Dr. Dennis Ulbrich

Email

EDUCATION

Dr. rer. nat. – Mathematics
University of Bremen, Department of Mathematics 4.2017 — 9.2021

- PhD thesis: Ergodic theory of nonlinear waves in discrete and continuous excitable media
  - Advisors: **Prof. J. Rademacher**, **Prof. M. Keßeböhmer**
  - Referees: Prof. J. Rademacher (University of Bremen), **Prof. I. Melbourne** (Warwick University)
- cf. **MGP**

Brückenstipendium of the University of Bremen
University of Bremen, Department of Mathematics 4.2016 — 4.2017

- Further studies
- Extensions of the results of my Master's thesis
- Successful acquisition of third-party funding (DFG) for my PhD project

M.Sc. and B.Sc. in Mathematics
University of Bremen until 4.2016

- M.Sc. thesis: Dynamics of the three-state 1D Greenberg-Hastings cellular automaton
  - Referees: Prof. J. Rademacher, **Dr. T. Samuel** (University of Exeter)
- B.Sc. thesis: Unerwartete Fehler bei bedingten Erwartungswerten und Wahrscheinlichkeiten
  - Referees: **Prof. W. Brannath** (University of Bremen), **Dr. K. Falk** (University of Kiel)

EMPLOYMENT

Postdoctoral researcher
Hochschule Bremen, School of Electrical Engineering and Computer Science 2.2025 — 5.2025

- Project work: AI-based transmission, analysis and verification of handwritten documents

Lecturer in Mathematics
Hochschule Bremen, School of Nature and Engineering 10.2024 — 3.2025

- Mathematik 1

Postdoctoral Researcher
University of Münster, Department of Mathematics, Institute for Analysis and Numerics
6.2023 — 6.2024

- Research on discrete hypocoercivity within **DFG project 456849348**
- Keywords:
  - Hypocoercivity
  - Kinetic equations
  - BGK-type approximations
  - Chemical reactions
  - Entropy methods
- Supervision: **Prof. M. Pirner**

Non-academic professional activities
Bremen, Köln 9.2022 — 2.2023

Lecturer in Mathematics
Jacobs University Bremen, Mathematical Sciences 1.2022 — 6.2022

- Finite Mathematics
- Introduction to Dynamical Systems

Research assistant (PhD student)
University of Bremen, Department of Mathematics 4.2017 — 9.2021

Research groups: Nonlinear Analysis and Applied Analysis, Stochastics and Dynamical Systems

- Research within **DFG project number 384027439**
- PhD thesis: Ergodic theory of nonlinear waves in discrete and continuous excitable media:
  - Advisors: **Prof. J. Rademacher**, **Prof. M. Keßeböhmer**
  - Referees: Prof. J. Rademacher (University of Bremen), **Prof. I. Melbourne** (Warwick University)
- Keywords:
  - Nonlinear analysis
  - Ergodic Theory
  - PDE
  - Excitable media
  - Cellular automata
  - Dynamical Systems

PUBLICATIONS

IN PROGRESS

- Discrete hypocoercivity for a nonlinear kinetic reaction model without initial close-to-equilibrium assumption. (working title)
  joint work with **L. Liu** and **M. Pirner**

REFEREED JOURNAL ARTICLES

- A. Pauthier, J.D.M. Rademacher, D. Ulbrich.
  Weak and strong interaction of excitation kinks in scalar parabolic equations.
  J Dyn Diff Equat. Published 30 July 2021; Volume 35, pages 2199-2235, (2023) **[DOI]** **[arXiv]**
- M. Keßeböhmer, J.D.M. Rademacher, D. Ulbrich.
  Dynamics and topological entropy of 1D Greenberg-Hastings cellular automata.
  Ergodic Theory and Dynamical Systems. 2021;41(5):1397-1430 **[DOI]** **[arXiv]**

THESES

- D. Ulbrich.
  Ergodic theory of nonlinear waves in discrete and continuous excitable media.
  Dissertation, 2021 **[DOI]**

OTHER

GRANTS

Brückenstipendium
University of Bremen, Department of Mathematics 4.2016 — 4.2017

- **More details**

SUPERVISION

Student Research Project
University of Bremen, Department of Mathematics 2021 — 2022

- Wave patterns in cellular automata for excitable media, see **here**

ORGANISATION

Administrational tasks
University of Bremen, Department of Mathematics 2016 – 2021

- Supporting several **summer and winter schools**
- Maintaining the Mathematical Collection of the University of Bremen and creating its website