



Penelope Gehring

Contact Information

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Websites: Personal Websites at [Albert Einstein Institute](#) or at [University of Potsdam](#)

Social Network: [arxiv](#); [researchgate](#)

Research Interests

Dirac-type operators on curved spacetimes with timelike boundary: non-local boundary conditions, initial boundary value problems, Fredholmness, Index Theory

Asymptotically hyperbolic Riemannian manifolds: Bartnik extensions, stability questions of the Riemannian Penrose Inequality

Academic Degrees & Education

Since Oct. 2019 **University of Potsdam & Albert Einstein Institute Potsdam (Max Planck Institute for Gravitational Waves)**

PhD studies in Mathematics funded by the International Max Planck Research School ([IMPRS](#)) for Mathematical and Physical Aspects of Gravitation, Cosmology and Quantum Field Theory

Topic: Non-local boundary conditions for the Dirac operator on spacetimes with timelike boundary

Supervisor: Prof. Dr. Christian Bär

2nd supervisor: Prof. Dr. Jan Metzger

- 2017-2019 **University of Tübingen**
 Master of Science in Mathematical Physics
Thesis: Construction of higher dimensional asymptotically hyperbolic initial data sets with minimal boundary
Supervisor: Prof. Dr. Carla Cederbaum
2nd supervisor: Dr. Armando J. Cabrera Pacheco
- Winter 2018 **Université Pierre et Marie Curie (Sorbonne Paris)**
 Taking classes in M2 "Mathématiques Recherche" with **ERASMUS+**
- 2014-2017 **University of Tübingen**
 Bachelor of Science in Mathematics
Thesis: The Isoperimetric Inequality: Proofs by Convex and Differential Geometry
Supervisor: Prof. Dr. Carla Cederbaum

Teaching

- Summer 2020 **Boundary Value Problems and Index Theory** (Tutorial) at University of Potsdam
- Winter 2020 **Differential geometry I** (Tutorial) at University of Potsdam
- Winter 2019 **Introduction to Differential Geometry** (Tutorial) at University of Potsdam
- Summer 2019 **Analysis 4** (Tutorial) at University of Tübingen
- Winter 2018 **Analysis 3** (Tutorial) at University of Tübingen
- Summer 2017 **Analysis 2** (Tutorial) at University of Tübingen
- Winter 2017 **Class on Latex** at University of Tübingen
- Winter 2017 **Analysis 1** (Tutorial) at University of Tübingen

Publications & Preprints

- Bachelor's thesis Gehring, Penelope (2019): "The Isoperimetric Inequality: Proofs by Convex and Differential Geometry", Rose-Hulman Undergraduate Mathematics Journal: Vol. 20, no. 2, Article 4.
- Preprint Armando J. Cabrera Pacheco, Carla Cederbaum, Penelope Gehring, Alejandro Peñuela Diaz (2021): "Constructing electrically charged Riemannian manifolds with minimal boundary, prescribed asymptotics, and controlled mass"; under review for publication in AHP since 18th of August 2021; [arXiv:2106.14703](https://arxiv.org/abs/2106.14703)

Selection of Talks at Seminars & Conferences

Seminar Talks

- February 2022 **University of Tübingen / University of Potsdam**; "Geometric Analysis, Differential Geometry and Relativity" seminar series
- December 2021 **University of Basel**; "Bernoullis Tafelrunde" seminar series

- 2021 **Albert Einstein Institute Potsdam**; Seminar series organized by IMPRS; two times
- 2019-2021 **University of Potsdam**; Research Seminar of Christian Bär; four times
- [Conference Talks](#)
- February 2020 **10th Central European Relativity Seminar**; Potsdam
- Winter 2018 **Student conference of the German Mathematics Society**; Paderborn

Participation in Conferences & Workshops

In Persona

- Summer 2018 **Summer School on Minimal Surfaces, Flows, and Relativity**; University of Connecticut (USA); funded by the scholarship **PROMOS**
- Winter 2018 **8th Central European Relativity Seminar**; Masaryk University of Brno (Czech Republic)
- Summer 2017 **Summer School** "Between Geometry and Relativity" in Vienna (Austria); funded by the scholarship PROMOS

Online

- Winter 2022 11th Central European Relativity Seminar
- Winter 2022 Conference "Microlocal and Global Analysis, Interactions with Geometry"
- Winter 2021 12th Central European Relativity Seminar
- Winter 2021 Conference "Microlocal and Global Analysis, Interactions with Geometry"

Future Conferences

- Summer 2022 Conference "Dirac operators in Topology, Geometry and Representation Theory"; Cortona (Italy)
- Summer 2022 EWM-EMS Summer School "The Cauchy Problem in General Relativity"; Institut Mittag-Leffler (Sweden)

Other Engagement

- Since 2021 Managing the Twitter account of the Geometry working group of Christian Bär: [Geometry@Potsdam](#)
- Since 2021 Member of the priority programme of the DFG **SPP 2026 "Geometry at Infinity"** in project 37 "Boundary value problems and index theory on Riemannian and Lorentzian manifolds"
- 2017-2019 Helped as a guide in the Mathematics exhibition **"Mind and Shape"** at University of Tübingen
- 2017-2019 Participated in the mentoring program for women in the mathematics department at University of Tübingen
- 2017-2018 Organized a lecture series about job opportunities for mathematicians at University of Tübingen



Languages

German	Native Language
English	Fluent
French	Intermediate
Spanish	Elementary Proficiency