

# Máté Baranyi

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## Education

- PhD** **2018–ongoing**, Budapest University of Technology and Economics (**BME**).  
Department of Stochastics & Doctoral School of Mathematics and Computer Science.  
Subjects: *Graphical Models, Nonparametric Statistics, Time Series Analysis*  
Supervisor: Dr. Marianna Bolla
- MSc** **2016–2018**, **BME**.  
MSc in Applied Mathematics.  
Main subjects: Stochastic Analysis, Probability Theory, Statistics  
Thesis: *Graphical models and some related algorithms*, supervised by Dr. Marianna Bolla
- BSc** **2013–2016**, **BME**.  
BSc in Mathematics, Applied Mathematics specialization.  
Thesis: *The separator of a subset of a semigroup*, supervised by Dr. Attila Nagy
- High school** **2009–2013**, Esze Tamás Gimnázium, Mátészalka.  
Advanced Final Exam in Mathematics; uni. admission score: 470/480

## Experience

- 2017 august– **Risk Management Intern**, Morgan Stanley Hungary Analytics Ltd..  
2018 march Model Risk Management internship in the Institutional Equity Division. Writing and maintaining model review documents for exotic equity-based financial products from model risk perspective.

## Research Projects

*Contractual research projects I have been working on during my PhD studies as a member of different small groups of the university. These usually involved mathematical or machine learning research, studies, and implementation of algorithms.*

- 2021 Oct– **BME–Nokia Bell Labs collaboration**.  
**ongoing** Working on topics related to cross-domain network state modeling.
- 2020 Dec– **BME–Nokia Bell Labs collaboration**.  
2021 Jul Working on topics related to Anomaly Detection of high dimensional sensor data.
- 2020 May– **BME–I-QRS International Ltd. collaboration**.  
2020 Dec Working on the objective to find the driving latent sources of motion sensor data; funded by the HU-MATHS-IN project through the Széchenyi University of Győr.
- 2019 Mar– **BME–Nokia Bell Labs collaboration**.  
2019 Oct Working on topics related to dimension reduction of high and varying dimensional sensor data.
- 2018 Jun– **BME FIKP-MI/SC**.  
2020 May Working on different topics related to Artificial Intelligence and Time Series Analysis; funded by the Ministry of Human Capacities (EMMI) of Hungary.

## Teaching Activity

- 2018 fall– **Supervisor as PhD student, BME.**  
**ongoing** Supervising mathematics students for their thesis work or individual projects.
- 2018 fall– **Teaching as PhD student, BME.**  
**ongoing** Teaching weekly practice classes for electrical engineering students on probability theory, and lab classes for mathematics students on statistics. It also involved preparing/correcting midterms/exams.
- 2017 fall– **Demonstrator, BME.**
- 2019 spring Grading weekly homeworks and administrating the result table for courses (held for mathematics students), called Mathematical Statistics, Statistics I., Markov processes & Martingales.
- Student Projects**
- Some individual school projects I am proud of.*
- 2017 fall **Individual Projects II, MSc course.**  
Working on a task related to Educational Data Mining, supervised by Roland Molontay from BME.
- 2017 spring **Individual Projects I, MSc course.**  
Working on a task related to Credit Risk Scorecard Dev., supervised by Ildikó Priksz from OTP Bank.
- 2015 spring– **Programming Projects I and II, BSc courses.**  
2015 fall Working on a task related to the mathematics of Voting Systems.

## Programming and Computer Skills

My main prog. language is **Python**.

Mainly used related tools/packages: **NumPy**, **TensorFlow**, **pySpark**, **scikit-learn**, etc.

Intermediate knowledge of: **R**, **L<sup>A</sup>T<sub>E</sub>X**, **Excel**, **Tensorflow**.

Basic knowledge of: Wolfram, C, C++, HTML, MATLAB.

## Languages

Hungarian native language

English fluent (writing, reading), intermediate (speaking)

German intermediate (writing, reading), basic (speaking)

## Conferences

- 2021 Nov **2021 Asilomar Conf on Signals, Systems, and Computers**, *online*.  
Short presentation, titled *A novel dynamic Principal Component Analysis method, applied to physiological data*
- 2020 Oct **21st Annual ACM SIGITE 2020 Conference**, *online*.  
Short presentation, titled *Interpretable Deep Learning for University Dropout Prediction*
- 2019 Jul **International Symposium on Educational Technology (ISET)**, *Hradec Kralové, Czechia*.  
Short presentation, titled *Effect of Mathematics Remediation on Academic Achievement – A Regression Discontinuity Approach*
- 2018 Dec **11th International Conference of the ERCIM WG on Computational and Methodological Statistics (CFE-CMStatistics)**, *Pisa, Italy*.  
Short presentation, titled *Nonparametric regression estimation in chain graph models*

## Publications

- [1] Máté Baranyi, Marcell Nagy, and Roland Molontay. Interpretable Deep Learning for university dropout prediction. In *Proceedings of the 21st Annual Conference on Information Technology Education*, page 13–19, New York, NY, USA, 2020. Association for Computing Machinery. doi:10.1145/3368308.3415382.
- [2] Máté Baranyi and Marianna Bolla. Iterated Conditional Expectation algorithm on DAGs and regression graphs. *Econometrics and Statistics*, 20:131–152, 2021. doi:10.1016/j.ecosta.2020.05.003.
- [3] Máté Baranyi, Kristóf Gál, Roland Molontay, and Mihály Szabó. Modeling Students' Academic Performance Using Bayesian Networks. In *2019 17th International Conference on Emerging eLearning Technologies and Applications (ICETA)*, pages 42–49. IEEE, November 2019. doi:10.1109/ICETA48886.2019.9040067.
- [4] Máté Baranyi and Roland Molontay. Effect of mathematics remediation on academic achievement – a regression discontinuity approach. In *2019 International Symposium on Educational Technology (ISET)*, page 29–33. IEEE, 7 2019. doi:10.1109/ISET.2019.00016.
- [5] Máté Baranyi and Roland Molontay. Comparing the effectiveness of two remedial mathematics courses using modern regression discontinuity techniques. *Interactive Learning Environments*, 29(2):247–269, 2021. doi:10.1080/10494820.2020.1839506.
- [6] Marianna Bolla, Fatma Abdelkhalek, and Máté Baranyi. Graphical models, regression graphs, and recursive linear regression in a unified way. *Acta Scientiarum Mathematicarum*, 85(12):9–57, 2019. doi:10.14232/actasm-018-331-4.
- [7] Marianna Bolla, Tamás Szabados, Máté Baranyi, and Fatma Abdelkhalek. Block circulant matrices and the spectra of multivariate stationary sequences. *Special Matrices*, 9(1):36–51, Jan 2021. doi:10.1515/spma-2020-0121.