Personal Information:
Researcher in mathematical physics, quantum information, probability, and electoral systems.
Contact: frederik.ravn.klausen@gmail.com, http://frederikravnklausen.github.io, Citizenship: Danish.
Languages: Danish (native), English (fluent), German (fluent), Python (experienced), R (intermediate).

Research, Teaching and Education

- Postdoc, University of Cambridge, Oct 2025-
  Research in probability mentored by Wendelin Werner.
- Postdoctoral Research Fellow, Princeton University, Oct 2024-Oct 2025.
  Research in mathematical physics with mentor Michael Aizenman.
- Postdoc, MATH & Niels Bohr Institute, University of Copenhagen, Oct 2023 - Sep 2024.
  Research and supervision in quantum software; lecturing "Mathematical Analysis"; representing PhDs and postdocs in the university-wide Senate; member of the Danish standardization board for quantum technologies.
- PhD, QMATH, University of Copenhagen, Jan 2020-Oct 2023, Supervisor: Albert H. Werner. Research stays with Simone Warzel at TU Munich. Thesis: Random Problems in Mathematical Physics.
  Research in mathematical physics and quantum information; PhD and postdoc representative in the Department Collaboration Committee; teaching a freshman project on quantum information theory twice; supervising two master's students (Boris Kjær, Mie Glückstadt) on statistical mechanics.
- Teaching Assistant, University of Copenhagen Sep 2014-Jul 2018.
  Introduction to Mathematics, Linear Algebra (x 3), Complex Analysis, Analysis 0 (x 2), Geometry 1, Electrodynamics, Analysis 2, Measure and Integration Theory, Statistical Physics.
- Member of the working group of the Danish Mathematical Olympiad Dec 2015-
  (Correcting tests, posing problems, teaching on training camps, fundraising, organization development and leading the Danish Team in IMO 2017, 2018 and Baltic Way 2015-2020).
- 2017-2019: M.Sc. Mathematics, University of Copenhagen, GPA: 12/12. Two exchange semesters at ETH Zürich specialising in mathematical physics.
  Thesis: *Exponential decay of truncated correlation functions for the 2d-Ising model at the critical temperature.*
  Supervision: Aran Raoufi and Wendelin Werner, ETH Zürich.
- 2016-2017: B.Sc. Physics, University of Copenhagen (some courses transferred from math),
  GPA of additional courses (including a course on didactics for natural science): 12/12.
- 2013-2016: B.Sc. Mathematics, University of Copenhagen. GPA: 11.7/12. Exchange semester at LMU Munich, 2015. Thesis: *Causal structure in General relativity.*

Other employment

- Trading Intern, Jane Street, London, Jul-Sep 2022.
  Financial training and data analysis in Python and Excel.
- Consulting Intern, McKinsey & Company, Copenhagen, May-Jun 2016.
- Astronomy Guide, Tycho Brahe Planetarium, Mar 2014-Aug 2016.
  (Explaining astronomy to the public by public shows, guided tours, lectures for school kids etc.)
- Badminton Coach, Charlottenlund Badmintonklub, Sep 2007-Jul 2012.

Awards

- 1st. prize: China Adolescent Science and Technology Innovation Contest, 2014.
- 1st. prize: Physical Science, Young Scientists Denmark, 2014.
- Bronze medal, International Physics Olympiad (IPhO), 2013.
- Honorable Mention, International Mathematical Olympiad (IMO), 2013.
- 1st: The Danish Physics Olympiad 2013.
- 2nd: Danish Mathematical Olympiad (Georg Mohr-Konkurrencen), 2013.

Grants

- *Fluctuating Random Surfaces in Magnetic Systems*, two-year postdoc grant, Princeton University and University of Cambridge,1M DKK, Carlsberg Foundation, 2024.
- *Sponsorship* for the Danish math olympiad, 1M DKK, Jobindex and others, 2018-.
- *Kovalevskaya Travel Grants*, for participating in ICM 2022 (cancelled).
- *Travel grant for master's studies* at ETH, (40.000 DKK), Augustinus and Oticon Foundations, ETH, 2018.
- *Diligence award*, 5.000 DKK, Gammel Hellerup Gymnasium, 2013.

Volunteer Work

- Treasurer, Nordisk Kollegium, 2023.
- Member of the pre-selection jury 2016-2025 and the final jury 2017-2024, Young Scientists Denmark.
- Correcting the Danish Physics Olympiad 2014 and teaching at the Danish Physics Olympiad 2015.
- The Danish Youth Association of Science 2011 - 2014. (*Arranging lectures, excursions, MathCamps.*)

Scientific Talks

- *The Hammersley stratagem*, Tübingen, 19/12-2024.
- *Decoherence is an echo of Anderson localization in open quantum systems*, Quantissima 13/8-2024, ICMP 2/7-2024, Rutgers 20/5-2024, TU Munich, 15/11-2022.
- *Phase transitions for graphical representations of the Ising model using the uniform even subgraph*, Penn, USA, 4/1-25, NYU, USA, 14/3-25, Princeton, USA 30/4-24, Lund, Sweden 5/4-24, Tsinghua, China, 31/1-2024, Nancy, France, 30/11-23, Cambridge, UK, 7/11-2023, Chalmers, Sweden, 17/10-2023.
- *Problems in mathematics of quantum systems from the beginning*, Fribourg, Switzerland, 1/12, 2023.
- *Two-tier electoral systems, the Danish election in 2022, unclarities and impossibility results*, Rutgers, USA 19/5-2025, Princeton, USA, 12/3-2025, QMATH, Copenhagen, Denmark, 21/12-2022.
- *Spectra of translation-invariant Lindbladians in infinite volume*, QMATH, Copenhagen 1/6-2022.
- *Critical exponents for the Ising model in a magnetic field with random currents*, QMATH, Copenhagen, 4/9-2020, Percolation Today, 15/6-2021, Current Topics in Mathematical Physics, 20/7-2021.
- *QMATH tracks the spread of Danish Coronavirus from genetic data*, University of Copenhagen, 30/5-2020, Data@Breakfast, Online, South Africa. 19/6-2020.

Outreach Talks

- *Unclarities in the Danish election law*, Prime Minister's Office, 23/10-24.
- *Problems with graphs and probabilities*, Farum Mathematics Seminar, 13/2-24.
- *The Ising model its the phase transition*, Tea with a researcher, 3/11-23.
- *Math research through pictures*, Culture night, 13/10-23.
- *Doing a PhD*, UCPH career day, 11/5-23.
- *What can a quantum computer do for you?*, Culture night, 14/10-22.
- *Why Quantum Computing is fundamentally different*, UCAPS Late night PhD talks. 24/2-22.
- *From spectra to quantum physics*, UCPH alumni association, 30/11-21.
- *Quantum Computing is fundamentally different* poster pitch to: EU commissioner Margrethe Vestager 22/2-22, staff of the American embassy in Denmark 22/3-22, group from the Ministry of Education 21/2-22, senior staff from Novo Nordisk 1/11-22, Board of the Danish Quantum Community, 14/12-22, Public Audience 11/6-22.

Outreach Papers

All titles were translated from Danish to English. Only the most relevant listed.

- Tightening the electoral law is timely prudence., Politiken, 2025.
- *Proposal for Adjustments to the Danish Election Act*, Memo to the Ministry of the Interior, 2024.
- Give Temporary Researchers Better Conditions, Uniavisen, 2023.
- Mathematicians Reveal COVID-19 Transmission Routes, Aktuel Naturvidenskab, 2020.
- *Denmark Hosted Baltic Way 2017*, on behalf of the Georg Mohr Competition, LMFK-bladet, 2018.
- *Meditation on the Central Binomial Coefficient*, FAMØS, 2015.
- Physics in the Olympiad Class, Aktuel Naturvidenskab, 2013.
- Talented Students Must Not Forget the Community, Politiken, 2012.

List of Publications

A complete and updated list can also be found on Google Scholar.

Peer-Reviewed Publications

- U. T. Hansen, **F. R. Klausen**, P. Wildemann, *Non-uniqueness of phase transitions for graphical representations of the Ising model on tree-like graphs*, *ALEA* **22**, 889–904 (2025).
- A. J. Bay-Smidt, **F. R. Klausen**, C. Sünderhauf, R. Izsák, G. C. Solomon, N. S. Blunt, *Fault-tolerant quantum simulation of generalized Hubbard models*, *PRX Quantum* **6**, 030348 (2025).
- U. Hansen, B. Kjær, **F. R. Klausen**, *The Uniform Even Subgraph and Its Connection to Phase Transitions of Graphical Representations of the Ising Model*, *Communications in Mathematical Physics* (2025).
- **F. R. Klausen**, S. Warzel, *Decoherence is an echo of Anderson localization in open quantum systems*, *Annales Henri Poincaré* (2025).
- D. Harley, I. Datta, **F. R. Klausen**, A. Bluhm, D. S. França, A. Werner, M. Christandl, *Going Beyond Gadgets: The Importance of Scalability for Analogue Quantum Simulators*, *Nature Communications* (2024).
- **F. R. Klausen**, A. Lauritzen, *A stochastic cellular automaton model of culture formation*, *Physical Review E* **108**, 054307 (2023).
- U. Hansen, **F. R. Klausen**, *Strict monotonicity, continuity and bounds on the Kertész line for the random-cluster model on* $\mathbb{Z}^d$, *Journal of Mathematical Physics* **64**, 013302 (2023).
- **F. R. Klausen**, A. Raoufi, *Mass scaling of the near-critical 2D Ising model using random currents*, *Journal of Statistical Physics* **189**, 71 (2022).
- **F. R. Klausen**, *On monotonicity and couplings of random currents and the loop-*$O(1)$ *model*, *ALEA, Latin American Journal of Probability and Mathematical Statistics* **19**, 161–188 (2022).
- A. Bluhm, M. Christandl, F. Gesmundo, **F. R. Klausen**, L. Mančinska, V. Steffan, D. S. França, A. Werner, *SARS-CoV-2 transmission routes from genetic data: A Danish case study*, *PloS One* **15**(11): e0241405 (2020).
- P. Jensen, **F. R. Klausen**, P. Rasmussen, *Combinatorial classification of quantum lens spaces*, *Pacific Journal of Mathematics* **297**(2), 257–274 (2018).
- S. Holdum, **F. R. Klausen**, P. Rasmussen, *Powers in prime bases and a problem on the central binomial coefficient*, *Integers: Electronic Journal of Combinatorial Number Theory* **14**, A43 (2014).
- S. Holdum, **F. R. Klausen**, P. Rasmussen, *On a conjecture on the representation of positive integers as the sum of three terms of the sequence* $\lfloor n^2/a \rfloor$, *The Journal of Integer Sequences* **17**, Article 14.3.8 (2014).

In Press

- J. Elklit, S. Holdum, **F. R. Klausen**, *What is wrong with the proportionality in the Danish Parliamentary Elections Act—and what can be done about it?*, *Politica*, in press (2025).

Preprints

- U. T. Hansen, J. Jiang, **F. R. Klausen**, *General coupling for Ising models and beyond*, arXiv:2506.10765 (2025).
- **F. R. Klausen**, *The Disproportionate Power of Votes Near Electoral Thresholds*, (2025).
- S. Holdum, **F. R. Klausen**, *Impossibility Theorem for Two-Tier Electoral Systems*, (2025).
- **F. R. Klausen**, *Sandsynligheden for overrepræsentation ved Folketingsvalg*, (2025).
- **F. R. Klausen**, *Spectra of Lindbladians on the infinite line: From non-Hermitian to full evolution via tridiagonal Laurent matrices*, arXiv:2206.09879 (2022).