Adrian Röllin

Curriculum Vitae

Education

11/2002–11/2006	**Ph.D. in Mathematics**, *University of Zürich, Switzerland*, under supervision of A. D. Barbour.
10/1996–10/2002	**M.Sc. in Mathematics**, *University of Zürich, Switzerland*, minor subjects: computer science, actuarial science.

Positions

since 07/2021	Professor, Department of Statistics and Data Science, NUS
01/2015–06/2021	Associate Professor, Department of Statistics and Applied Probability, NUS
07/2009–12/2014	Assistant Professor, Department of Statistics and Applied Probability, NUS
09/2008–06/2009	Postdoc, Department of Mathematics, NUS
05/2008–07/2008	Postdoc, Institute of Social and Preventive Medicine, University of Bern
04/2007–03/2008	Postdoc, Department of Statistics, University of Oxford

Other Appointments

since 07/2018	Honorary appointment, Saw Swee Hock School of Public Health, NUS
since 07/2016	Honorary appointment, Department of Mathematics, NUS

Awards and Recognitions

2019	IMS Fellow (Institute of Mathematical Statistics)
2019	ISI Elected Member (International Statistical Institute)
2019	Dean's Chair, Faculty of Science, NUS
2010	Young Scientist Award, Faculty of Science NUS
2007	PhD thesis awarded for scientific excellence from the Faculty of Science, University of Zürich

Editorial Work

since 01/2021	Associate Editor for Bernoulli Journal
since 10/2020	Associate Editor for Applied Probability Trust (*Advances in Applied Probability* and *Journal of Applied Probability*)
2013–2021	Associate Editor of *Probability in the Engineering and Informational Sciences*

Professional Committee Work

2025	Chair, Scientific Programme Committee, 65th ISI World Statistics Congress, The Hague
since 2020	Ethel Newbold Prize Committee, Bernoulli Society
since 2020	Management Committee, Singapore Mathematical Society

Service appointments

since 2021	Head, Department of Statistics and Data Science, NUS
2018–2021	Deputy Director, Institute for Mathematical Sciences, NUS
2018–2021	Deputy Head, Department of Statistics and Applied Probability, NUS

2018–2021   Faculty Promotion and Tenure Committee, Faculty of Science, NUS

Memberships in Professional Organisations

- American Mathematical Society
- Bernoulli Society
- Institute of Mathematical Statistics
- International Statistical Institute
- Singapore Mathematical Society

Research Interests

- Distributional approximations in probability and statistics via Stein's method
- Random graphs and other random combinatorial objects
- Epidemiological modelling
- Applied statistical modelling and analysis in life sciences
- Statistical applications of deep neural networks

Research Group

Postdocs

since 2023   Francesca Cottini, joint Luxembourg-Singapore research grant, NRF Luxembourg

2022–2023   Yuanfei Huang, under MOE Tier 2 research grant

2022–2023   Tianshu Cong, under MOE Tier 2 research grant

2020–2022   Van Hao Can, under MOE Tier 2 research grant

2019–2021   Zhuosong Zhang, under MOE Tier 2 research grant

2018–2021   Gursharn Kaur, under Faculty of Science RSB program

2019–2020   Arturo Jaramillo Gil, joint with *University of Luxembourg*, under Luxembourg NRF

2019–2020   Xiaochuan Yang, joint with *University of Luxembourg*, under Luxembourg NRF

Ph.D. students

since 2021   Ryo Imao, *Stein's Method for Multivariate Translated Poisson Approximation*

2018–2023   Shang Li, *Stein's Method for Total Variation Approximation With Applications to Analysis of Computer Algorithms*.

2016–2020   Wai Hoh Tang, *Deep Learning in Fluorescence Spectroscopy*.

2010–2014   Daniel Paulin (co-supervised with Louis H. Y. Chen), *Stein's method for Concentration of Measure*.

Invited Talks and Invited Conference Sessions

Upcoming events

01/2024   Invited participant, *Discussion Meeting on Probability* at ICTS-TIFR Bangalore, India

01/2024   Invited speaker, *IMS Pacific RIM*, Melbourne

Past events

08/2023   Invited speaker, *Permutation and Causal Inference Connections and Applications*, IMSI Chicago, United States

03/2023   Invited speaker, *UK Easter Probability Meeting*, Manchester, United Kingdom

09/2022   Invited speaker, *Graph Limits, Non-Parametric Models, and Estimation*, Simons Institute, UC Berkeley

04/2022   Invited speaker, *Advances in Stein's Method and its Applications in Machine Learning and Optimization*, BIRS Workshop, Banff, Canada

03/2022   Invited speaker (hybrid), *Workshop: Population Dynamics and Statistical Physics in Synergy*, Oberwolfach, Germany

10/2020   Invited speaker (online talk), *Stochastics Seminar*, Georgia Tech, USA

07/2020   Invited speaker (online talk), *Probability Victoria Seminar*, Australia

2020	Invited participant, *Discussion Meeting on Stochastic Analysis, Geometry, and Random Fields* at ISI Bangalore, India
2019	Invited to conduct 4-day mini-lecture series as part of graduate course *Introduction to Causal Inference and Stein's method*, Universities of Mannheim and Heidelberg, Germany
2019	Invited-session organiser, *ISI World Statistics Congress*, Kuala Lumpur, Malaysia
2019	Invited speaker, *Mathematical Colloquium*, Institute for Mathematics, University of Osnabrück, Germany
2018	Invited speaker, *Workshop on High-Dimensional Phenomena in Probability*, Bochum, Germany
2018	Invited speaker, *Workshop in Honour of Carl-Gustav Esseen's 100th Birthday*, Uppsala, Sweden
2018	Invited participant, *AIM Workshop on Stein's Method and Applications in High-Dimensional Statistics*, San Jose, United States
2018	Invited-session speaker, *IMS Asia Pacific Rim Meeting*, Singapore
2018	Invited-session speaker, *9th International Workshop on Applied Probability*, Budapest, Hungary
2018	Invited speaker, *International Conference in Statistics and Probability in Memory of 125 P. C. Mahalanobis*, Kolkata, India
2017	Invited speaker at *Melbourne-Singapore Probability and Statistics Forum*, Melbourne, Australia
2017	Invited speaker, *Probability Meeting at ISI Bangalore*, Bangalore, India
2016	Invited-session organiser and invited-session speaker, *IMS Asia Pacific Rim Meeting*, Hong Kong
2016	Invited speaker, *Asian Mathematical Conference*, Bali, Indonedia
2015	Invited-session speaker, *Stochastic Processes and Applications*, Oxford, United Kingdom
2014	Invited-session speaker, *IMS Annual Meeting*, Sydney, Australia
2014	Invited speaker, *International Colloquium on Stein's Method, Concentration Inequalities, and Malliavin Calculus* , Nantes, France
2013	Invited speaker for lecture series at the University of Melbourne, Melbourne, Australia
2013	Invited speaker, *Workshop on New Directions in Probability*, ISI Bangalore, India
2013	Invited-session speaker, *IMS-China International Conference on Statistics and Probability*, Chengdu, China
2013	Invited-session speaker, *Statistics, Science, and Society: New Challenges and Opportunities*, international conference organised by the International Indian Statistical Association, Chennai, India
2012	Invited speaker of contributed session, *8th World Congress in Probability and Statistics*, Istanbul, Turkey
2012	Invited-session speaker, *International Workshop in Applied Probability*, Jerusalem, Israel

Conference Organiser

Chair or co-chair of organising committee

2022	*Stein's Method — The Golden Anniversary* (4-week program, 60 participants), Institute for Mathematical Sciences, NUS
2022	*A Tale of Rare Events — Symposium in Honour of Louis Chen on His 80th Birthday* (4 days, 30 participants), NUS
2022	*SASI — Singapore–Abu Dhabi–Shanghai–India Probability Meeting*, NYU Abu Dhabi Institute, Abu Dhabi
2019	*SASI — Singapore–Abu Dhabi–Shanghai–India Probability Meeting* (3 days, over 30 participants), Institute for Mathematical Sciences and Department of Mathematics, NUS

2016   *Second Melbourne–Singapore Probability and Statistics Forum* (1 day, 15 participants), Institute for Mathematical Sciences, NUS

2015   *Workshop on New Directions in Stein's Method* (2 weeks, around 70 participants), Institute for Mathematical Sciences, NUS

Member of organising committee

2021   *SASI — Singapore–Abu Dhabi–Shanghai–India Probability Meeting*, NYU Abu Dhabi

2019   *Symposium in Memory of Charles Stein [1920 - 2016]* (2 weeks, around 70 participants), Institute for Mathematical Sciences, NUS

2010   *Workshop on Epidemiology of Infectious Diseases: Emerging Challenges* (1 week), Institute for Mathematical Sciences, NUS

Selected Publications

Preprints

[44] L. H. Y. Chen and A. Röllin. Stein couplings for normal approximation. arXiv:1003.6039.

Published

[43] A. Röllin and Z.-S. Zhang (2023). Dense multigraphon-valued stochastic processes and edge-changing dynamics in the configuration model. *Ann. Appl. Probab.* **33**, 3207–3239

[42] A. Röllin (2022). Kolmogorov bounds for the normal approximation of the number of triangles in the Erdős-Rényi random graph. *Probab. Engrg. Inform. Sci.* **36**, 747–773.

[41] J. Fulman and A. Röllin (2022). Stein's method, heat kernel, and linear functions on the orthogonal groups. *J. Algebra* **607**, 272–285.

[40] L. H. Y. Chen, A. Röllin, A. Xia (2021). Palm theory, random measures and Stein couplings. *Ann. Appl. Probab.* **31**, 2881–2923.

[39] G. Kaur and A. Röllin (2021). Higher-order fluctuations in dense random graph models. *Electronic J. Probab.* **26**, article no. 139, 1–36.

[38] X. Fang, H. L. Gan, S. Holmes, H. Huang, E. A. Peköz, A. Röllin, and W. Tang (2021). Arcsine laws for random walks generated from random permutations with applications to genomics. *J. Appl. Probab.* **58**, 851–867.

[37] S. Athreya, F. den Hollander and A. Röllin. Graphon-valued stochastic processes from population genetics (2021). *Ann. Appl. Probab.* **31**, 1724–1745.

[36] W. H. Tang and A. Röllin (2021). Model identification for ARMA time series through convolutional neural networks. *Decis. Support Syst.* **146**, 113544.

[35] J. Sankaran, H. Balasubramanian, W. H. Tang, X. W. Ng, A. Röllin, and T. Wohland (2021). Simultaneous spatiotemporal super-resolution and multi-parametric fluorescence microscopy. *Nature Communications* **12**, no. 1748.

[34] L. H. Y. Chen, L. Goldstein and A. Röllin. Stein's method via induction (2020). *Electronic J. Probab.* **25**, article no. 132, 49 pp.

[33] J. Fulman and A. Röllin (2020). Stein's method and Narayana numbers. *Statist. Probab. Lett.* **165**, article no. 108835, 1–9.

[32] E. A. Peköz, N. Ross and A. Röllin (2020). Exponential and Laplace approximation for occupation statistics of branching random walk. *Electronic J. Probab.* **25**, article no. 55, 1–22.

[31] A. K. J. Teo, K. Prem, M. I. C. Chen, A. Röllin, M. L. Wong, H. H. La and A. R. Cook (2019). Estimating the size of key populations for HIV in Singapore using the network scale-up method. *Sex. Transm. Infect.* **95**, 602–607.

[30] A. D. Barbour, A. Röllin, and N. Ross (2019). Error bounds in local limit theorems using Stein's method. *Bernoulli* **25**, 1076–1104.

[29] A. D. Barbour and A. Röllin (2019). Central limit theorems in the configuration model. *Ann. Appl. Probab.* **29**, 1046–1069.

[28] E. A. Peköz, A. Röllin and N. Ross (2019). Pólya urns with immigration at random times. *Bernoulli* **25**, 189–220.

[27] A. D. Barbour and A. Röllin (2018). A central limit theorem for the gossip process. *Electron. J. Probab.* **23**, article no. 123, 1–37.

[26] A. Röllin (2018). On quantitative bounds in the mean martingale central limit theorem. *Statist. Probab. Lett.* **138**, 171–176

[25] S. Athreya and A. Röllin (2018). Respondent driven sampling and sparse graph convergence. *Electron. Comm. Probab.* **23**, article no. 3,1–12.

[24] H. L. Gan, A. Röllin, N. Ross. Dirichlet approximation of equilibrium distributions in Cannings models with mutation. *Adv. Appl. Probab.* **49**, 927–959.

[23] E. A. Peköz, A. Röllin and N. Ross (2017). Joint degree distributions of preferential attachment random graphs. *Adv. Appl. Probab.* **49**, 368–387.

[22] S. Athreya and A. Röllin (2016). Dense graph limits under respondent-driven sampling. *Ann. Appl. Probab.* **26**, 2193–2210.

[21] E. A. Peköz, A. Röllin and N. Ross (2016). Generalized gamma approximation with rates for urns, walks and trees. *Ann. Probab.* **44**, 1776–1816.

[20] X. Fang and A. Röllin (2015). Rates of convergence for multivariate normal approximation with applications to dense graphs and doubly indexed permutation statistics. *Bernoulli* **21**, 2157–2189.

[19] A. Röllin and N. Ross (2015). Local limit theorems via Landau-Kolmogorov inequalities. *Bernoulli* **21**, 851–880.

[18] L. H. Y. Chen and A. Röllin (2013). Approximating dependent rare events. *Bernoulli* **19**, 1243–1267.

[17] E. A. Peköz, A. Röllin, and N. Ross (2013). Total variation error bounds for geometric approximation. *Bernoulli* **19**, 610–632.

[16] A. Röllin (2013). Stein's method in high dimensions with applications. *Ann. Inst. Henri Poincaré Probab. Stat.* **49**, 529–549.

[15] E. A. Peköz, A. Röllin and N. Ross (2013). Degree asymptotics with rates for preferential attachment random graphs. *Ann. Appl. Probab.* **23**, 1188-1218.

[14] A. Röllin (2012). On magic factors and the construction of examples with sharp rates in Stein's method. *Probability Approximations and Beyond, Lecture Notes in Statistics 205*, Springer.

[13] C. L. Althaus, J. C. M. Heijne, S. A. Herzog, A. Röllin and N. Low (2012). Individual and population level effects of partner notification for *Chlamydia trachomatis*. *PLoS ONE* **7**.

[12] E. A. Peköz and A. Röllin (2011). Exponential approximation for the nearly critical Galton-Watson process and occupation times of Markov chains. *Electron. J. Probab.* **16**, 1381–1393.

[11] S. Chatterjee, J. Fulman and A. Röllin (2011). Exponential approximation by Stein's method and spectral graph theory. *ALEA Lat. Am. J. Probab. Math. Stat.* **8**, 197–223.

[10] E. A. Peköz, A. Röllin (2011). New rates for exponential approximation and the theorems of Rényi and Yaglom. *Ann. Probab.* **39**, 587–608.

[9] C. L. Althaus, J. C. M. Heijne, A. Röllin and N. Low (2010). Transmission dynamics of Chlamydia trachomatis affect the impact of screening programmes. *Epidemics* **2**, 123-131.

[8] G. Reinert and A. Röllin (2010). Random subgraph counts and U-statistics: multivariate normal approximation via exchangeable pairs and embedding. *J. Appl. Probab.* **47**, 378–393.

[7] S. Tueckmantel, A. Röllin, A. E. Müller and C. Soligo (2009). Facial correlates of frontal bone pneumatisation in strepsirrhine primates. *Mammalian Biology* **74**, 25-35.

[6] E. A. Peköz, A. Röllin, V. Čekanavičius and M. Shwartz (2009). A three-parameter binomial approximation. *J. Appl. Probab.* **46**, 1073–1085.

[5] G. Reinert and A. Röllin (2009). Multivariate normal approximation with Stein's method of exchangeable pairs under a general linearity condition. *Ann. Probab.* **37**, 2150–2173.

[4] A. Röllin (2008). A note on the exchangeability condition in Stein's method. *Statist. Probab. Lett.* **78**, 1800–1806.

[3] A. Röllin (2008). Symmetric and centered binomial approximation of sums of locally dependent random variables. *Electron. J. Probab.* **13**, 756–776.

[2] A. Röllin (2007). Translated Poisson approximation using exchangeable pair couplings. *Ann. Appl. Probab.* **17**, 1596–1614.

[1] A. Röllin (2005). Approximation of sums of conditionally independent variables by the translated Poisson distribution. *Bernoulli* **11**, 1115–1128.

Teaching

since 07/2009	Lecturing at the National University of Singapore
09/2008–06/2009	Teaching assistant at the National University of Singapore
04/2007–03/2008	Teaching assistant, supervision of MSc students and admission interviewing at the University of Oxford
11/2002–03/2007	Teaching assistant for lectures in mathematics, probability, statistics and bioinformatics, graduate and undergraduate level

Courses taught

Acad. Year	Sem.	Module Code	Module Title
2019/2020	1	ST5214	Advanced Probability Theory
2018/2019	1	ST5214	Advanced Probability Theory
2017/2018	1	ST1131	Introduction to Statistics
2015/2016	2	ST5225	Statistical Analysis of Networks
2015/2016	1	ST5214	Advanced Probability Theory
2014/2015	2	MA4251/ST4238	Stochastic Processes II
2014/2015	1	ST5214	Advanced Probability Theory
2013/2014	2	GEM2900	Understanding Uncert. and Stat. Thinking
2012/2013	2	MA2216/ST2131	Probability
2012/2013	1	ST5214	Advanced Probability Theory
2011/2012	2	MA4251/ST4238	Stochastic Processes II
2011/2012	1	MA3238/ST3236	Stochastic Processes I
2010/2011	2	MA4251/ST4238	Stochastic Processes II
2010/2011	1	MA3238/ST3236	Stochastic Processes I
2009/2010	2	MA4251/ST4238	Stochastic Processes II
2009/2010	1	MA3238/ST3236	Stochastic Processes I