CURRICULUM VITAE JOHANNES ALT

Personal information

Name:	Johannes ALT
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Employment

since $01/2023$:	Bonn Junior Fellow (W2), University of Bonn
01/2021 - 12/2022:	Marie Skłodowska-Curie Global Postdoctoral Fellow
	Outgoing phase: Courant Institute of New York University
	Host: Professor Dr. Paul Bourgade
	Incoming phase: University of Geneva
	Host: Professor Dr. Antti Knowles
08/2021 - 09/2021:	Research member at Mathematical Sciences Research Institute in
	Berkeley
09/2018 - 12/2020:	Postdoctoral researcher at University of Geneva
	Advisor: Professor Dr. Antti Knowles
09/2014 - 08/2018:	Doctoral student at Institute of Science and Technology Austria
	Supervisor: Professor László Erdős, PhD

University Education

09/2014 - 08/2018:	PhD in Mathematics
	Institute of Science and Technology Austria
	Title: Dyson equation and eigenvalue statistics of random matrices
	Oral thesis defence: $12/07/2018$
10/2012 - 08/2014:	Master of Science Mathematics
	Ludwig-Maximilians university Munich, final GPA: 1.0
	Carathéodory prize for outstanding master thesis in Mathematics
10/2009 - 09/2012:	Bachelor of Science Mathematics
	Saarland university, final GPA: 1.0
10/2009 - 09/2012:	Bachelor of Science Physics
	Saarland university, final GPA: 1.1
02/2011 - 04/2011:	Internship at the Max-Planck Institute for Plasma Physics

Honours, Awards, and Fellowships

- Research membership in SLMath (former MSRI) fall programme 2021 on Universality and Integrability in Random Matrix Theory and Interacting Particle Systems in Berkeley (March 2021)
- Marie Skłodowska-Curie Global Fellowship (February 2020)
- Carathéodory prize of Ludwig-Maximilians university Munich for outstanding master thesis in Mathematics (July 2015)

• Deutschlandstipendium paid by German government and Deutsche Telekom AG (10/2012 – 09/2014)

Obtained external funding

• Marie Skłodowska-Curie Global Fellowship, EUR 178 206 (February 2020)

Publications

- [17] Spectrum occupies pseudospectrum for random matrices with diagonal deformation and variance profile, preprint, 2024, 41 pp., arXiv:2404.17573, with T. Krüger.
- [16] Localized phase for the Erdős-Rényi graph,
 Comm. Math. Phys. 405 (2024), 74 pp., extended arXiv version: arXiv:2305.16294, with R. Ducatez and A. Knowles.
- [15] The completely delocalized region of the Erdős-Rényi graph, Electron. Commun. Probab. 27 (2022), paper no. 10, 9 pp., arXiv:2109.03227, with R. Ducatez and A. Knowles.
- [14] Poisson statistics and localization at the spectral edge of sparse Erdős-Rényi graphs, Ann. Probab. 51 (2023), no. 1, 277-358, arXiv:2106.12519, with R. Ducatez and A. Knowles.
- [13] Local elliptic law,
 Bernoulli 28 (2022), no. 2, 866-909, arXiv:2102.03335, with T. Krüger.
- [12] Delocalization transition for critical Erdős-Rényi graphs, Comm. Math. Phys. 388 (2021), no. 1, 507-579, arXiv:2005.14180, with R. Ducatez and A. Knowles.
- [11] Inhomogeneous Circular Law for Correlated Matrices,
 J. Funct. Anal. 281 (2021), no. 7, 109120, 73 pp., arXiv:2005.13533, with T. Krüger.
- [10] Spectral radius of random matrices with independent entries, Probab. Math. Phys. 2 (2021), no. 2, 221–280, arXiv:1907.13631, with L. Erdős and T. Krüger.
- [9] Extremal eigenvalues of critical Erdős-Rényi graphs, Ann. Probab. 49 (2021), no. 3, 1347–1401, arXiv:1905.03243, with R. Ducatez and A. Knowles.
- [8] The Dyson equation with linear self-energy: spectral bands, edges and cusps, Doc. Math. 25 (2020), 1421–1539, arXiv:1804.07752, with L. Erdős and T. Krüger.
- [7] Correlated random matrices: Band rigidity and Edge universality, Ann. Probab. 48 (2020), no. 2, 963–1001, arXiv:1804.07744, with L. Erdős, T. Krüger and D. Schröder.
- [6] Singularities of the density of states of random Gram matrices, Electron. Commun. Probab. 22 (2017), no. 63, 13 pp., arXiv:1708.08442.
- [5] Location of the spectrum of Kronecker random matrices, Ann. Inst. H. Poincaré Probab. Statist., 55 (2019), no. 2, 661–696, arXiv:1706.08343, with L. Erdős, T. Krüger and Yu. Nemish.
- [4] Local inhomogeneous circular law, Ann. Appl. Probab. 28 (2018), no. 1, 148–203, arXiv:1612.07776, with L. Erdős and T. Krüger.
- [3] Local law for random Gram matrices, Electron. J. Probab. **22** (2017), no. 25, 41 pp., arXiv:1606.07353, with L. Erdős and T. Krüger.
- [2] The local semicircle law for random matrices with a fourfold symmetry, J. Math. Phys. 56 (2015), no. 10, arXiv:1506.04683.

Proceedings

[1] Spectral radius of random matrices with independent entries, in: Oberwolfach Rep. 16 (2019), no. 4, p. 3471.

Contributions to conferences

- **Upcoming:** Random hyperbolic surfaces and random graphs, Workshop at CIRM, Marseille, invited talk, November 2024.
- **Upcoming:** 35th International Workshop on Operator Theory and its Applications, Special Session "Random Matrices and Free Probability", University of Kent, Canterbury, invited talk, August 2024.
- Young European Probabilists (YEP) workshop XVIII, Eindhoven, invited talk, *Localized phase* of the Erdős-Rényi graph, 30/03/2023.
- Session on Random Matrices at 2022 Annual Meeting of the Institute of Mathematical Statistics, London, invited talk, *Localization and Delocalization in Erdős-Rényi graphs*, 28/06/2022.
- XVII Brunel-Bielefeld Workshop on Random Matrix Theory and Applications, invited talk, Localization and Delocalization in Erdős-Rényi graphs, 17/12/2021.
- Session on Statistical Mechanics and Random Structures, Young Researchers Symposium of International Congress on Mathematical Physics, Geneva, talk, *Poisson-statistics for extremal eigenvalues of subcritical Erdős-Rényi graphs*, 29/07/2021.
- Session on Random Matrices, Bernoulli-IMS One World Symposium 2020 (online meeting), video talk, *Inhomogeneous circular law for correlated matrices*, August 2020. Video available at https://www.youtube.com/watch?v=3Ymin26DiH8
- Random Matrices, Conference at Mathematical Research Institute Oberwolfach, talk, Spectral radius of random matrices with independent entries, 11/12/2019.
- NCCR SwissMap General Meeting, Villars-sur-Ollon, talk, Extreme Eigenvalues and Eigenvectors of critical Erdős-Rényi graphs, 10/09/2019.
- Random Matrices and Random Graphs, Conference at CIRM Luminy, talk, *Correlated random matrices: Dyson equation and edge universality*, 16/04/2019.
- International congress on mathematical physics, Montreal, talk, Correlated random matrices: Dyson equation and edge universality, 24/07/2018.
- Annual meeting of the German mathematical society, section functional analysis, Paderborn, talk, *Dyson equation and the self-consistent density of states*, 08/03/2018.
- XIII Brunel Bielefeld Workshop, ZiF, Bielefeld, poster, *Local inhomogeneous circular law*, December 2017.
- Park City Mathematics Institute: Summer session on random matrices, poster, *Local inhomo-geneous circular law*, June July 2017.

Presentations at research seminars and colloquia

- TU Braunschweig, University of Osnabrück, Applied Algebra and Analysis Online Seminar, Spectral Phases of the Erdős-Rényi graph, 03/05/2024.
- University of Mainz, Rhein-Main Stochastik Kolloquium, Spectral Phases of the Erdős-Rényi graph, 02/06/2023.
- University of Bonn, Oberseminar Stochastik, Spectral Phases of Erdős-Rényi graphs, 20/04/2023.
- University of Duisburg-Essen, Probability Seminar, Spectral Phases of Erdős-Rényi graphs, 04/04/2023.
- University of Basel, Seminar in Probability Theory and Statistics, Spectral Phases of Erdős-Rényi graphs, 12/10/2022.
- FAU Erlangen, Oberseminar Stochastik, Spectral Phases of Erdős-Rényi graphs, 19/07/2022.
- University of Chicago, Probability and Statistical Physics Seminar, Localization and Delocalization in Erdős-Rényi graphs, 08/04/2022.
- Massachusetts Institute of Technology, MIT Probability Seminar, Boston, Localization and Delocalization in Erdős-Rényi graphs, 04/04/2022.
- Temple University, Penn/Temple Probability Seminar, Philadelphia, Localization and Delocalization in Erdős-Rényi graphs, 29/03/2022.
- City University of New York, Probability Seminar, Localization and Delocalization in Erdős-Rényi graphs, 22/03/2022.

- TU Vienna, Seminar, Random matrices and random graphs: localization and delocalization, 20/12/2021.
- University of California, San Diego, Probability seminar (online), Localization and Delocalization in Erdős-Rényi graphs, 18/11/2021.
- Bonn University, Seminar, Random matrices and random graphs: localization and delocalization, 08/11/2021.
- Hamburg University, Seminar (online), Random matrices and universality, 05/07/2021.
- Bonn University, Stochastics seminar, Extreme Eigenvalues and Eigenvectors of critical Erdős-Rényi graphs, 24/10/2019.
- Bielefeld University, Random matrix seminar, Spectral radius of random matrices with independent entries, 23/10/2019.
- IST Austria, Analysis & Mathematical physics seminar, Extreme Eigenvalues of critical Erdős-Rényi graphs, 11/07/2019.
- ETH Zurich & University Zurich, Zurich graduate colloquium, What is a random matrix?, 05/03/2019.
- TU Graz, Structure theory seminar, Correlated random matrices: Dyson equation and edge universality, 17/12/2018.
- Queen Mary University of London, Probability and applications seminar, *Local inhomogeneous circular law*, 07/02/2018.
- Bielefeld University, Random matrix seminar, Local inhomogeneous circular law, 18/12/2017.
- Courant Institute, New York University, Probability and mathematical physics seminar, Local inhomogeneous circular law, 08/12/2017.
- University of Geneva, Mathematical physics seminar, *Local inhomogeneous circular law*, 04/12/2017.
- Saarland University, Saarbrücken, Free probability seminar, *Local inhomogeneous circular law*, 22/11/2017.
- Institut Henri Poincaré, Paris, Random matrices and graphs seminar, *Local inhomogeneous circular law*, 05/05/2017.
- University of Lancaster, Probability seminar, Local inhomogeneous circular law, 23/03/2017.

Teaching experience

As lecturer

University of Bonn

Winter term $2024/2025$:	Lecturer of <i>Stochastics</i> in teacher's education programme
Summer term 2024:	Lecturer of Random matrices and universality
Winter term $2023/2024$:	Lecturer of student seminar Selected topics in random matrices and ran-
	dom operators
Summer term 2023:	Lecturer of Random matrices and universality

University of Geneva

Spring term 2020:	Lecturer of Random matrices and universality II
Spring term 2019:	Lecturer of Introduction to random matrices

The lecture Random matrices and universality II was part of the SwissMap Master Class 2019/2020 on Mathematical Physics at the University of Geneva. It was recorded and the links to the videos can be found at https://unige.ch/~alt/ranmat_universality.html

As teaching assistant

Fall term 2020:	Teaching assistant for <i>Probability Theory</i> at University of Geneva
Fall term 2019:	Teaching assistant for Random Matrices and Universality I at University
	of Geneva

Winter term $2016/2017$:	Teaching assistant for <i>Mathematical Analysis</i> at IST Austria
Summer term 2016:	Teaching assistant for <i>Fourier Transform</i> at IST Austria
Summer term 2014:	Tutor for Mathematical Statistical Physics at LMU Munich
Winter term $2013/2014$:	Tutor and marker for Analysis III at LMU Munich

Supervision

• ongoing: one Master thesis and one Bachelor thesis

Service and Organization

- External examiner of PhD thesis of Jacob Fronk (University of Copenhagen, 2023)
- Main organizer of summer school on *Recent developments in disordered systems* at Hausdorff center in Bonn in September 2024 (Main lecturers: Alice Guionnet, Ioan Manolescu, Eliran Subag, Simone Warzel)
- Coorganizer of the research seminars *Stochastics* and *Mathematical Physics* at University of Bonn (since 01/03/2023)
- Organizer of the research seminar Mathematical Physics at University of Geneva (01/09/2018 - 31/08/2020)

• Referee for Annals of Probability, Annales de l'Institut Henri Poincaré, Probabilités et Statistiques, Bernoulli Journal, Communications in Mathematical Physics, Electronic Journal of Probability, Journal of Mathematical Physics, Journal of Statistical Physics, Probability and Mathematical Physics, and Random Matrices: Theory and Applications; quick opinions for Communications in Mathematical Physics, Electronic Journal of Probability, Journal of Functional Analysis and Probability Theory and Related Fields.

Outreach activities

14/03/2024:	Public lecture (in person & online) at 9. Bonner Mathemacht (9th night of
	mathematics in Bonn) titled Busfahrzeiten, Atomkerne und Riemannsche
	Zetafunktion: Verteilungen von Zufallsmatrizen sind überall
06/12/2023:	Public lecture at <i>Dies Academicus</i> at University of Bonn
	Antrittsvorlesung (inaugural lecture) titled Busfahrzeiten, Atomkerne und
	Riemannsche Zetafunktion: Verteilungen von Zufallsmatrizen sind überall
27/05/2018:	Participation in the Open Campus Day at IST Austria:
	Interactive presentation of probabilistic experiments to the general public.
25/11/2016:	Participation in the Student Open Day at IST Austria:
	Presentation of the research topics of the Erdős group to undergraduate
	students interested in the PhD programme.

Conference attendances

July 2024:	International congress on mathematical physics, conference, Strasbourg
July 2023:	43rd Conference on Stochastic Processes and their Applications, conference,
	Lisbon
June 2023:	Recent Advances in Quantum and Statistical Mechanics, summer school,
	Hausdorff School for Advances Studies in Mathematics, Bonn
March 2023:	Young European Probabilists (YEP) workshop XVIII, Eindhoven
July 2022:	Random matrices and Random Landscapes, Conference in honour of Yan
	Fyodorov's 60th birthday, Ascona
July 2022:	Probability and Mathematical Physics, Helsinki
June 2022:	Institute of Mathematical Statistics – Annual Meeting in Probability and
	Statistics, London

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December 2021:	XVII Brunel – Bielefeld Workshop, ZiF, Bielefeld, Online Meeting
September 2021:	Universality and Integrability in Random Matrix Theory and Interacting
	Particle Systems, Part 2, MSRI, Berkeley
August 2021:	Universality and Integrability in Random Matrix Theory and Interacting
	Particle Systems, Part 1, MSRI, Berkeley
August 2021:	International congress on mathematical physics, Geneva
July 2021:	ICMP Young Researchers Symposium, Geneva
September 2020:	7th NCCR SwissMAP general meeting, Saanenmöser
August 2020:	Bernoulli-IMS One World Symposium 2020, Online Conference
May 2020:	Online Random Matrices and Their Applications 2020, Online Conference
February 2020:	Workshop on Mathematical Physics, Les Diablerets
December 2019:	Random Matrices, Mathematical Research Institute Oberwolfach
September 2019:	6th NCCR SwissMap general meeting, Villars-sur-Ollon
August 2019:	From Many Body Problems to Random Matrices, BIRS, Banff
April 2019:	Random Matrices and Random Graphs, CIRM Luminy
February 2019:	Workshop on Statistical Mechanics, Les Diablerets
November 2018:	Brown measures and non-normal random matrices, Toulouse
July 2018:	International congress on mathematical physics, Montreal
July 2018:	ICMP Young Researchers Symposium, Montreal
June 2018:	Probability and Mathematical Physics, Summer school, IST Austria,
	Klosterneuburg
March 2018:	Annual meeting of the German mathematical society, Paderborn
December 2017:	XIII Brunel – Bielefeld Workshop, ZiF, Bielefeld
June – July 2017:	Summer session on random matrices, Park City Mathematics Institute
August 2016:	Frontiers in Mathematical Physics, CRM, Montreal
August 2016:	Methods of Modern Mathematical Physics, Young Researcher Symposium,
	Fields Institute, Toronto
June, July 2015:	Quantum Many-body Systems, Random Matrices and Disorder, Workshops,
	ESI, Vienna
September 2013:	Free Probability and Operator Algebras, Master Class, WWU Münster.

Miscellaneous

Language skills:	German (mother tongue), English (fluent), French (advanced knowl-
	edge).
Computer skills:	Matlab, Mathematica, LATEX, Programming language C.
Leisure time activities:	Hiking, swimming, running, biking.