CURRICULUM VITAE
JOHANNES ALT

Personal information

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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

[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

- 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 inhomogeneous circular law*, June – July 2017.

Presentations at research seminars and colloquia

- **Upcoming:** 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

Summer term 2024:	Lecturer of *Random matrices and universality*
Winter term 2023/2024:	Lecturer of student seminar *Selected topics in random matrices and random 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 *Probability Theory* 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 *Mathematical Analysis* at IST Austria
Summer term 2016:	Teaching assistant for *Fourier Transform* 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 Mathenacht* (9th night of mathematics in Bonn) titled *Busfahrzeiten, Atomkerne und Riemannsche Zetafunktion: Verteilungen von Zufallsmatrizen sind überall*
06/12/2023:	Public lecture at *Dies Academicus* 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 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
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 knowledge).
Computer skills:	Matlab, Mathematica, LaTeX, Programming language C.
Leisure time activities:	Hiking, swimming, running, biking.