

Benjamin Eichinger

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Research Interests

direct and inverse spectral theory of Jacobi matrices, universality phenomena for orthogonal polynomials and random matrices, Schrödinger operators, canonical systems, integrable systems, extremal problems of Chebyshev type

Education

- **Habilitation in Mathematics**, TU Wien, Austria 2025
Thesis: *Eigenvalue asymptotics of finite difference and differential operator*
- **Ph.D. in Mathematics**, Johannes Kepler University Linz, Austria 2017
Thesis: *Periodic GMP matrices and asymptotics of extremal polynomials for Chebyshev and Ahlfors problems in the complex plane*
Advisor: Peter Yuditskii
- **M.Sc. in Mathematics**, Johannes Kepler University Linz, Austria 2014
- **B.Sc. in Mathematics**, Johannes Kepler University Linz, Austria 2012

Academic Positions

- **Lecturer in Mathematics**, Lancaster University, UK 2024–Present
- **Postdoctoral Fellow**, TU Wien, Austria 2021–2024
- **Postdoctoral Fellow**, Johannes Kepler University Linz, Austria 2020–2021
funded by Erwin Schrödinger fellowship J 4138
- **Postdoctoral Fellow**, Rice University, USA 2019–2020
funded by Erwin Schrödinger fellowship J 4138
- **Postdoctoral Fellow**, Lund University, Sweden 2018–2019
funded by Erwin Schrödinger fellowship J 4138

Grants

- Research grant from FWF Austrian Science Fund, “Szegő theorems for semibounded subsets of the real axis”, €326.308, 2021–2025.
- Erwin Schrödinger fellowship awarded from FWF Austrian Science Fund, “Extremal polynomials on subsets of the unit circle”, €161.390, 2021–2025.

Teaching Experience

- Lecturer: **Further Calculus**, Lancaster University, 2024.
- Lecturer: **Orthogonal Polynomials**, TU Wien, 2023.
- Lecturer: **Introduction to Hardy Spaces**, TU Wien, 2022.

- Teaching Assistant: **Functional Analysis**, TU Wien, 2022.
- Lecturer: **Complex Analysis**, JKU Linz, 2020.
- Lecturer: **Calculus II**, Rice University, 2019.
- Teaching Assistant: Functional Analysis, Dynamical Systems and Chaos, Probability Theory and Statistics, Analysis, JKU Linz, 2014-2017

Conferences organized

- Organizer of conference: *Operator Theory and Approximation*, Vienna, Austria, July 2024
- Organizer of conference: *Complex Analysis, Spectral Theory and Approximation meet in Linz*, Linz, Austria, 2022
- Co-organizer of Mini-Symposia: *Extremal polynomials and almost periodicity* 15th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Hagenberg, Austria, 2019

Invited Talks

- **Plenary talk:** Extremal Polynomials and Dynamical Systems, Copenhagen, Denmark, 2025.
- **Invited talk:** North British Functional Analysis Seminars, Glasgow, UK, 2025.
- **Invited section talk:** International Congress on Mathematical Physics, Strasbourg, France, 2024
- **Plenary talk:** 17th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Granada, Spain, 2024
- **Plenary talk:** International Conference on Spectral Theory and Approximation, Lund, Sweden, 2023.
- **Plenary talk:** Contemporary Analysis and Its Applications, Portoroz, Slovenia, 2023.
- **Invited talk:** Øresund Seminar, Lund, Sweden, 2022.
- **Invited talk:** Workshop on Reflectionless Operators, Oberwolfach, Germany, 2017.
- **Invited talk:** 35th Annual Western States Mathematical Physics Meeting, Pasadena, California, 2017

Selected Seminar Talks

- *Eigenvalues for Schrödinger operators*, Kolloquium, TU Wien, Vienna, 2025
- *Universality Limits via Canonical Systems*, London Analysis and Probability Seminar, King's College, London, 2025
- *Necessary and sufficient conditions for universality limits*, Passare Day, Stockholm University, Sweden, 2024
- *Universality limits via canonical systems*, MathPhys Analysis Seminar, ISTA, Klosterneuburg, Austria, 2024
- *Universality limits via canonical systems*, IMPAN Functional Analysis Seminar, IMPAN, Warsaw, Poland, 2024

- *Necessary and sufficient conditions for universality limits*, Lancaster Pure Mathematics Seminar, UK, 2023
- *An approach to universality using Weyl m -functions*, KU Leuven Analysis Seminar, Belgium, 2022
- *Stahl–Totik regularity for continuum Schrödinger operators*, Stockholm Analysis Seminar, Sweden, 2020 (online)
- *Periodic coordinates for the isospectral torus of almost periodic CMV matrices*, Rice University Spectral Theory Seminar, Houston, Texas, 2019
- *Periodic coordinates for the isospectral torus of almost periodic CMV matrices*, Johannes Kepler University Linz Analysis Seminar, Austria, 2018
- *Periodic coordinates for the isospectral torus of almost periodic CMV matrices*, Universidad de Zaragoza Analysis Seminar, Saragossa, Spain, 2018
- *Chebyshev problems on Circular Arcs*, Centre de Recerca Matemàtica Seminar, Barcelona, Spain, 2018
- *The KdV hierarchy via Abelian coverings*, Lund University Analysis Seminar, Sweden, 2018
- *Chebyshev problems on a Circular Arc*, Rice University Geometry Analysis Seminar, Houston, Texas, 2017
- *Szegő–Widom asymptotics of Chebyshev Polynomials on Circular Arcs*, Lund University Analysis Seminar, Sweden, 2016
- *Killip–Simon Problem and Jacobi Flow on GMP matrices*, Vienna University of Technology Analysis Seminar, Austria, 2015

Selected Contributed Talks

- *Universality limits and homogeneous de Branges spaces*, IWOTA2024, Canterbury, United Kingdom, 2024
- *Universality limits via canonical systems*, ARNO2024, Leuven, Belgium, 2024
- *Universality limits with regularly varying scaling*, IWOTA2023, Helsinki, Finland, 2023
- *Universality limits with regularly varying scaling*, Orthogonal Polynomials and Applications, Leuven, Belgium, 2023
- *An approach to universality using Weyl m -functions*, IWOTA2022, Krakow, Poland, 2022
- *An approach to universality using Weyl m -functions*, Operator Theory 28, Timisoara, Romania, 2022
- *An approach to universality using Weyl m -functions*, Baylor Analysis Fest, Waco, Texas, 2022 (online)
- *Periodic coordinates for the isospectral torus of almost periodic CMV matrices*, 15th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Hagenberg, Austria, 2019
- *KdV Hierarchy via Abelian coverings and operator identities*, Mathematical Physics at the Crossings, Blacksburg, Virginia, 2019

- *Periodic coordinates for the isospectral torus of almost periodic CMV matrices*, International Conference on Orthogonal Polynomials and Holomorphic Dynamics, Copenhagen, Denmark, 2018
- *Chebyshev problems on Circular Arcs*, 14th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Canterbury, UK, 2017
- *Szegő-Widom asymptotics of Chebyshev Polynomials on Circular Arcs*, Harmonic Analysis, Complex Analysis, Spectral Theory and all that, Bedlewo, Poland, 2016
- *Killip-Simon Problem and the Jacobi Flow on GMP matrices*, 13th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Gaithersburg, USA, 2015

Languages

- German (native), English (fluent).

Publications

22. *A Weyl matrix perspective on unbounded non self-adjoint Jacobi matrices*, with M. Lukić and G. Young, preprint, arXiv:2503.03086.
21. *Asymptotics of L^r extremal polynomials for $0 < r < \infty$ on C^{1+} Jordan regions*, with B. Buchecker and M. Zinchenko, preprint, arXiv:2502.17616.
20. *On point spectrum of Jacobi matrices generated by iterations of quadratic polynomials*, with M. Lukić and P. Yuditskii, preprint, arXiv:2405.19470.
19. *Necessary and sufficient conditions for universality limits*, with M. Lukić and H. Woracek, preprint, arXiv:2409.18045.
18. *Homogeneous spaces of entire functions*, with H. Woracek, preprint, arXiv: 2407.04979.
17. *Extremal polynomials and polynomials preimages*, with J.S. Christiansen and O. Rubin, to appear in **Constr. Approx.**, arXiv: 2312.12992.
16. *Asymptotics for Christoffel functions associated to continuum Schrödinger operators*, **J. Anal. Math.**, 153 (2024), no. 2, 519–553.
15. *Limit-Periodic Dirac Operators with Thin Spectra*, with J. Fillman and E. Gwaltney and M. Lukić, **J. Funct. Anal.**, 283 (2022), no. 12, 35 pp.
14. *An approach to universality using Weyl m -functions*, with M. Lukić and B. Simanek, to appear in **Ann. of Math. (2)**, preprint, arXiv: 2108.01629
13. *Asymptotics of Chebyshev rational functions with respect to subsets of the real line*, with M. Lukić and G. Young, **Constr. Approx.**, 59 (2024), no. 3, 541–581.
12. *Stahl–Totik Regularity for Dirac Operators*, with E. Gwaltney and M. Lukić, preprint, arXiv:2012.12889
11. *Orthogonal rational functions with real poles, root asymptotics, and GMP matrices*, with M. Lukić and G. Young, **Trans. Amer. Math. Soc.**, 10, (2023).
10. *Pointwise Remez inequality*, with P. Yuditskii, **Constr. Approx.**, 54, (2021), 529–554
9. *Spectral properties of Schrödinger operators associated to almost minimal substitution systems*, with P. Gohlke, **Ann. Henri Poincaré**, 22, (2021), 1377–1427.
8. *Stahl–Totik regularity for continuum Schrödinger operators*, with M. Lukić, **Anal. PDE**, 18, (2025), 591–628.
7. *Szegő’s Theorem for Canonical Systems: the Arov Gauge and a Sum Rule*, with D. Damanik and P. Yuditskii, **J. Spectr. Theory**, 11, (2021), 1255–1277.
6. *Finite-gap CMV matrices: Periodic coordinates and a Magic Formula*, with J.S. Christiansen and T. VandenBoom, **Int. Math. Res. Not.**, (2020), 1–70
5. *KdV hierarchy via Abelian coverings and operator identities*, with T. VandenBoom and P. Yuditskii, **Trans. Amer. Math. Soc. Ser. B**, 6 (2019), 1–44.
4. *Ahlfors problem for polynomials*, with P. Yuditskii, special issues dedicated to the 150th anniversary of **Mat. Sb.**, 209, (2018), no. 3, 34–66.
3. *Szegő–Widom asymptotics of Chebyshev polynomials on Circular Arcs*, **J. Approx. Theory**, 217, (2017), 15–25.
2. *Periodic GMP matrices*, **SIGMA Symmetry Integrability Geom. Methods Appl.**, 12 (2016), 1–19.

1. *Jacobi Flow on SMP Matrices and Killip-Simon Problem on Two Disjoint Intervals*, with F. Puchhammer and P. Yuditskii, **Compt. Methods Funct. Theory**, 16, (2014), 3–41.