



Tim van Beeck

Ph.D. Student · Numerical mathematics

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Scientific biography

I am a Ph.D. student in Applied Mathematics at the University of Göttingen, supervised by Christoph Lehrenfeld. My research focuses on the numerical analysis of partial differential equations. I am currently working on the discretization of time-harmonic wave propagation problems arising in nematoacoustics and helioseismology.

Education

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| since 01/2024 | Ph.D. in Mathematics , University of Göttingen.
<i>Supervisor:</i> Christoph Lehrenfeld. |
| 12/2021 - 12/2023 | M.Sc. in Mathematics , University of Göttingen, Grade: 1.0 (with distinction).
<i>Thesis:</i> On stable discontinuous Galerkin discretizations for Galbrun's equation.
<i>Supervisor:</i> Christoph Lehrenfeld. |
| 10/2017 - 12/2021 | B.Sc. in Mathematics , University of Göttingen, Grade: 2.3.
<i>Thesis:</i> On a Discontinuous Galerkin discretization for a degenerate diffusion equation.
<i>Supervisor:</i> Christoph Lehrenfeld. |
| 2009 - 2017 | Secondary school (Abitur), Gymnasium Corvinianum Northeim. |

Experience

Positions:

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| since 01/2024 | Research assistant , University of Göttingen, Germany. |
| 11/2021 - 12/2023 | Student assistant , University of Göttingen, Germany. |

Teaching:

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| 10/2023 - 03/2024 | Partial differential equations (University of Göttingen, tutorial class, 2SWS). |
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Publications

Preprints:

- [1] E. Burman, J. Preuss, **T. van Beeck**, *Variational data assimilation for the wave equation in heterogeneous media*. arXiv:2509.13108.
- [2] M. Halla, C. Lehrenfeld, **T. van Beeck**, *Hybrid discontinuous Galerkin discretizations for the damped time-harmonic Galbrun's equation*. arXiv:2504.09547.
- [3] P. E. Farrell, **T. van Beeck**, U. Zerbinati, *Analysis and numerical analysis of the Helmholtz–Korteweg equation*. arXiv:2503.10771.
- [4] **T. van Beeck**, U. Zerbinati, *An adaptive mesh refinement strategy to ensure quasi-optimality of finite element methods for self-adjoint Helmholtz problems*. arXiv:2403.06266.

Journal articles:

- [1] C. Lehrenfeld, **T. van Beeck**, I. Voulis, *Analysis of divergence-preserving unfitted finite element methods for the mixed Poisson problem*. Math. Comp. 94 (2025), 1667–1699, DOI: 10.1090/mcom/4027.

Scientific exchange

Research visits:

10/2025	University of Oxford, United Kingdom, working with Umberto Zerbinati.
12/2024	Pavia, Italy, working with Umberto Zerbinati.
01/2024 - 03/2024	UCL London, United Kingdom, working with Erik Burman & Janosch Preuss <i>Topic: Variational data assimilation for the wave equation in heterogeneous media.</i>

Conference talks:

09/2025	ENUMATH 2025, Heidelberg, Germany, <i>Divergence-preserving unfitted FEM for the mixed Poisson problem.</i>
05/2025	EFEF 2025, Trieste, Italy, <i>Pressure-robustness in an axisymmetric setting.</i>
02/2025	Wave Phenomena 2025, Karlsruhe, Germany, <i>Learned infinite elements for the vector-valued Galbrun's equation.</i>
11/2024	GAMM Numerical Analysis, Augsburg, Germany, <i>Hybrid discontinuous Galerkin discretizations of Galbrun's equation.</i>
09/2024	FEM Symposium 2024, Chemnitz, Germany, <i>Divergence-preserving unfitted FEM for the mixed Poisson problem.</i>
07/2024	WCCM 2024, Vancouver, Canada, <i>Divergence-preserving unfitted FEM for the mixed Poisson problem.</i>
06/2024	WAVES 2024, Berlin, Germany, <i>Stable hybrid discontinuous Galerkin discretization for Galbrun's equation.</i>
06/2024	EFEF 2024, London, United Kingdom, <i>Ensuring quasi-optimality for the Helmholtz problem.</i>
05/2023	EFEF 2023, Enschede, Netherlands, <i>Unfitted Mixed Finite Element Methods.</i>
06/2022	41th NoKo, Hannover, Germany, <i>Unfitted Mixed Finite Element Methods.</i>

Administrative work

04/2024 - 03/2027	Managing board of the institute for numerical and applied mathematics (representing scientific employees).
04/2025 - 03/2026	Deputy PhD students representative (Faculty of Computer Science & Mathematics).