

Curriculum Vitae

Márton Balázs

Born: 1976, Budapest, Hungary
Citizenship: Hungarian
Languages: Hungarian (native), English (fluent), French (mid-level)

Education:

1999 - 2003: Graduate Program, Department of Stochastics, Institute of Mathematics, Budapest University of Technology and Economics.
Supervisor: Prof. Bálint Tóth.
2000: Two-month invitation to CWI Amsterdam, supervised by Prof. Jacob van den Berg.
2002-2003: Doctoral Support Program, Central European University, Budapest.
2003: Three-month invitation to Institut Henri Poincaré, Paris
Degree: PhD 2003, Summa Cum Laude.
PhD Thesis: *Coupling methods in stochastic deposition models.*

1994 - 1999: Eötvös Loránd University, Budapest.
1999: Participant of the National Scientific Conference of Physicist Students.
Degrees: MSc. Physicist 1999, Physics Teacher 1999.
Diploma Thesis: Finite groups as inner symmetries in lattice quantum field theories.

1990 - 1994: ELTE Apáczai Csere János High School
1994: 6th place on the National Competition of High School Students in physics.

Research interests: Probability, Markov chains, stochastic interacting systems, systems in random media

Work experience:

- 2013 - :** School of Mathematics,
University of Bristol
- 2018 - : Reader in Probability
- 2015 - : Fellow of the HEA (UK)
- 2013 - 2018: Senior Lecturer
- 2013:** Visiting Researcher
Alfréd Rényi Institute of Mathematics,
Hungarian Academy of Sciences
- 2012 - 2013:** Researcher
MTA-BME Stochastics Research Group
- 2008 - 2013:** Associate Professor
Department of Stochastics, Institute of Mathematics,
Budapest University of Technology and Economics
- 2009 - 2013: Project manager for an industrial cooperation
with Nokia Siemens Networks, Budapest
- 2007 - 2008:** Researcher
MTA-BME Stochastics Research Group
- 2006 - 2008:** Assistant Professor
Department of Stochastics, Institute of Mathematics,
Budapest University of Technology and Economics
- 2003 - 2006:** Van Vleck Visiting Assistant Professor
University of Wisconsin - Madison, Mathematics Department
- Postdoc advisor:* Prof. Timo Seppäläinen

Technical Proficiencies:

- proficient: L^AT_EX (including Beamer, PSTricks, TikZ), GNU/Linux OS (user level)
- intermediate: HTML, CSS, Awk (file processing), MS Windows, MS Office
- basic: PHP, MySQL, Python

Grants and Prizes:

- 2017:** PI in EPSRC Standard Grant EP/R021449/1, UK,
- 2012:** Paul Erdős Prize, Hungarian Academy of Sciences,
- 2011:** Student Conference Advisor's Prize, BUTE, HU,
- 2010:** Bolyai Plaque, Hungarian Academy of Sciences,
- 2010:** János Bolyai Scholarship for young researchers,
Hungarian Academy of Sciences,
- 2008:** Distinguished Lecturer of the Faculty of Natural Sciences, BUTE, HU,
- 2007:** PI in the OTKA Grant no. F-67729, HU,
- 2006:** Géza Grünwald Medallion, The János Bolyai Mathematical Society, HU,
- 2006:** János Bolyai Scholarship for young researchers,
Hungarian Academy of Sciences,
- 2005:** PI in the National Science Foundation Grant No. DMS 0503650, US.

Student advising:

- PhD supervision:
 - Jess Jay (graduation expected in 2022)
 - Felix Maxey-Hawkins (graduation expected in 2021)
 - Attila László Nagy
 - Júlia Komjáthy (co-supervision, 2012), proceeded later as assistant professor at TU Eindhoven
- MSc supervision:
 - Daniel Adams (2018, proceeded as PhD student in Edinburgh)
 - Jacob Calvert (2016, proceeded as PhD student at UC Berkeley)
 - Dávid Bóka (2013, proceeded as PhD student at the Eötvös University)
 - Árpád Csata (2012), proceeded to work in finance
 - Péter Kovács (2012), proceeded later as research fellow at MTA-BME Information Systems Research Group, Budapest
 - Miklós Zoltán Rácz (co-supervision, 2010), proceeded later as assistant professor at Princeton
 - Júlia Komjáthy (2008)
- BSc supervision:
 - Áron Folly (2011)
 - Dávid Szabó (2011), proceeded as PhD student at the University of Manchester
 - Árpád Csata (2009)
 - György Farkas (co-supervision, 2009), proceeded later to work in financial software development
 - Péter Kovács (co-supervision, 2009)
- REU supervision:
 - Áron Folly (2011)
 - Dávid Szabó (2011)
 - György Farkas (co-supervision, 2009)
 - Péter Kovács (co-supervision, 2009)
 - Miklós Zoltán Rácz (co-supervision, 2009)

Service for the scientific community:

- Moderator for arXiv/math.PR, May 2019–,
- Organiser of the invited session *New challenges in interacting particle systems* of the *40th Conference on Stochastic Processes and Their Applications*, June 2018, Gothenburg, SE,
- Co-organiser of *Probability, Analysis and Dynamics*, April 2018, Bristol,
- Co-organiser of *New results and challenges with random walks in dynamic random environment*, January 2017, Bristol,
- Co-organiser of the Probability session of *BMC 2016*, March 2016, Bristol,

- Co-organiser of *Stochastics and Interactions*, July 2015, Budapest,
- Organiser of the special session *Fluctuations in Interacting Particle Systems* of the *38th Conference on Stochastic Processes and Their Applications*, July 2015, Oxford, UK,
- Co-organiser of *Probability, Analysis and Dynamics*, April 2014, Bristol,
- Co-organiser of the *Probability and Statistics Seminar* series, 2013–2017, University of Bristol, UK,
- Organiser of the invited session *Interacting particle systems* of the *36th Conference on Stochastic Processes and Their Applications*, July 2013, Boulder, Colorado,
- Co-organiser of the conference *Entropy and nonequilibrium dynamics*, May 2013, Budapest
- Panel member, Hungarian Research Fund (OTKA), Spring 2013, Budapest
- Organised, jointly with Domokos Szász and Bálint Tóth the conference *Hydrodynamics and fluctuations in interacting particle systems*, March 2008, Budapest
- Organiser, jointly with Bálint Tóth, of the *Stochastics Seminar*, Budapest (the most prestigious probability seminar in Hungary, regularly inviting leading international researchers), 2006 - 2013
- Acted as reviewer for *ALEA*, *Ann. App. Probab.*, *Ann. Probab.*, *Brazilian J. of Probab. and Stat.*, *Elect. Comm. Probab.*, *Elect. J. Probab.*, *EPSRC*, the *Hungarian Research Fund*, *J. of Stat. Phys.*, *New J. Phys.*, *Phys. Rev. E*, *Stoch. Proc. and Appl*, *W. H. Freeman and Company*
- AMS Reviewer (2007-2012)

Outreach activities:

- Gave popularizing lectures and demonstrations to high school students
- Conducted an industrial cooperation between BUTE and the Budapest Research Division of Nokia Siemens Networks (2009-2013)

Administrative duties:

- Director of IT Strategy, School of Mathematics, University of Bristol (2017-)
- Set up and maintained the MTA-BME Stochastics Research Group webpage (2007-2013)
- Maintained the Department webpage at BUTE (2012)
- Contributed to the administration of the Hungarian State - BUTE grant TÁMOP 4.2.2 (2012)

Publications:

- Refereed publications:
 26. Large deviations and wandering exponent for random walk in a dynamic beta environment, *The Annals of Probability*, **47**:(4) (2019), pp. 2186-2229 (joint with T. Seppäläinen and F. Rassoul-Agha),

25. Q-zero range has random walking shocks, *Journal of Statistical Physics*, **174**:(5) (2019), pp. 958-971 (joint with L. Duffy and D. Pantelli),
24. Unifying particle-based and continuum models of hillslope evolution with a probabilistic scaling technique *Journal of Geophysical Research - Earth Surface*, **123** (2018) (joint with J. Calvert and K. Michaelides),
23. Product blocking measures and a particle system proof of the Jacobi triple product *Annales de l'Institut Henri Poincaré, Probab. et Stat.*, **54**:(1) (2018), pp. 514-528 (joint R. Bowen),
22. How to initialize a second class particle? *The Annals of Probability*, **45**:(6A) (2017), pp. 3535-3570 (joint with A. L. Nagy),
21. Coexistence of shocks and rarefaction fans: complex phase diagram of a simple hyperbolic particle system *Journal of Statistical Physics*, **165**:(1) (2016), pp. 115-125 (joint with A. L. Nagy, B. Tóth, I. Tóth),
20. An electric network for non-reversible Markov chains, *The American Mathematical Monthly*, **123**:(7) (2016), pp. 657-682 (joint with Á. Folly),
19. Dependent Double Branching Annihilating Random Walk, *Electronic Journal of Probability* **20** (2015), Article 84, 32 pages (joint with A. L. Nagy),
18. Comparing dealing methods with repeating cards, *ALEA-Latin American Journal of Probability and Mathematical Statistics* **11**:(2) (2014), pp. 615-630, (joint with D. Z. Szabó),
17. Modeling Flocks and Prices: Jumping Particles with an Attractive Interaction, *Annales de l'Institut Henri Poincaré, Probab. et Stat.*, **50**:(2) (2014), pp. 425-454 (joint with M. Z. Rácz and B. Tóth),
16. Fluctuation bounds in the exponential bricklayers process, *Journal of Statistical Physics* **147**:(1) (2012), pp. 35-62 (joint with J. Komjáthy and T. Seppäläinen),
15. Microscopic concavity and fluctuation bounds in a class of deposition processes, *Annales de l'Institut Henri Poincaré, Probab. et Stat.* **48**:(1) (2012), pp. 151-187 (joint with J. Komjáthy and T. Seppäläinen),
14. Fluid level dependent Markov fluid model with continuous zero transition, *Performance Evaluation* **68**:(11) (2011), pp. 1149-1161 (joint with G. Horváth, S. Kolumbán, P. Kovács and M. Telek),
13. Scaling exponent for the Hopf-Cole solution of KPZ/Stochastic Burgers, *Journal of the American Mathematical Society*, **24** (2011), pp. 683-708 (joint with J. Quastel and T. Seppäläinen),
12. Random walk of second class particles in product shock measures, *Journal of Statistical Physics*, **139**:(2) (2010), pp. 252-279 (joint with Gy. Farkas, P. Kovács and A. Rákos),
11. Order of current variance and diffusivity in the asymmetric simple exclusion process, *Annals of Mathematics* **171**:(2) (2010), pp. 1237-1265 (joint with T. Seppäläinen),
10. Fluctuation bounds for the asymmetric simple exclusion process, *ALEA - Latin American Journal of Probability and Mathematical Statistics* **VI** (2009), pp. 1-24 (joint with T. Seppäläinen),
9. Order of current variance and diffusivity in the rate one totally asymmetric zero range process, *Journal of Statistical Physics* **133** (2008), pp. 59-78 (joint with J. Komjáthy),
8. Exact connections between current fluctuations and the second class particle in a class of deposition models, *Journal of Statistical Physics* **127** (2007), pp. 431-455 (joint with T. Seppäläinen),

7. Existence of the zero range process and a deposition model with superlinear growth rates, *The Annals of Probability* **35** (2007) No. 4, pp. 1201-1249 (joint with F. Rassoul-Agha, T. Seppäläinen and S. Sethuraman),
6. Cube root fluctuations for the corner growth model associated to the exclusion process, *Electronic Journal of Probability* **11** (2006), pp. 1094-1132 (joint with E. Cator and T. Seppäläinen),
5. The random average process and random walk in a space-time random environment in one dimension, *Communications in Mathematical Physics*, **266** (2006) No. 2, pp. 499-545 (joint with F. Rassoul-Agha and T. Seppäläinen),
4. Multiple shocks in bricklayers' model, *Journal of Statistical Physics*, **117** (2004), pp. 77-98,
3. Stochastic bounds on the zero range processes with superlinear jump rates, *Periodica Mathematica Hungarica* **47** (2003) pp. 17-28,
2. Growth fluctuations in a class of deposition models, *Annales de l'Institut Henri Poincaré, Probab. et Stat.*, **39** (2003), Issue 4, pp. 639-685,
1. Microscopic shape of shocks in a domain growth model, *Journal of Statistical Physics*, **105** (2001), pp. 511-524,

- Preprints / unpublished work:

4. Non-existence of bi-infinite geodesics in the exponential corner growth model (2020),
<https://arxiv.org/abs/1909.06883>, accepted for publication in *Forum of Mathematics, Sigma* (joint with O. Busani and T. Seppäläinen).
3. Hydrodynamic limit of the zero range process on a randomly oriented graph (2020),
<https://arxiv.org/abs/2002.09214> (joint with F. Maxey-Hawkins).
2. Local stationarity of exponential last passage percolation (2020),
<https://arxiv.org/abs/2001.03961> (joint with O. Busani and T. Seppäläinen).
1. A convexity property of expectations under exponential weights (2007),
<http://arxiv.org/abs/0707.4273> (joint with T. Seppäläinen).

- Other publications:

4. Martingale Theory Lecture Notes (2018),
3. Probability 1. Lecture Notes, in Hungarian (2008) (joint with B. Tóth),
2. A mathematical model of traffic jams, in Hungarian, *Urban Traffic* (2003), Issue 3, pp. 162-164,
1. A model of traffic jams, in Hungarian, *Mathematical and Physical Journal for Secondary Schools* (2003), pp. 301-307.

Invited conference talks:

38. Large Scale Stochastic Dynamics, September 2019, Oberwolfach, DE,
37. Dynamics, random media and universality of complex physical systems, August 2019, Münster, DE,
36. Advances in Last Passage Percolation, June 2019, Sussex, UK,

35. Probability and NonLocal PDEs: Interplay and Cross-Impact, September 2018, Swansea UK,
34. Encontro Nacional da Sociedade Portuguesa de Matemática, July 2018, Bragança, PT,
33. Easter Probability Meeting, April 2018, Sheffield, UK,
32. Particle systems and PDE's VI., November 2017, Nice, FR,
31. Interacting Systems and SPDEs, June 2017, Sheffield, UK,
30. Large Scale Stochastic Dynamics, November 2016, Oberwolfach, DE,
29. Random Walks on Random Networks @ BMC 2016 (satellite meeting), March 2016, Bristol, UK,
28. Large Deviations for Interacting Particle Systems and Partial Differential Equations, YEP XIII., March 2016, Eindhoven, NL,
27. Random walks on graphs and potential theory, May 2015, University of Warwick, UK,
26. New Perspectives in Analysis and Probability, March 2015, University of Sussex, UK,
25. Particle systems and PDE's III., December 2014, Braga, PT,
24. Laplacians, Random Walks, Bose Gas, Quantum Spin Systems, September 2014, Bristol, UK,
23. 37th Conference on Stochastic Processes and their Applications (contributed session talk), July 2014, Buenos Aires, AR,
22. School and Workshop on Random Interacting Systems, University of Bath, June 2014, UK,
21. 2013-14 Warwick EPSRC Symposium on Statistical Mechanics: Combinatorics and Statistical Mechanics, University of Warwick, April 2014, UK,
20. Large Scale Stochastic Dynamics, October 2013, Oberwolfach, DE,
19. Erdős Centennial, July 2013, Budapest, HU,
18. Summer School on KPZ Equation and Rough Paths, Centre Henri Lebesgue, June 2013, Rennes, FR,
17. Particle systems and PDE's, December 2012, Braga, PT,
16. Interacting Particle Systems and Related Topics, August 2012, Florence, IT,
15. Large Scale Stochastic Dynamics, August 2010, Oberwolfach, DE,
14. Rencontres de Probabilités, May 2010, Rouen; **minicourse**, FR,
13. Interacting Stochastic Particle Systems, May 2009, CRM, Montréal, CA,
12. Joint Probability Workshop (Technion & BUTE), January 2009, Technion, Haifa, IL,
11. Interacting Particle Systems and Percolation, October 2008, IHP, Paris, FR,
10. Arbeitsgemeinschaft on Percolation, October 2007, Oberwolfach, DE,
9. Large Scale Stochastic Dynamics, August 2007, Oberwolfach, DE,
8. Miniworkshop Terschelling, September 2006, NL,

7. Markov Processes and Related Topics (in honor of Tom Kurtz on his 65th birthday), July 2006, Madison, Wisconsin, US,
6. Large Scale Behaviour of Interacting Particle Systems: Fluctuations and Hydrodynamics, August 2005, Budapest, HU,
5. Large Scale Stochastic Dynamics, September 2004, Oberwolfach, DE,
4. Second Dutch-Hungarian Workshop: "Randomness in space and Time", June 2003, Budapest, HU,
3. Center of Applied Mathematics and Computational Physics at Technical University Budapest, April 2003, Göd, HU,
2. Workshop on Mathematical Physics, August 2001, Mambucaba, IMPA Rio de Janeiro, BR,
1. Random Walks Conference, February 2001, Erwin Schrödinger Institute, Vienna, AT.

Other conference talks:

5. Bernoulli-IMS One World Symposium 2020 (short, prerecorded talk), August 2020, *Internet*,
4. Large Scale Stochastic Dynamics (second, short talk), September 2019, Oberwolfach, DE,
3. Statistical Physics Day, April 2011, Budapest, HU,
2. 100th Statistical Mechanics Conference, December 2008, Rutgers, US,
1. Hydrodynamics and fluctuations in interacting particle systems (also organiser), March 2008, Budapest, HU.

Invited seminar talks:

34. Oberseminar Stochastics, University of Bonn, January 2020, DE,
33. Statistics Seminar, Durham University, November 2019, UK,
32. Probability Seminar, University of Manchester, October 2019, UK,
31. Oberseminar ANALYSIS - PROBABILITY, University of Leipzig and Max-Planck Institute, June 2019, D,
30. Stochastics Seminar, TU Budapest, January 2019, HU,
29. Mathematics and Applications Sussex (MASS) seminars, December 2018, UK,
28. TU Delft, Seminar Series in Probability and Statistics, November 2018, NL,
27. University of Oxford, The Probability Workshop, October 2018, UK,
26. University of Warwick Probability Seminar, February 2018, UK,
25. UCD Probability Seminar, January 2018, Dublin IE,
24. University of Leiden; Most Informal Probability Seminar, April 2017, NL,
23. University of Warwick; Midlands Probability Theory Seminars, November 2016, UK,

22. University of Oxford, Dept. of Stats. Probability Workshop, February 2016, UK,
21. University of Cambridge, Probability Seminar, November 2015, UK,
20. University of Bonn, Oberseminar Stochastics, July 2015, DE,
19. Budapest Semesters in Mathematics, Colloquium, July 2014, HU,
18. University of Oxford, March 2014, UK,
17. University of Bath, January 2014, UK,
16. University of Sheffield, November 2013, UK,
15. University of Warwick, October 2013, UK,
14. Hungarian Academy of Sciences, Section of Mathematics meeting, opening lecture, Budapest, October 2012, HU,
13. University of Wisconsin, February 2011, Madison, Wisconsin, US,
12. University of Oxford, June 2008, UK,
11. University of Wisconsin, March 2007, Madison, Wisconsin, US,
10. University of Toronto, March 2007, Toronto, Ontario, CA,
9. ÚTIA, December 2006, Prague, CZ,
8. Iowa State University, Department Colloquium, April 2006, Ames, Iowa, US,
7. Mathematical Biosciences Institute at the Ohio State University, March 2005, Columbus, Ohio, US,
6. Ohio State University, March 2004, Columbus, Ohio, US,
5. Centre de Mathématiques et Informatique, March 2003, Marseille, FR,
4. Institut Henri Poincaré, February 2003, Paris, FR,
3. EURANDOM, December 2001 Eindhoven, NL,
2. CWI, November 2000 Amsterdam, NL,
1. Utrecht University, November 2000, NL.

Local seminar talks:

16. Joint Mathematical physics and Probability seminars, December 2018, Bristol, UK,
15. Laplacians, Random Walks, Bose gas and Quantum Spin Systems Workshop (Leverhulme Trust International Network), January 2017, Bristol, UK,
14. University of Bristol, November 2013, UK,
13. MTA KFKI RMKI Theoretical Physics Seminar, Budapest, May 2011,
12. ELTE Seminars in Statistical Physics, Budapest, May 2011,
11. Institute of Mathematics TU Budapest, April 2011,
10. Institute of Mathematics, October 2009, Technical University Budapest,
9. Young Researchers' Seminar, Rényi Institute, March 2009, Budapest,

8. Institute of Mathematics, popularizing talk, June 2008, Technical University Budapest,
7. Institute of Mathematics, March 2007, Technical University Budapest,
6. Rényi Institute of Mathematics, November 2006, Budapest,
5. Institute of Mathematics, November 2006, Technical University Budapest,
4. University of Wisconsin, March 2006, Madison, Wisconsin,
3. University of Wisconsin, October 2004, Madison, Wisconsin,
2. University of Wisconsin, September 2003, Madison, Wisconsin,
1. Institute of Mathematics, November 2001, Technical University Budapest.

Course setup and development:

- *Martingale Theory with Applications* (half semester, 150 mins./week) for undergraduate mathematics students (at University of Bristol),
- *Probability 1* (one semester, 150 mins./week) large undergraduate mathematics unit (at University of Bristol),
- *Further Topics in Probability* (one semester, 200 mins./week) for undergraduate mathematics students (at University of Bristol),
- *Stochastic models* (one semester, 90 mins./week); topics course for MSc mathematics students (at BUTE Budapest),
- *Markov processes and martingales* (one semester, 180 mins./week) for MSc mathematics students (at BUTE Budapest),
- *Mathematical problem solving*, a general mathematics topics course (one semester, 90 mins./week) for MSc physics students (at BUTE Budapest),
- *Probability Theory 2.* (one semester, 90 mins./week) for BSc mathematics students (at BUTE Budapest),
- *Probability Theory 1.* (one semester, 180 mins./week) for BSc mathematics and physicist students (at BUTE Budapest)
- A third semester BSc engineering mathematics lecture (one semester, 180 mins./week) in English (at BUTE Budapest),

Other teaching experience:

- *Probability Theory* (Budapest Semesters in Mathematics),
- Second and third semester analysis exercise-classes for physicist students (at BUTE Budapest),
- An advanced undergraduate/mid-graduate level course on introduction to stochastic processes (at UW-Madison),
- A first science calculus course (at UW-Madison),
- A large second business calculus course (at UW-Madison),
- A trigonometry course (at UW-Madison),

- A differential equations and linear algebra course (at UW-Madison),
- An intermediate undergraduate-level introductory probability course (at UW-Madison),
- A general mathematics course for elementary school teachers (at UW-Madison),
- An intermediate undergraduate-level course on introductory combinatorics (at UW-Madison),
- Introduction to probability exercise-class (at BUTE Budapest),
- Various calculus exercise-classes (at BUTE Budapest).

Civil activities:

- I am *media officer* and *ride leader* for *Cycle Bristol CTC*, November 2018-.
- I co-organised *Linux Presentation Day*, a free public event in Bristol, June 2018.
- I used to be a member of the *Hungarian Tramway History Association*, a non-profit organisation that saves and preserves old tramcars, popularizes rail transport systems.
- I used to help the *Association for Ragweed-free Hungary* with exploring and documenting infected pieces of land.

30th August, 2020.

Márton Balázs