

Ioannis P. A. Papadopoulos

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EMPLOYMENT

Hooke Research Fellow, <i>University of Oxford</i>	start date Jan. 2026
BMS Dirichlet Fellow, <i>Weierstrass Institute Berlin</i>	Nov. 2023 – date
· Research interests: nonlinear partial differential equations, quasi-variational inequalities, topology optimization, numerical analysis, scientific computing, finite element methods.	
Research Associate, <i>Imperial College London</i>	Jul. 2021 – Nov. 2023
· EPSRC Grant: <i>Spectral element methods for fractional differential equations, with applications in applied analysis and medical imaging</i> , PI: Dr Sheehan Olver.	
· Leverhulme Trust Research Project Grant: <i>Constructive approximation theory on and inside algebraic curves and surfaces</i> .	
The MathWorks, Inc., Cambridge	2019 – 2020
· Two summer placements, with the GPU & deep learning group and the parallel toolbox group.	

EDUCATION

PhD in Mathematics, <i>University of Oxford</i> , viva date: 24 Sep. 2021	2017 – 2021
· Title: <i>Computing multiple solutions of topology optimization problems</i> .	
· Supervisors: Prof. Patrick Farrell and Prof. Endre Süli.	
· EPSRC Centre for Doctoral Training in Partial Differential Equations.	
MSc in Mathematical Modelling and Scientific Computing, <i>University of Oxford</i> (Distinction)	2016 – 2017
· Dissertation: <i>Computing and controlling transitions in multi-stable partial differential equations</i> supervised by Prof. Patrick Farrell.	
BSc in Mathematics, <i>Imperial College London</i> (First Class Honours)	2013 – 2016

NOTABLE PRIZES

· IMA Leslie Fox Prize in Numerical Analysis , second place, for the numerical analysis of divergence-free finite element methods for the topology optimization of fluids.	2023
· MathWorks PhD scholarship	2017–2021
· Oxford three-minute thesis competition (first place)	2019
· Durham Prize , awarded by Keble College for performance during an MSc.	2017
· Gerald Whitrow Prize , awarded for excellence during the final undergraduate examinations.	2016
· Dean's List , awarded to the top 10% of the cohort.	2016
· London Mathematical Society undergraduate research bursary.	2015
· Imperial College London Undergraduate Research Bursary.	2014

SUPERVISING & TEACHING

Guest Lecturer, Department of Mathematics, Imperial College London 2023

- “Finite elements: numerical analysis” (Part 1, MATH60022).

Co-supervisor, Department of Mathematics, Imperial College London 2021– 2022

- Co-supervised two 4th year undergraduate dissertations.
- Co-supervised a 2nd year group project on deflation who won the **Winton Capital Second Year Project Prize**.

Teaching Assistant/Tutor, Mathematical Institute, University of Oxford 2018 – 2021

- Courses: continuous optimization (year 3/4 course), numerical linear algebra (year 3/4 course), functional analysis I (year 3 course), numerical solution of differential equations I (year 3 course), numerical solution of differential equations II (year 3 course), scientific computing and numerical analysis of PDEs (PhD course), further PDEs (MSc course).
- Marking and presenting solutions of problems to students.

Tutor, Oxford Study Abroad Programme, University of Oxford 2020 – 2021

- Continuous Optimization - one-on-one tutoring covering the UCLA syllabus in 8 weeks.

MATHEMATICAL ENGAGEMENT

- Organizer of the Research Group 8 seminars at WIAS 2024–date
- Assistant in the Imperial-UCL Numerical Analysis Seminars 2022–2023
- Organizer of minisymposia at CSE23 and Biennial NA conferences 2023
- President of the University of Oxford SIAM Student Chapter 2020–2021
- Founder of the Oxford numerical analysis reading group 2019–date
- Peer reviewer for Foundations of Computational Mathematics, SIAM Journal on Scientific Computing, SIAM Journal on Numerical Analysis, SIAM Journal on Optimization, Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales, Optimization Methods and Software, Structural and Multidisciplinary Optimization, Computer Methods in Applied Mechanics and Engineering, and Journal of Scientific Computing

TALKS

Highlighted talks (selected from over 50 presentations):

The latent variable proximal point algorithm for variational problems with inequality constraints

- Biennial Numerical Analysis Conference in Glasgow, UK June 2025

Numerical analysis of a topology optimization problem for Stokes flow/linear elasticity

- IMA Leslie Fox Prize Competition (second place) June 2023

A sparse hp -finite element method for rectangles, disks, annuli, and cylinders

- CSE25 in Fort Worth, Texas, USA March 2025
- Bath Numerical Analysis Seminar October 2023
- Flatiron Institute (New York) July 2023

Sparse spectral methods for fractional PDEs

- ICOSAHOM 2023 August 2023
- University of Leicester CSE Mathematics Seminar October 2022

Computing multiple solutions of topology optimization problems

- RICAM Special Workshop in Linz, Austria October 2025
- USNCCM17 in Albuquerque, New Mexico July 2023

- [15] A. Alphonse, P. Dvurechensky, **I. P. A. Papadopoulos**, C. Sirotenko, *LeAP-SSN: a semismooth Newton method with global convergence rates*, (2025), <https://arxiv.org/abs/2508.16468>.
- [14] **I. P. A. Papadopoulos**, *Hierarchical proximal Galerkin: a fast hp-FEM solver for variational problems with pointwise inequality constraints*, (2024), <https://arxiv.org/abs/2412.13733>.
- [13] A. Alphonse, C. Christof, M. Hintermüller, **I. P. A. Papadopoulos**, *A globalized inexact semismooth Newton method for nonsmooth fixed-point equations involving variational inequalities*, (2024), <https://arxiv.org/abs/2409.19637>.
- [12] K. Knook, S. Olver, **I. P. A. Papadopoulos**, *Quasi-optimal complexity hp-FEM for Poisson on a rectangle*, (2024), <https://arxiv.org/abs/2402.11299>.
- [11] T. S. Gutleb, **I. P. A. Papadopoulos**, *Explicit fractional Laplacians and Riesz potentials of classical functions*, (2023), <https://arxiv.org/abs/2311.10896>.

PUBLICATIONS

- [10] **I. P. A. Papadopoulos**, T. S. Gutleb, J. A. Carrillo, S. Olver, *A frame approach for equations involving the fractional Laplacian*, IMA Journal of Numerical Analysis (2025), <https://doi.org/10.1093/imanum/draf086>.
- [9] Jørgen S. Dokken, Patrick E. Farrell, Brendan Keith, **I. P. A. Papadopoulos**, Thomas M. Surowiec, *The latent variable proximal point algorithm for variational problems with inequality constraints*, Computer Methods in Applied Mechanics and Engineering (2025), <https://doi.org/10.1016/j.cma.2025.118181>.
- [8] **I. P. A. Papadopoulos**, S. Olver, *A sparse hierarchical hp-finite element method on disks and annuli*, Journal of Scientific Computing (2025), <https://doi.org/10.1007/s10915-025-02964-4>.
- [7] **I. P. A. Papadopoulos**, *Numerical analysis of the SIMP model for the topology optimization problem of minimizing compliance in linear elasticity*, Numerische Mathematik, 1–36 (2024), <https://doi.org/10.1007/s00211-024-01438-3>.
- [6] **I. P. A. Papadopoulos**, T. S. Gutleb, R. M. Slevinsky, S. Olver, *Building hierarchies of semiclassical Jacobi polynomials for spectral methods in annuli*, SIAM Journal on Scientific Computing, 46(6), pp. A3448-A3476 (2024), <https://doi.org/10.1137/23M160846X>.
- [5] **I. P. A. Papadopoulos**, S. Olver, *A sparse spectral method for fractional differential equations in one-spatial dimension*, Advances in Computational Mathematics, 50, 69 (2024), <https://doi.org/10.1007/s10444-024-10164-1>.
- [4] **I. P. A. Papadopoulos**, P. E. Farrell, *Preconditioners for computing multiple solutions in three-dimensional fluid topology optimization*, SIAM Journal on Scientific Computing, 45 (2023), pp. B853-B883, <https://doi.org/10.1137/22M1478598>.
- [3] **I. P. A. Papadopoulos**, *Numerical analysis of a discontinuous Galerkin method for the Borrvall-Petersson topology optimization problem*, SIAM Journal on Numerical Analysis, 60 (2022), pp. 2538–2564, <https://doi.org/10.1137/21M1438943>.
- [2] **I. P. A. Papadopoulos**, E. Süli, *Numerical analysis of the topology optimization of Stokes flow*, Journal of Computational and Applied Mathematics, 12 (2022), p. 114295, <https://doi.org/10.1016/j.cam.2022.114295>.
- [1] **I. P. A. Papadopoulos**, P. E. Farrell, T. M. Surowiec, *Computing multiple solutions of topology optimization problems*, SIAM Journal on Scientific Computing, 43 (2021), pp. A1555–A1582, <https://doi.org/10.1137/20M1326209>.

SOFTWARE

- I. P. A. Papadopoulos, *HierarchicalProximalGalerkin.jl: a hp-FEM solver for the variational problems with inequality constraints*, (2024), [HierarchicalProximalGalerkin.jl](#).
- I. P. A. Papadopoulos, *SemismoothQVIIs.jl: a semismooth Newton method for obstacle-type quasivariational inequalities*, (2024), [SemismoothQVIIs.jl](#).
- I. P. A. Papadopoulos, *RadialPiecewisePolynomials.jl: an hp-finite element method for disks and annuli*, (2024), [RadialPiecewisePolynomials.jl](#).
- I. P. A. Papadopoulos, S. Olver, *AnnuliOrthogonalPolynomials.jl: multivariate orthogonal polynomials on the annulus*, (2023), [AnnuliOrthogonalPolynomials.jl](#).
- I. P. A. Papadopoulos, *FractionalFrames.jl: a spectral method for solving fractional differential equations*, (2023), [FractionalFrames.jl](#).
- I. P. A. Papadopoulos, P. E. Farrell, *fir3dab: software for the computation of multiple solutions in three dimensions of topology optimization problems*, (2022), [fir3dab](#).
- I. P. A. Papadopoulos, P. E. Farrell, *deflatedbarrier: software for the computation of multiple solutions of topology optimization problems*, (2021), [deflatedbarrier](#).