2018*
MSc in Applied Mathematics, specializing in Stochastics

- Master's thesis:
Data-Driven Analysis of Fractality and Other Characteristics of Complex Networks
Supervisors: Károly Simon, Roland Molontay
- Qualification of diploma: with highest honors (DGPA = 4.87/5)

Budapest University of Technology and Economics, Budapest, Hungary *2013 - 2016*
BSc in Applied Mathematics

- Bachelor's thesis: *Fractal Networks and Assortativity*

WORK & RESEARCH EXPERIENCE

Fulbright Visiting Student Researcher – Indiana University Bloomington *2022 Spring*
Research topic: network science

Junior researcher – Educational Development Informatics (formerly eKRÉTA) *2021 - Present*
Research topic: educational data science

Deputy team leader – Human & Social Data Science *2020 - Present*
Research topic: network science, educational data science, health data analytics,
and intelligent monitoring & anomaly detection

Young researcher – Higher Education Institutional Excellence Program (FIKP) *2018- Present*
Research topic: Artificial intelligence

Deputy coordinator – BME – Statistics Consulting Group *2017 - 2020*
We offer statistical consulting and provide data science research
and development service to our corporate and academic partners.

Research assistant – University of Debrecen (HU-MATHS-IN) *2018 - 2021*
Research topic: Data-driven analysis of complex networks

Research assistant – BME–Central Academic Office *2018 - 2020*
Research topic: Educational data science

Research assistant – MTA-BME Stochastics Research Group *2017 - 2019*

Research topic: Data-driven network science and fractal networks

Developer – Institute for Computer Science and Control 2017
Supervisor: Balázs Csanád Csáji. Topic: Machine learning, system identification

TEACHING EXPERIENCE

Laboratory instructor

- Data Analytics (in English)– Budapest University of Technology and Economics (BME) 2020 -
RapidMiner & Tableau
- Business Analytics (MBA) – BME (in English)– BME 2020 -
RapidMiner, Gephi, & Tableau
- Statistics I. – BME Spring 2020
Excel & R Studio (hypothesis testing, correlation and regression analysis)
- Applied Stochastics (in English) – BME 2019 - 2021
Python simulations (network models, random walks, queueing theory, percolation)

Teaching assistant

- Data Science (in English) – Aquincum Institute of Technology (AIT-Budapest) 2019 - Present
Assistance in recitation classes and evaluating projects
- Introduction to Data Science I. – BME 2017 - 2020
Data visualization tutorial classes using Tableau
Grader, and student project supervisor

Assistant supervisor

- Individual research project of Bachelor and Master students at BME 2018 - Present
Topic: Educational data science
- Summer internship of Master students from ENSAE, Paris Summer 2019 and 2020
Topic: Data science and network science
- Summer internship of Bachelor students from the UK Summer 2018
Topic: Educational data science and network science
- BSc and MSc Theses. Topics: data science and network science 2018 - Present

CONFERENCES & SCHOOLS

SITE 2022: 33rd Annual Conference of the Society for Information Technology April 2022
and Teacher Education, San Diego, USA
Title of presentation: *Interpretable Dropout Prediction:
Towards XAI-Based Personalized Intervention*

Networks 2021: A Joint Sunbelt and NetSci Conference July 2021
Title of presentation: *Twenty Years of Network Science:
A Bibliographic and Co-Authorship Network Analysis*

The 9th International Conference on Complex Networks and their Applications December 2020
Title of presentation: *Data-Driven Analysis of Complex Networks
and Their Model-Generated Counterparts*

NetSci-X 2020 International Conference and School on Network Science, Tokyo, Japan January 2020

Title of poster: *Comparing Box-Covering Algorithms for Fractal Dimension of Complex Networks*

The 47th European Society of Engineering Education (SEFI) Annual Conference, September 2019
Budapest, Hungary

The 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining, Vancouver, Canada August 2019
Title of presentation: *On the Structural Properties of Social Networks and their Measurement-calibrated Synthetic Counterparts*

1st Conference on Transfer between Mathematics & Industry, July 2019
Santiago de Compostela, Spain
Title of poster: *Machine Learning Algorithms for Predicting Academic Performance and Identifying the Contributing Factors*

7th International Conference on Complex Networks and their Applications, December 2018
Cambridge, UK

2nd Danube Conference for Higher Education Management, Budapest November 2018
Title of presentation: *Predictive Power of Admission Point Score and its Variants on Academic Performance*

INES 2018, 22nd IEEE International Conference on Intelligent Engineering Systems, June 2018
Las Palmas, Gran Canaria, Spain
Title of presentation: *Predicting Dropout in Higher Education Based on Secondary School Performance*

PUBLICATIONS

1. Nagy, M. & Molontay, R. (2023). *Interpretable Dropout Prediction: Towards XAI-Based Personalized Intervention*. International Journal of Artificial Intelligence in Education, 1-27
2. Zakar-Polyák, E., Nagy, M., & Molontay, R. (2023). *Towards a better understanding of the characteristics of fractal networks*. Applied Network Science 8 (1), 17
3. Zakar-Polyák, E., Nagy, M., & Molontay, R. (2023). *Investigating the origins of fractality based on two novel fractal network models*. In Complex Networks XIII: Proceedings of the 13th Conference on Complex Networks, CompleNet 2022 (pp. 43-54).
4. Molontay, R., & Nagy, M. (2022). *How to improve the predictive validity of a composite admission score? A case study from Hungary*. Assessment & Evaluation in Higher Education, 1-19.
5. Kui, B., Pintér, J., Molontay, R., Nagy, M., ... & Hungarian Pancreatic Study Group. (2022). *EASY-APP: An artificial intelligence model and application for early and easy prediction of severity in acute pancreatitis*. Clinical and Translational Medicine, 12(6), e842.
6. Nagy, M., & Molontay, R. (2022). *Network classification-based structural analysis of real networks and their model-generated counterparts*. Network Science, 10(2), 146-169.
7. Kiss, S., Pintér, J., Molontay, R., Nagy, M., ... & Szentesi, A. (2022). *Early prediction of acute necrotizing pancreatitis by artificial intelligence: A prospective cohort-analysis of 2387 cases*. Scientific Reports, 12(1), 7827.
8. Fülöp O, & Nagy, M. (2021). *Teaching Mathematics Online with Increased Empathy in the COVID-19 Pandemic*. Opus et Educatio 8 (3).

9. Kovács, P.T., Molontay, R., & Nagy, M. (2021). *Comparative Analysis of Box-Covering Algorithms for Fractal Networks*. Applied Network Science, Springer.
10. Nagy, M., & Molontay, R. (2021). *Comprehensive analysis of the predictive validity of the university entrance score in Hungary*. Assessment & Evaluation in Higher Education, 1-19.
11. Molontay, R., & Nagy, M. (2021). *Twenty Years of Network Science: A Bibliographic and Co-authorship Network Analysis*. Big Data and Social Media Analytics, 1-24, Springer.
12. Baranyi, M., Nagy, M., & Molontay, R. (2020). *Interpretable Deep Learning for University Dropout Prediction*. In Proceedings of the 21st Annual Conference on Information Technology Education, ACM.
13. Kiss, B., Nagy, M., Molontay, R., & Csabay, B. (2019). *Predicting Dropout Using High School and First-semester Academic Achievement Measures*. In Proceedings of the 17th International Conference on Emerging eLearning Technologies and Applications, pp. 383-389, IEEE.
14. Nagy, M., Molontay, R., & Szabó, M. (2019). *A Web Application for Predicting Academic Performance and Identifying the Contributing Factors*. In Proceedings of the 47th SEFI Annual Conference, pp. 1794-1806.
15. Molontay, R., & Nagy, M. (2019). *Two Decades of Network Science: as seen through the co-authorship network of network scientists*. In Proceedings of The 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining, pp. 584-588.
16. Nagy, M., & Molontay, R. (2019). *On the structural properties of social networks and their measurement-calibrated synthetic counterparts*. In Proceedings of the 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining, pp. 584-588.
17. Nagy, M., & Molontay, R. (2018). *Predicting Dropout in Higher Education based on Secondary School Performance*. In Proceedings of the 22nd International Conference on Intelligent Engineering Systems, pp. 389-394, IEEE.

RELATED SKILLS

Programming languages	Python, R, Wolfram Language, MATLAB, SQL
Network science packages	networkx, graph-tool, igraph, PyGraphistry
Network science tools	Gephi, Cytoscape, VOSviewer
Data science packages	scikit-learn, pandas, seaborn, matplotlib, numpy, statsmodels, pytorch
Data science tools	Tableau, RapidMiner
Foreign languages	English (full professional working proficiency), German (intermediate proficiency)