

# Umberto Zerbinati

## Curriculum Vitae

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### Education

- 2022–present **DPhil in Mathematics, University of Oxford, Oxford, United Kingdom**  
**Supervisors:** Prof. Patrick E. Farrell.
- 2020–2022 **Master Degree in Applied Mathematics, KAUST, Thuwal, Saudi Arabia**  
**Thesis Title:** A Priori Error Analysis For A Penalty Finite Element Method  
**Supervisors:** Prof. Daniele Boffi, GPA: 3.74/4.
- 2016–2020 **Bachelor Degree in Mathematics, University of Pavia, Pavia, Italia**  
**Thesis Title:** Second Order Finite Difference Methods For The Wave Equation With Dirichlet Boundary Conditions  
**Supervisors:** Prof. Andrea Moiola and Prof. Ilaria Perguia, Graduation Grade: 106/110.
- 2019 **Erasmus+ Traineeship, University of Vienna, Vienna, Austria**  
**Research Topic:** Numerical solution of the wave equation.
- 2016–2019 **Collegio Ghislieri, Pavia, Italia**

### Teaching Experience

- 2025–present **Stipendary Lecturer, Oriel College, Oxford**
- Michaelmas 2023 **TA for Applied Partial Differential Equations (B5.2), Mathematical Institute, Oxford**  
**Lecturer:** Prof. Andreas Muench.
- Michaelmas 2023 **Tutor for Metric Spaces and Complex Analysis (A2), Wadham college, Oxford**  
**Lecturer:** Prof. Dmitry Belyaev and Prof. Panagiotis Papazoglou.
- Hilary and Trinity 2023 **Tutor for Numerical Analysis (A7), Magdalen College, Oxford**  
**Lecturer:** Prof. Andrew Wathen.
- Michaelmas 2022 **TA for Numerical Linear Algebra (C6.1), Mathematical Institute, University of Oxford**  
**Lecturer:** Prof. Yuji Nakatsukasa.

### Research Visit

- March 2023 **University of Catania, Working with Prof. Giovanni Russo**  
**Research Topic:** Particle pushers for non-Hamiltonian systems.
- December 2019 **University of Vienna, Working with Prof. Anastasia Molchanova**  
**Research Topic:** Finite element discretisations for elasticity.

### Software Development

	Level	Skill	Comment
Language:	■■■■■	Python	I contribute to software libraries PETSc and Firedrake. I develop and maintain my own software library, ngsPETSc.

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## References

- [1] Clarissa Astuto, Daniele Boffi, Giovanni Russo, and Umberto Zerbinati. A nodal ghost method based on variational formulation and regular square grid for elliptic problems on arbitrary domains in two space dimensions. *arXiv preprint (2402.04048)*, 2024.
- [2] Clarissa Astuto, Armando Coco, and Umberto Zerbinati. A comparison of the coco-russo scheme and  $\mathbb{P}_1$ -FEM for elliptic equations in arbitrary domains. *arXiv preprint (2405.16582)*, 2024.
- [3] Patrick E. Farrell, Giovanni Russo, and Umberto Zerbinati. Kinetic derivation of an inviscid compressible Leslie-Ericksen equation for rarified calamitic gases. *Multiscale Modeling and Simulation*, 2024.
- [4] Patrick E. Farrell and Umberto Zerbinati. Time-harmonic waves in Korteweg and nematic-Korteweg fluids. *arXiv preprint (2411.13354)*, 2024.
- [5] Manuel Trezzi and Umberto Zerbinati. When rational functions meet virtual elements: the lightning virtual element method. *Calcolo*, 61(3):35, Jun 2024.
- [6] Tim van Beeck and Umberto Zerbinati. An adaptive mesh refinement strategy to ensure quasi-optimality of the conforming finite element method for the Helmholtz equation via T-coercivity. *arXiv preprint (2403.06266)*, 2024.
- [7] Stefano Zampini, Umberto Zerbinati, George Turkyiah, and David Keyes. PETScML: Second-order solvers for training regression problems in scientific machine learning. In *Proceedings of the Platform for Advanced Scientific Computing Conference, PASC '24*, New York, NY, USA, 2024. Association for Computing Machinery.
- [8] Umberto Zerbinati. PINNs and GaLS: A priori error estimates for shallow physics informed neural networks applied to elliptic problems. *IFAC-PapersOnLine*, 55(20):61–66, 2022. 10th Vienna International Conference on Mathematical Modelling MATHMOD 2022.