



# Dr. Dominik Schröder

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## Education

### Maria-Theresia-Gymnasium

ABITUR

*München*

2001 – 2010

### ETH Zürich

MATHEMATICS & PHYSICS

*Zürich*

2010 – 2011

### LMU München

MATHEMATICS & PHYSICS

*München*

2011 – 2014

- **BSc in Mathematics.** Final grade *1.08*  
Bachelor thesis “The Integrated Density of States of Random Schrödinger Operators” supervised by Prof. Dr. Peter Müller.
- **MSc in Theoretical and Mathematical Physics** with distinction (final grade *1.0*)  
Master thesis “Phase Transition in the Density of States of Quantum Spin Glasses” supervised by Prof. Dr. László Erdős.

### University of Cambridge

MATHEMATICS

*Cambridge*

2014 – 2015

- **MASt in Mathematics.** with distinction  
Essay “Interlacing Families and the Kadison-Singer Problem” supervised by Prof. Timothy Gowers.

### IST Austria

MATHEMATICS

*Wien*

Sep 2015 – Mär 2019

- **PhD in Mathematics.**  
Doctoral thesis “From Dyson to Pearcey: Universal Statistics in Random Matrix Theory” supervised by Prof. Dr. László Erdős.

## Positions

### Bosch Center for Artificial Intelligence

INDUSTRY SABBATICAL (DURING THE PHD)

*Renningen*

Apr 2018 – Aug 2018

- Work on clustering of image and audio data
- Focus: Analysis of facets of the lifted multicut polytope on paths
- Goal: Combination of initial segmentation by neural networks with additional expert knowledge

### IST Austria

POSTDOC

*Wien*

Mar 2019 – Sep 2019

### ETH Zürich

POSTDOC

*Zürich*

since Oct 2019

- 2019–2022: *Junior Fellow* at the ETH Institute for Theoretical Studies,
- Since 2022: *SNF Ambizione Independence Grant*
- Mentors: Prof. Vincent Tassion, Prof. Wendelin Werner & Prof. Alain-Sol Sznitman

## Publications

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ORCID ID [orcid.org/0000-0002-2904-1856](https://orcid.org/0000-0002-2904-1856)

Google Scholar [scholar.google.com/citations?user=u3ilHrcAAAAJ](https://scholar.google.com/citations?user=u3ilHrcAAAAJ)

*b-index: 15*

Full Publication List [n.ethz.ch/~dschroeder/publications.pdf](https://n.ethz.ch/~dschroeder/publications.pdf)

### Statistical physics

1 PUBLICATION:

- Phase transition in the density of states of quantum spin glasses, *Math. Phys. Anal. Geom.*

### Random matrix theory

24 PUBLICATIONS. KEY PUBLICATIONS:

- Random Matrices with Slow Correlation Decay, *Forum of Mathematics, Sigma*
- Edge Universality for non-Hermitian Random Matrices, *Probab. Theory Related Fields*
- Central Limit Theorem for Linear Eigenvalue Statistics of non-Hermitian Random Matrices, *Comm. Pure Appl. Math.*
- Normal Fluctuation in Quantum Ergodicity for Wigner Matrices, *in revision at Ann. Probab.*

### Machine learning theory

3 PUBLICATIONS:

- Analysis of one-hidden-layer Neural Networks via the Resolvent Method, *NeurIPS 2021*
- Deterministic Equivalent and Error Universality of Deep Random Features Learning, *ICML 2023*
- Asymptotics of Learning with Deep Structured (Random) Features, *ICML 2024*

## Personal Projects

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### cSP

[wirhabenzeit/csp](#)

PYTHON, JAVASCRIPT

Regression on EEG data using resnet1d. Written in Python (PyTorch), inference and visualization in JavaScript (onnxruntime)

### StravaMap

[wirhabenzeit/stravamap](#)

JAVASCRIPT

Map and statistical analysis of personal outdoor activities. Written in JavaScript (React.js, D3.js)

## Programming Skills

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<b>Python</b>	Advanced, including deep learning frameworks (PyTorch, TensorFlow)
<b>Typescript</b>	Advanced, including React, Node.js, D3.js
<b>SQL</b>	Intermediate
<b>C++</b>	Basic

## Teaching experience

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### Lecture

*ETH Zürich*

PROBABILITY THEORY

2022

	Motivation	Clarity	Script	Structure
<i>Evaluation</i>	4.5/5.0	4.3/5.0	4.4/5.0	4.4/5.0

### Course assistant

*ETH Zürich*

MEDLEY IN ADVANCED PROBABILITY

2020

### Course assistant

*IST Austria*

RANDOM MATRIX THEORY

2017 – 2018

## Supervision of students

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### Master thesis

VANESSA PICCOLO: "ASYMPTOTIC SPECTRAL DENSITY OF NON-LINEAR RANDOM MATRIX MODELS"  
*Won the "Premio Pro Ticino Zurigo" prize*

*ETH Zürich*

2020 – 2021

### Bachelor thesis

NICOLAS HOTTON: "THE BBP PHASE TRANSITION IN PRINCIPAL COMPONENT ANALYSIS"

*ETH Zürich*

2023

### Semester papers

TOPICS: DYSON BROWNIAN MOTION, RANDOM MATRIX THEORY, PRINCIPAL COMPONENT ANALYSIS

*ETH Zürich*

2021–2023

## Prizes & Fellowships

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2010 – 2015 **Studienstiftung des deutschen Volkes**, Scholarship

2015 **Horne Prizes for Physical Sciences**

*Clare College, Cambridge*

2015 – 2017 **IST Austria Excellence Scholarship**

*IST Austria*

2019 – 2022 **ITS Junior Fellow** supported by Dr. Rössler and the Walter Haefner Foundation

*ETH Zürich*

## Acquired funding

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2022 – 2026 **SNF (Schweizerischer Nationalfonds) Ambizione**. Value CHF544,720  
Project: *Random matrix universality in data science and theoretical physics*

## Miscellaneous

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Jul – Aug 2010 **Volunteer teacher for mathematics & english**, Godavari State School

*Nepal*