Benedikt Gräßle

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Degrees

10/2024 **Ph.D. in Mathematics (Dr. rer. nat.; summa cum laude)**,
Humboldt-Universität zu Berlin, Germany (supervised by Prof. Carsten Carstensen)
Thesis: *A posteriori nonconforming finite element error analysis for fourth-order problems with quadratic semilinearity*

08/2021 **M.Sc. in Mathematics**, Humboldt-Universität zu Berlin, Germany
Thesis: *Conforming multilevel FEM for the biharmonic equation*

12/2019 **B.Sc. in Computer Science**, Humboldt-Universität zu Berlin, Germany

09/2019 **B.Sc. in Mathematics**, Humboldt-Universität zu Berlin, Germany

Employment

10/2024 – present **Postdoctoral Researcher**, Universität Zürich, Switzerland

01/2022 – 09/2024 **Research assistant**, Humboldt-Universität zu Berlin, Germany

11/2021 – 12/2021 **Research assistant**, Universität Zürich, Switzerland

10/2018 – 09/2021 **Student assistant**, Humboldt-Universität zu Berlin, Germany

Education

01/2022 – 09/2024 **Ph.D.** at Humboldt-Universität zu Berlin, **BMS phase II** at Berlin Mathematical School

09/2017 – 06/2018 **Erasmus+ exchange** (Mathematics and Computer Science), Imperial College London, UK

10/2015 – 09/2021 **Undergraduate studies** (Mathematics and Computer Science), Humboldt-Universität zu Berlin

2005 – 2014 **Secondary School**, Gymnasium Elmschenhagen, Kiel

Research visits

03/2026 – 05/2026 **Research visit (3 months) of Prof. Michael Feischl**, Technical University of Vienna, Austria

03/2024 **Research visit (2 weeks) of Prof. Xuefeng Liu**, Tokyo Women's Christian University, Japan

09/2022 **Research visit (1 month) of Prof. Neela Nataraj**, IIT Bombay, Mumbai, India

Awards and Scholarships

2026 – 2029 **Elected member** of the EMYA, the European Mathematics Society (EMS) Young Academy

2025 – 2027 **Elected member** of the GAMM Juniors, the GAMM's council of young researchers

2024 **BMS Certificate of Distinction** for Ph.D. thesis, Berlin Mathematical School (BMS)

2024 **"Best presentation" award**, LACAM 2024

04/2018 – 09/2021 **Scholarship**, *Studienstiftung des deutschen Volkes*

09/2017 – 06/2018 **Exchange scholarship**, *Erasmus+*

04/2017 – 03/2018 **Scholarship**, *Deutschlandstipendium*

2014 **DMV Abiturpreis (High School Award)**, German Mathematical Society

Teaching

09/2025 – 12/2025 **Numerical methods for elliptic and parabolic PDE**, Universität Zürich
Lecturer (4 SWS, hours per week), English course language

02/2025 – 05/2025 **Mathematical modeling**, Universität Zürich
Lecturer (2 SWS), German

04/2024 – 07/2024 **Partial differential equations**, Humboldt-Universität zu Berlin
Tutorial class instructor (2 SWS), English

10/2023 – 02/2024 **Analysis and its relation to computer science**, Humboldt-Universität zu Berlin
Tutorial class instructor (4 SWS), German

04/2023 – 07/2023 **Numerical mathematics and optimisation**, Humboldt-Universität zu Berlin
Tutorial class instructor (2 SWS), German

10/2022 – 02/2023 **Theory and numerical analysis of time evolution problems**, Humboldt-Universität zu Berlin
Tutorial class instructor (2 SWS), English

Supervision of students and theses

10/2025 – 03/2026 **Co-Supervision of M.Sc. thesis**, University of Zurich
Thesis title: *Green's function for acoustic problems in layered media*

10/2025 – present **Supervision of M.Sc. thesis (ongoing)**, University of Zurich
Topic: *Solution existence verification for semilinear problems*

11/2025 – present **Supervision of student project (ongoing)**, University of Zurich
Project in Numerical Analysis / Mixed Finite Element Methods

Presentations

Invited lectures at conferences and seminars

02/2026 **Invited Lecture**, BMS Student Conference, Berlin, Germany

09/2025 **Analysis Seminar**, Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland

06/2025 **Departmental Seminar**, City University Hong Kong, Hong Kong

05/2025 **Departmental Seminar**, Universität Duisburg-Essen, Germany

03/2024 **Research Seminar**, Tokyo Women's Christian University (TWCU) Tokyo, Japan

02/2024 **Departmental Seminar**, City University Hong Kong, Hong Kong

Invited talks at minisymposia and workshops

07/2026 **Minisymposium on *Advancements in Computational Wave Problems and Related Applications* (planned)**, Computational Methods in Applied Mathematics (CMAM) 2026, Vienna, Austria

07/2025 **Minisymposium on *Numerical methods for complex wave propagation problems***, International Conference on Spectral and High Order Methods (ICOSAHOM) 2025, Montreal, Canada

06/2024 **Minisymposium on *Recent developments in numerical PDE***, Computational Methods in Applied Mathematics (CMAM) 2024, Bonn, Germany

03/2024 **Workshop on *Advanced Finite Element Methods for Nonlinear PDE***, Tsinghua Sanya International Mathematics Forum (TSIMF) 2024, Sanya, China

08/2023 **Minisymposium on *PDE Eigenvalue Problems: Computational Modeling and Numerical Analysis***, International Council for Industrial and Applied Mathematics (ICIAM) 2023, Tokyo, Japan

08/2023 **Minisymposium on *Hybrid High-Order Methods***, International Conference on Spectral and High Order Methods (ICOSAHOM) 2023, Seoul, South Korea

Contributed talks

07/2025 International Conference on Spectral and High Order Methods (ICOSAHOM) 2025, Montreal, Canada

02/2024 Latest Advances in Computational and Applied Mathematics (LACAM) 2024, IISER Thiruvananthapuram, Kerlala, India

08/2023 Numerical methods for spectral problems (NMSP) 2023, Kushiro, Japan

09/2022 International Conference on Computational Partial Differential Equations & Applications (ICCPDEA-2022), Dehli, India

09/2022 Computational Methods in Applied Mathematics (CMAM) 2022, Vienna, Austria

Publications

Preprints

[1] **B. Gräßle**, "Optimal trace norms for Helmholtz problems," Submitted to *Analysis and Applications*, 2025. arXiv:2506.11944.

[2] **B. Gräßle**, R. Hiptmair, and S. A. Sauter, "Stable skeleton integral equations for general coefficient Helmholtz transmission problems," Submitted to *Communications in Partial Differential Equations*, 2025. arXiv:2507.00991.

[3] **B. Gräßle** and S. A. Sauter, "Dirichlet-to-Neumann operator for the Helmholtz problem with general wavenumbers on the n-sphere," Submitted to *Partial Differential Equations and Applications*, 2025. arXiv:2503.18837.

2026

[1] C. Carstensen, **B. Gräßle**, and Q. Zhai, "Higher-order guaranteed lower biharmonic eigenvalue bounds," *Computer Methods in Applied Mechanics and Engineering*, vol. 451:118617, Apr. 2026. URL: https://linkinghub.elsevier.com/retrieve/pii/S0045782525008898.

2025

[1] N.-E. Bohne, **B. Gräßle**, and S. A. Sauter, "Pressure-improved Scott–Vogelius type elements," *Calcolo*, vol. 62:8, no. 1, p. 33, Mar. 2025. URL: https://link.springer.com/10.1007/s10092-024-00627-8.

[2] C. Carstensen and **B. Gräßle**, "Adaptive Morley FEM for 2D stationary Navier-Stokes," *Mathematics of Computation*, vol. 95, no. 358, pp. 613–645, Mar. 2025. URL: https://www.ams.org/mcom/2026-95-358/S0025-5718-2025-04069-9/.

[3] C. Carstensen and **B. Gräßle**, "Optimal convergence rates of adaptive WOPSIP from superclose nonconforming FEM," *Mathematics of Computation*, published electronically, Mar. 2025. URL: https://www.ams.org/mcom/0000-000-00/S0025-5718-2025-04082-1/.

[4] C. Carstensen, **B. Gräßle**, and E. Pirch, "Comparison of guaranteed lower eigenvalue bounds with three skeletal schemes," *Computer Methods in Applied Mechanics and Engineering*, vol. 433:117477, Jan. 2025. URL: https://linkinghub.elsevier.com/retrieve/pii/S004578252400731X.

2024

[1] C. Carstensen and **B. Gräßle**, "Rate-optimal higher-order adaptive conforming FEM for biharmonic eigenvalue problems on polygonal domains," *Computer Methods in Applied Mechanics and Engineering*, vol. 425:116931, May 2024. URL: https://linkinghub.elsevier.com/retrieve/pii/S0045782524001877.

[2] C. Carstensen, **B. Gräßle**, and N. Nataraj, "A posteriori error control for fourth-order semilinear problems with quadratic nonlinearity," *SIAM Journal on Numerical Analysis*, vol. 62, no. 2, pp. 919–945, Apr. 2024. URL: https://epubs.siam.org/doi/10.1137/23M1589852.

[3] C. Carstensen, **B. Gräßle**, and N. Nataraj, "Unifying a posteriori error analysis of five piecewise quadratic discretisations for the biharmonic equation," *Journal of Numerical Mathematics*, vol. 32, no. 1, pp. 77–109, 2024. URL: https://www.degruyter.com/document/doi/10.1515/jnma-2022-0092/html.

[4] C. Carstensen, **B. Gräßle**, and N. T. Tran, "Adaptive hybrid high-order method for guaranteed lower eigenvalue bounds," *Numerische Mathematik*, vol. 156, no. 3, pp. 813–851, Jun. 2024. URL: https://link.springer.com/10.1007/s00211-024-01407-w.

[5] **B. Gräßle**, N.-E. Bohne, and S. A. Sauter, "The pressure-wired Stokes element: A mesh-robust version of the Scott–Vogelius element," *Numerische Mathematik*, vol. 156, no. 5, pp. 1781–1807, Oct. 2024. URL: https://link.springer.com/10.1007/s00211-024-01430-x.

2023

[1] F. Bertrand, C. Carstensen, **B. Gräßle**, and N. T. Tran, "Stabilization-free HHO a posteriori error control," *Numerische Mathematik*, vol. 154, no. 3-4, pp. 369–408, Aug. 2023. URL: https://link.springer.com/10.1007/s00211-023-01366-8.

2022

[1] **B. Gräßle**, "Optimal multilevel adaptive FEM for the Argyris element," *Computer Methods in Applied Mechanics and Engineering*, vol. 399:115352, Sep. 2022. URL: https://linkinghub.elsevier.com/retrieve/pii/S0045782522004352.

Theses

[1] **B. Gräßle**, "A posteriori nonconforming finite element error analysis for fourth-order problems with quadratic semilinearity," Ph.D. dissertation, Humboldt-Universität zu Berlin, Aug. 2025. URL: https://edoc.hu-berlin.de/handle/18452/35086.

[2] **B. Gräßle**, "Conforming multilevel FEM for the biharmonic equation," M.S. thesis, Humboldt-Universität zu Berlin, Mathematisch-Naturwissenschaftliche Fakultät, 2022. URL: http://dx.doi.org/10.18452/24833.

Software

[1] **B. Gräßle**, *AFEM.jl (v0.1)*, Julia library for adaptive finite element methods, Oct. 2024. URL: https://zenodo.org/doi/10.5281/zenodo.13998868.

Academic service

Referee for *IMA Journal of Numerical Analysis*, *Journal of Numerical Mathematics*, *Journal of Scientific Computing*, and *GAMM Archive for Students*