

Jörg Weber

Curriculum Vitæ

Personal information

Title Dr. rer. nat.
Date of birth 2nd April 1993
Gender male
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Work experience

01/2025– **Principal Investigator of FWF ESPRIT grant**, *University of Vienna*, Faculty of Mathematics
10/2023– **Moritz Schlick postdoctoral fellow**, *University of Vienna*, Faculty of Mathematics
12/2024
09/2023– **Junior fellow**, *Institut Mittag-Leffler*
10/2023
09/2022– **Researcher**, *Lund University*, Centre for Mathematical Sciences
08/2023
09/2020– **Postdoctoral fellow**, *Lund University*, Centre for Mathematical Sciences
08/2022
10/2016– **Research assistant**, *University of Bayreuth*, Department of Mathematics
08/2020

Education

01/2017– **Dr. rer. nat.**, *University of Bayreuth*, Department of Mathematics
07/2020
2014–2016 **Master**, *University of Bayreuth*, Mathematics, secondary subject Physics
2011–2014 **Bachelor**, *University of Bayreuth*, Mathematics, secondary subject Physics

Doctoral thesis

title *The Relativistic Vlasov–Maxwell System with External Electromagnetic Fields*

supervisor Prof. Dr. Gerhard Rein

Conferences and seminars

Organised events

- 2024 Co-organisation of minisymposium *Steady Water Waves* at *SIAM Conference on Nonlinear Waves and Coherent Structures* in Baltimore
- 2023 Organisation of *Postdoc/PhD seminar* at Institut Mittag-Leffler, Stockholm
- 2021–2023 Co-organisation of *Seminar on Analysis, Geometry and PDEs* at Lund University

Talks and posters

- 2024 Invited talk at workshop *Nonlinear Water Waves: Rigorous Analysis and Scientific Computing*, Banff International Research Station
 - Invited talk at workshop *Mathematical theory of water waves*, Lund University
 - Invited talk in seminar *Partial differential equations*, University of Konstanz
 - Invited talk in seminar *Material modelling*, Weierstrass Institute for Applied Analysis and Stochastics, Berlin
 - Talk at *SIAM Conference on Nonlinear Waves and Coherent Structures*, Baltimore
 - Invited talk at conference *Fluid Flows – Analysis and Modelling*, University of Vienna
 - Invited talk at *GAMM Annual Meeting 2024*, University of Magdeburg
 - Invited talk in *Applied Analysis Seminar*, Saarland University
- 2023 Invited talk in *MCMP Seminar* (for Master students in mathematics and physics), University of Vienna
 - Invited talk in *Brown PDE Seminar*, Brown University
 - Invited talk in programme *Order and Randomness in Partial Differential Equations*, Institut Mittag-Leffler, Stockholm
 - Invited talk in programme *Mathematical Problems in Fluid Dynamics, part 2*, Simons Laufer Mathematical Sciences Institute, Berkeley
 - Invited talk in *Differential Equations Seminar*, University of Missouri
 - Invited talk in joint seminar *Asymptotic Models in Fluid Dynamics*, Lund University and University of Stuttgart
- 2022 Invited talk at *Vienna School of Mathematics*, University of Vienna
 - Invited talk in *Analysis and Probability Seminar*, Chalmers University of Technology
 - Poster in *Workshop on spatial dynamics and related approaches*, University of Stuttgart
 - Talk at *SIAM Conference on Nonlinear Waves and Coherent Structures*, University of Bremen
 - Invited talk in seminar *Nonlinear problems in Mathematical Physics*, University of Bayreuth
 - Invited talk in workshop *New Directions in Water Waves*, University of Bath
 - Poster at conference *When Kinetic Theory meets Fluid Mechanics*, ETH Zürich
 - Invited talk in *DNA seminar*, Norwegian University of Science and Technology

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- Poster at *SIAM Conference on Analysis of Partial Differential Equations* (held online)
- Talk at *Conference on Mathematics of Wave Phenomena*, Karlsruhe Institute of Technology
- 2021 Invited talk in *Differential Equations Seminar*, University of Missouri
- Talk at *4th IMA Conference on Nonlinearity and Coherent Structures*, Loughborough University
- Invited talk in *IntComSin Kolloquium*, University of Regensburg
- 2020 Talk in *Seminar on Analysis, Geometry, and PDEs*, Lund University
- Invited talk in *CAA seminar*, University of Erlangen-Nürnberg
- 2019 Talk at winter school *Gradient Flows and Variational Methods in PDEs*, University of Ulm
- Talk at conference *ENUMATH 2019*, Delft University of Technology
- Invited talk in *Analysis and Probability Seminar*, Chalmers University of Technology
- Talk at *GAMM Annual Meeting 2019*, University of Vienna
- 2017 Talk at *Young Researchers Meeting & CSE Workshop 2017*, University of Hamburg
- [Additional conferences and programmes participated in](#)
- 2023 *Courant PIs Workshop* and annual meeting *Simons Collaboration on Wave Turbulence*, Courant Institute of Mathematical Sciences and Simons Foundation, New York
- Abel symposium*, Orkanger
- Conference *Aspects of Nonlinear Evolution*, Leibniz University Hannover
- 2022 Seminar *Free Boundary Problems in Fluid Dynamics*, Oberwolfach seminar
- Programme *Mathematical Perspectives of Gravitation beyond the Vacuum Regime*, ESI, University of Vienna (online)
- 2021 Programme *Mathematical Problems in Fluid Dynamics*, Mathematical Sciences Research Institute, Berkeley (online)

Teaching

Lectures

- 2024W *Advanced partial differential equations* (Master level), University of Vienna; designed the course content and created lecture notes; held all lectures and seminars (twice per week, in total 23 lectures, 7 seminars)
- 2023S *Ordinary Differential Equations II* (Master level), Lund University; designed the course content and created lecture notes; held all lectures (twice per week, in total 18); designed and marked written and oral exams
- 2022S *Fourier Analysis* (Master level), Lund University; designed the course content and created lecture notes; held all lectures (twice per week, in total 16) and seminars (once per week, in total 8) as the only teacher; designed and marked written and oral exams
- 2021W *Linear Analysis* (Bachelor level), Lund University; designed the course content and created lecture notes; held all lectures (twice per week, in total 18); designed and marked written and oral exams

Seminars

- 2024S *Introduction to Mathematical Methodology*, University of Vienna; held exercise classes
- 2024S *Bachelor seminar*, University of Vienna; provided platform for students to work towards and present their Bachelor thesis
- 2020S *Advanced Complex Analysis*, University of Bayreuth; held and organised seminars; marked written exams
- 2019W *Introduction to Ordinary Differential Equations*, University of Bayreuth; held and organised seminars; marked written exams
- 2018S *Introduction to Advanced Analysis*, University of Bayreuth; held and organised seminars
- 2018W *Vector Calculus & Advanced Mathematics for Physicists B*, University of Bayreuth; held and organised seminars; marked written exams
- 2014–2019 *Analysis 1* and *Analysis 2* (several times), University of Bayreuth; held and organised seminars; designed and marked written exams

Taken courses in teacher training

- 2022 *Teaching and Learning in Higher Education*, Lund University

(Co-)Supervision

Master's thesis

- 2023 Anna-Mariya Otsetova, Lund University

Bachelor's thesis

- 2023 Abhijeet Vats, Lund University
- 2021 Yining Zhu, Lund University

Grants

- 01/2025– *ESPRIT* project *Overhanging water waves: new challenges and perspectives*, Austrian Science Fund (FWF), 340,819 EUR
- 2023 *The Fund of the Walter Gyllenberg Foundation* project *Localised pure-gravity water waves*, The Royal Physiographic Society in Lund, 46,000 SEK
- 2022 Travel funding for *Workshop on spatial dynamics and related approaches*, University of Stuttgart; *When Kinetic Theory meets Fluid Mechanics*, ETH Zürich; *Conference on Mathematics of Wave Phenomena*, Karlsruhe Institute of Technology (obsolete; conference was held online due to Covid-19)

Fellowships and Awards

- 2023 *Junior fellowship*, Institut Mittag-Leffler
- 2023 *Seal of Excellence* of the European Commission for a high-quality project proposal submitted under the call for Marie Skłodowska-Curie Actions Postdoctoral Fellowships 2022
- 2017 Nominated for *Teaching Award of the Faculty of Mathematics, Physics & Computer Sciences*, University of Bayreuth

Service

Referee for *Advances in Nonlinear Analysis*, *Classical and Quantum Gravity*, *Communications in Mathematical Physics*, *International Journal on Geomathematics*, *Journal of Differential Equations*, *Journal of Mathematical Fluid Mechanics*, *Mathematical Methods in the Applied Sciences*, *Physica D: Nonlinear Phenomena*, *Physica Scripta*, *Plasma Physics and Controlled Fusion*, *Proceedings in Applied Mathematics and Mechanics*, *Zeitschrift für angewandte Mathematik und Physik*

2023 Examiner of Master's thesis of Francisco Carvalho, Lund University

Computer skills

C++, HTML, L^AT_EX, Maple, Mathematica, MATLAB, Office

Languages

native German
fluent English
intermediate Swedish

Publications

- [1] (**with** A.-M. Otsetova and E. Wahlén). “Axisymmetric capillary water waves with vorticity and swirl connecting to static unduloid configurations”. In: *J. Differential Equations* 411 (2024), 604–618. DOI: 10.1016/j.jde.2024.08.005.
- [2] (**with** J. Bartsch, P. Knopf, and S. Scheurer). “Controlling a Vlasov–Poisson plasma by a Particle-In-Cell method based on a Monte Carlo framework”. In: *SIAM J. Control Optim.* 62.4 (2024), 1977–2011. DOI: 10.1137/23M1563852.
- [3] (**with** E. Wahlén). “Large-amplitude steady gravity water waves with general vorticity and critical layers”. In: *Duke Math. J.* 173.11 (2024), 2197–2258. DOI: 10.1215/00127094-2023-0054.
- [4] (**with** E. Wahlén). “Global bifurcation of capillary-gravity water waves with overhanging profiles and arbitrary vorticity”. In: *Int. Math. Res. Not. IMRN* 2023.20 (2023), 17377–17410. DOI: 10.1093/imrn/rnac280.
- [5] (**with** E. Lokharu and E. Wahlén). “On the amplitude of steady water waves with favorable constant vorticity”. In: *J. Math. Fluid Mech.* 25.3, 58 (2023). DOI: 10.1007/s00021-023-00796-6.
- [6] (**with** A. H. Erhardt and E. Wahlén). “Bifurcation analysis for axisymmetric capillary water waves with vorticity and swirl”. In: *Stud. Appl. Math.* 149.4 (2022), 904–942. DOI: 10.1111/sapm.12525.
- [7] (**with** P. Knopf). “On the two and one-half dimensional Vlasov–Poisson system with an external magnetic field: global well-posedness and stability of confined steady states”. In: *Nonlinear Anal. Real World Appl.* 65, 103460 (2022). DOI: 10.1016/j.nonrwa.2021.103460.
- [8] “Weak solutions of the relativistic Vlasov–Maxwell system with external currents”. In: *Math. Methods Appl. Sci.* 44.6 (2021), 4770–4801. DOI: 10.1002/mma.7070.
- [9] “Optimal control of the two-dimensional Vlasov–Maxwell system”. In: *ESAIM Control Optim. Calc. Var.* 27, S19 (2021). DOI: 10.1051/cocv/2020069.
- [10] (**with** S. Günther, J. Körner, T. Lebeda, B. Pötzl, G. Rein, and C. Straub). “A numerical stability analysis for the Einstein–Vlasov system”. In: *Classical Quantum Gravity* 38.3, 035003 (2021). DOI: 10.1088/1361-6382/abcbdf.

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- [11] “Confined steady states of the relativistic Vlasov–Maxwell system in an infinitely long cylinder”. In: *Kinet. Relat. Models* 13.6 (2020), 1135–1161. doi: 10.3934/krm.2020040.
- [12] (**with** P. Knopf). “Optimal control of a Vlasov–Poisson plasma by fixed magnetic field coils”. In: *Appl. Math. Optim.* 81.3 (2020), 961–988. doi: 10.1007/s00245-018-9526-5.
- [13] “Hot plasma in a container—an optimal control problem”. In: *SIAM J. Math. Anal.* 52.3 (2020), 2895–2929. doi: 10.1137/19M1275061.