

Penelope Gehring

Contact Information

Address	University of Potsdam, Institute for Mathematics
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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

- 2019-2023 University of Potsdam & Albert Einstein Institute Potsdam (Max Planck Institute for Gravitational Physics)
- Defense Jan. PhD studies in Mathematics funded by the International Max Planck Research 2023 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
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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

Publications Penelope Gehring (2019): "The Isoperimetric Inequality: Proofs by Convex and Differential Geometry", Rose-Hulman Undergraduate Mathematics Journal: Vol. 20, no. 2, Article 4

Armando J. Cabrera Pacheco, Carla Cederbaum, Penelope Gehring, Alejandro Peñuela Diaz (2023): "Constructing electrically charged Riemannian manifolds with minimal boundary, prescribed asymptotics, and controlled mass"; Journal of Geometry and Physics, Volume 185

Preprint Christian Bär and Penelope Gehring (2022): "The Cauchy problem for Lorentzian Dirac operators under non-local boundary conditions"; arXiv:2210.15052

	Selection of Talks at Seminars & Conferences
	Seminar Talks
June 2022	KTH Royal Institute of Technology ; Research seminar organized by Klaus Kröncke
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
December 2022	Jeunes Mathématicien.ne.s en Géométrie et Analyse, Mulhouse (France)
October 2022	Geometric Analysis Past, Present, Future (GAPPF) Season 2; Online Conference
September 2022	DMV Annual Meeting 2022, Free University, Berlin
June 2022	EWM-EMS Summer School: The Cauchy Problem in General Relativity ; Mittag-Leffler Institute
February 2020	10th Central European Relativity Seminar; Potsdam
February 2018	Student conference of the German Mathematics Society (DMV); Pader- born
	Participation in Conferences & Workshops
	In Persona
September 2022	Global Analysis on Manifolds – A Conference in Honour of Prof. Chris- tian Bär; Freiburg (Germany)

- July 2022 Workshop on Microlocal Analysis & PDEs; London
- June 2022 Conference "Dirac operators in Topology, Geometry and Representation Theory"; Cortona (Italy)
- July 2018 Summer School on Minimal Surfaces, Flows, and Relativity; University of Connecticut (USA); funded by the scholarship PROMOS
- February 2018 **8th Central European Relativity Seminar**; Masaryk University of Brno (Czech Republic)
 - July 2017 **Summer School** "Between Geometry and Relativity" in Vienna; funded by the scholarship PROMOS

Online

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

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

Further Skills

Office Word, Excel, Powerpoint, LaTex

Coding Sage, Mathematica