ROLAND MOLONTAY

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EDUCATION

Budapest University of Technology and Economics (BME)
Faculty of Natural Sciences
Doctoral School of Mathematics and Computer Science   *2015 - 2018*
PhD in Applied Mathematics

- Research topic: network science, applied probability theory and data science
- PhD thesis: Structural Analysis of Networks
- Supervisor: Károly Simon
- Qualification: summa cum laude
- Public defense: May 2021

Pallas Athéné Domus Educationis (PADE) Foundation   *2016 - 2019*
Supplementary PhD program in quantitative economics and finance
in co-operation with the Central Bank of Hungary.

Brown University, Providence, USA   *Spring 2016*
Visiting PhD student at ICERM in the Dimension and Dynamics semester program

Budapest University of Technology and Economics (BME)
Faculty of Natural Sciences   *2013 - 2015*
MSc in Applied Mathematics, Specialized in Stochastics

- Master's thesis: *Fractal Characterization of Complex Networks*
  Supervisor: Károly Simon
- Qualification of diploma: Excellent with highest honors

Budapest University of Technology and Economics (BME)
Faculty of Natural Sciences   *2010 - 2013*
BSc in Mathematics

- Bachelor's thesis: *Networks and Fractals*
  Supervisors: Károly Simon, Júlia Komjáthy
- Qualification of diploma: Excellent

WORK & RESEARCH EXPERIENCE

Research fellow – MTA-BME Stochastics Research Group   *Aug 2021 - Present*

Team Leader – Human & Social Data Science Lab – BME   *July 2018 - Present*

Assistant Professor – Department of Management and Business Economics, BME *Aug 2021 - Present*

Assistant research fellow – MTA-BME Stochastics Research Group   *Aug 2018 - Jul 2021*

Assistant Lecturer – Department of Management and Business Economics, BME *Aug 2020 - Jul 2021*

Founder-coordinator – BME – Statistics Consulting Group   *June 2016 - Present*
We offer statistical consulting and provide data science research

and development service to our corporate and academic partners.

Researcher – Research projects in cooperation with Nokia Bell Labs   *2014 - Present*
Research coordinator and lead researcher

- Variable Dimensionality Input Handling for Machine Learning Algorithms   *2019*
- Network State Transition Modeling and Prediction   *2017 - 2018*
- Fingerprinting of computational resources of data processing   *2016*
- User Segmentation Analysis   *2014*

Assistant research fellow – University of Debrecen (HU-MATHS-IN)   *Sep 2018 - Aug 2020*

R&D engineer intern – Nokia Solutions and Networks   *July 2014 - Oct 2014*
Automatizing data collection, analyzing, and visualizing performance indicators

Junior researcher – BME – Social Renewal Operational Program   *Spring 2013*
Future Internet Research, Services and Technology (FIRST)

TEACHING EXPERIENCE

Lecturer, Aquincum Institute of Technology (AIT-Budapest)   *Feb 2019 - Present*

- Data Science (for US computer science students)

Lecturer, Budapest University of Technology and Economics (BME)   *Sep 2017 - Present*

- Introduction to Data Science I. (for applied mathematics students)
- Data Analytics – BME (for finance master students)
- Business Analytics (for MBA students)

Instructor, BME   *Sep 2012 - Present*

- Mathematics A3 (for civil engineers)
- Mathematics A2 (for civil and chemical engineers)
- Mathematics EP2 (for architect students)
- Mathematics EP1 (for architect students)
- Introduction to mathematics (for engineering and economics students)

Supervising students   *Sep 2015 - Present*

- **PhD students**

  - Marcell Nagy, topic: data-driven methods of network science

- **BSc Theses**

  - *Data-driven analysis of fractal networks*   *2020*
  - *Detecting Trolls in Social Networks*   *2019*
  - *Analysis of Co-Authorship Network of Network Scientists*   *2018*
  - *Dynamic Signature Recognition*   *2018*
  - *Network Theory and its Application to Banking Systems*   *2017*
  - *Fractal Networks and Assortativity*   *2016*
  - *Random Walk on Complex Networks*   *2016*

- **MSc Theses**

  - *Data-driven Analysis of Fractality and Other Characteristics of Complex Networks*   *2018*
  - *Comparing Risk Measures: Value at Risk and Expected Shortfall*   *2017*

- **Scientific Students Projects (TDK)**

  - *Comparative Analysis of Box-Covering Algorithms*   *2020*
    Silver Medal at the National Conference of Scientific Students' Associations, Gold Medal

- *Predicting the results of Hungarian football matches with probabilistic and machine learning models*   2020
  Silver Medal at the National Conference of Scientific Students' Associations, Gold Medal
- *Predicting academic performance based on psychological factors and pre-enrollment achievment measures*   2020
  Honorary Mention at the National Conference of Scientific Students' Associations, Silver Medal
- *The Web of Life - Essay on the potential effects of a networks-based ecosystem-model on modern agriculture*   2020
  Silver Medal
- *Statistical analysis of the reformed BME SET system*   2019
  Silver Medal at the National Conference of Scientific Students' Associations, Gold Medal, Rector's Award
- *The Effect of Grade Inflation on Student Evaluations of Teaching*   2018
  Gold Medal at the National Conference of Scientific Students' Associations, Silver Medal
- *Impact of Living on Campus on Academic Achievements*   2018
  Gold Medal at the National Conference of Scientific Students' Associations, Gold Medal
- *A probabilistic Approach to the Analysis of Curriculum Prerequisite Networks*   2017
  Gold Medal

- Individual research project of 25 Master students at BME   *2016 - Present*
  Topic: Educational data science

- Summer internship of two Master students from ENSAE, Paris   *Summer 2020, 2019*
  Topic: Data science and network science

- Summer internship of 5 Bachelor students from the UK   *Summer 2018*
  Topic: Educational data science and network science

CONFERENCES & SHORT VISITS

- NetSci-X 2020 Int. Conf. and School on Network Science, Tokyo, Japan   *January 2020*
  Title of presentation: *Comparing Structural Feature-Based and Graph Embedding-Based Network Classification Methods*

- The 47th European Society of Engineering Education (SEFI) Annual Conf.   *September 2019*
  Budapest, Hungary
  Title of presentation: *A Web Application for Predicting Academic Performance and Identifying the Contributing Factors*

- The 2019 IEEE/ACM International Conference on Advances in Social Networks   *August 2019*
  Analysis and Mining, Vancouver, Canada
  Title of presentation: *Two Decades of Network Science – as seen through the co-authorship network of network scientists*

- 1st Conference on Transfer between Mathematics & Industry,   *July 2019*
  Santiago de Compostela, Spain
  Title of poster: *Copula-Based Anomaly Scoring and Localization of High-Dimensional Data with Application in Telecommunication Networks*

- 45th International Conference on Current Trends in Theory and   *January 2019*
  Practice of Computer Science, Novy Smokovec, Slovakia
  Title of presentation: *On the Complexity of Color-Avoiding Site and Bond Percolation*

- 7th International Conference on Complex Networks and their Applications,   *December 2018*
  Cambridge, UK
  Title of presentation: *Modified Box-Dimension of Graphs and Hierarchical Scale-Free Graphs*

- 2nd Danube Conference for Higher Education Management, Budapest   *November 2018*
  Title of presentation: *Who are the Best "Suppliers" for Universities*

- Building Bridges (Celebrating László Lovász), Budapest   *July 2018*
  Title of posters: *Illustrating the Co-authorship Network of László Lovász,*
  The CPE Network: Scientific Impact of the Combinatorial Problems and Exercises

- INES 2018, 22nd IEEE Int. Conf. on Intelligent Engineering Systems,   *June 2018*
  Las Palmas, Gran Canaria, Spain

- Mathematisches Forschungsinstitut Oberwolfach, Germany   *December 2017*
  Title of conference: Network Models: Structure and Function

- INES 2017, 21st IEEE Int. Conf. on Intelligent Engineering Systems,   *October 2017*
  Larnaca, Cyprus
  Title of presentation: *Cross-Correlation Based Clustering and*
  Dimension Reduction of Multivariate Time Series

- Alfréd Rényi Institute of Mathematics, Budapest   *August 2017*
  Title of conference: Graph limits, groups and stochastic processes

- University of Maryland, College Park, USA   *April 2016*
  Workshop on Dynamical Systems and Related Topics

- EURANDOM, Technical University of Eindhoven, Netherlands   *December 2015*
  WAW 2015 Conference and School

- Bar-Ilan University, Tel Aviv, Israel   *May 2015*
  Consultation with the Complex Networks research group

- EURANDOM, Technical University of Eindhoven, Netherlands   *January 2014*
  School on Probability Theory and Combinatorics

- ATHENS Programme, Instituto Superior Técnico, Lisbon, Portugal   *March 2013*
  School on Operations Research

PUBLICATIONS

1. Barnes, K., Riesenmy, T., Trinh, M. D., Lleshi, E., Balogh, N., & Molontay, R. (2021). *Dank or Not?–Analyzing and Predicting the Popularity of Memes on Reddit.* Applied Network Science, 6(21)
2. Nagy, M., & Molontay, R. (2021) *Comprehensive Analysis of the Predictive Validity of University Entrance Score in Hungary.* Assessment & Evaluation in Higher Education, 1-19.
3. Séllei, B., Stumphauser, N., & Molontay, R. (2021). *Traits versus Grades—The Incremental Predictive Power of Positive Psychological Factors over Pre-Enrollment Achievement Measures on Academic Performance.* Applied Sciences, 11(4), 1744.
4. Zeleny, K., Molontay, R., & Szabó, M. (2021). *A kollégiumi lét egyetemi teljesítményre gyakorolt hatásának vizsgálata.* Statisztikai Szemle, 99(1), 46-79.
5. Baranyi, M., & Molontay, R. (2020). *Comparing the effectiveness of two remedial mathematics courses using modern regression discontinuity technique*s. Interactive Learning Environments, 1-23.
6. Berezvai, Z., Lukáts, G. D., & Molontay, R. (2020). *Can professors buy better evaluation with lenient grading? The effect of grade inflation on student evaluation of teaching.* Assessment & Evaluation in Higher Education, 1-16.
7. 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 (pp. 13-19).
8. Horváth, G., Kovács, E., Molontay, R., & Nováczki, S. (2020). *Copula-Based Anomaly Scoring of High-Dimensional Data with Application in Telecommunication Networks.* ACM Transactions on Intelligent Systems and Technology (TIST), 11(3), 1-26.

9. Molontay, R., Horváth, N., Bergmann, J., Szekrényes, D., & Szabó, M. (2020). *Characterizing Curriculum Prerequisite Networks by a Student Flow Approach* . IEEE Transactions on Learning Technologies. 13(3), 491 - 501, IEEE

10. Barnes, K., Riesenmy, T., Trinh, M. D., Lleshi, E., Balogh, N., & Molontay, R. (2020). Dank or Not?–Analyzing and Predicting the Popularity of Memes on Reddit. Applied Network Science. (Elfogadva)

11. Molontay, R., & Nagy, M. (2020). *Twenty Years of Network Science: A Bibliographic and Co-authorship Network Analysis.* Lecture Notes in Social Networks, Springer. (Elfogadva)

12. Bergmann J., Molontay R., Szekrényes D., & Szabó M. (2020). *Kreditrendszerű képzések mintatan-terveinek és előtanulmányi hálóinak elemzése a hazai matematika alapszakok példáján.* Alkalmazott Matematikai Lapok, 37(1), pp. 9-45.

13. Komjáthy, J., Molontay, R., & Simon, K. (2019). *Transfinite fractal dimension of trees and hierarchical scale-free graphs.* Journal of Complex Networks, 7(5), pp. 764-791.

14. Barabás B., Fülöp O., & Molontay R. (2019). *The Co-Authorship Network and Scientific Impact of László Lovász.* Journal of Combinatorial Mathematics and Combinatorial Computing, 108, pp. 187-192.

15. Berezvai Z., Lukáts G., & Molontay R. (2019). *A pénzügyi ösztönzők hatása az egyetemi oktatók osztályozási gyakorlatára.* Közgazdasági Szemle, 66, pp. 733-750.

16. Molontay, R., & Varga, K. (2019). *On the Complexity of Color-Avoiding Site and Bond Percolation.* In Proceedings of the 45th International Conference on Current Trends in Theory and Practice of Computer Science, pp. 354-367, Springer

17. Baranyi, M., & Molontay, R. (2019). *Effect of Mathematics Remediation on Academic Achievements – a regression discontinuity approach.* In Proceedings of the International Symposium on Educational Technology, pp. 29-33, IEEE.

18. Horváth, N, Molontay, R., & Szabó, M. (2019). *Who are the Most Important "Suppliers" for Universities? – Ranking secondary schools based on their students' university performance.* In Proceedings of the 2nd Danube Conference: In search of excellence in higher education, pp. 133-143.

19. Baranyi, M., Gál, K., Molontay, R., & Csabay, B. (2019). *Modeling Students' Academic Performance Using Bayesian Networks.* In Proceedings of the 17th International Conference on Emerging eLearning Technologies and Applications, pp. 42-49, IEEE.

20. 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.

21. 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.

22. 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.

23. 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.

24. 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.

25. Horváth, M. D., Molontay, R., & Szabó, M. (2018). *Visualizing Student Flows to Track Retention and Graduation Rates.* In Proceedings of the 22nd International Conference on Information Visualisation pp. 338-343, IEEE.

26. Barabás, B., Fülöp, O., Molontay, R., & Pályi, G. (2017). *Impact of the Discovery of Fluorous Biphasic Systems on Chemistry: A Statistical and Network Analysis.* ACS Sustainable Chemistry & Engineering, 5(9), pp. 8108-8118, ACM.

27. Horváth, I., Finta, I., Kovács, F., Mészáros, A., Molontay, R., & Varga, K. (2017). *Markovian Queue with Garbage Collection.* In Proceedings of the 24th International Conference on Analytical and Stochastic Modelling Techniques and Applications, Lecture Notes in Computer Science, 10378, pp. 109-144, Springer.
28. Egri, A., Horváth, I., Kovács, F., Molontay, R., & Varga, K. (2017). *Cross-Correlation Based Clustering and Dimension Reduction of Multivariate Time Series.* In Proceedings of the 21st International Conference on Intelligent Engineering Systems pp. 242-246, IEEE.
29. Egri, A., Horváth, I., Kovács, F., & Molontay, R. (2016). *Fingerprinting and Reconstruction of Functionals of Discrete Time Markov Chains.* In the proceedings 23rd International Conference on Analytical and Stochastic Modelling Techniques and Applications, Lecture Notes in Computer Science, 9845, pp. 140-154, Springer.

SERVICE AND ACTIVITIES

- Program Committee Member: Complex Networks 2019, 2020, 2021, Advances in Social Network Analysis and Mining (ASONAM 2020)

- Reviewer: Interactive Learning Environments, Social Networks Analysis and Mining, Journal of Educational Measurement: Issues and Practice, Periodica Polytechnica, Information Fusion

- Member of the János Bolyai Mathematical Society

- Member of the Hungarian Artificial Intelligence Coalition (Education and Public Awareness Working Group)

- Member of the Artificial Intelligence National Laboratory

- Member of the Hungarian Service Network for Mathematics in Industry and Innovation (HU-MATHS-IN)

- Member of the Selection Committee of Scientific Student Scholarship (BME)

- Coordinator of the data science specialization of the mathematics program at BME

- Outreach activities: Science Camp, Children's University, Researcher's Night

- Social media coordinator of the Institute of Mathematics, BME

AWARDS

- Gyula Farkas Memorial Award (awarded by János Bolyai Mathematical Society) (2020)

- BME Innovation Award of the Pro Progressio Foundation (2020)

- Research scholarship of the New National Excellence Program (ÚNKP) (2019)

- Pro Progressio Foundation's Award for Outstanding Supervisors of Scientific Student Projects (TDK) (2019)

- Outstanding Lecturer Award of the Faculty of Natural Sciences at BME (2019)

- Innovation Award of the Department of Stochastics (2018)

- Scientific Scholarship of the Faculty of Natural Sciences (2014)

- Medal of Study of Városmajori Secondary School (2010)

RELATED SKILLS

Programming languages	Python, R, Wolfram Language (Mathematica)
Languages	Hungarian (native proficiency)
	English (full professional working proficiency)
	German (limited working proficiency)