Jeremy G. Hoskins

| Contact Information | Department of Statistics University of Chicago 5747 South Ellis Avenue Chicago, Illinois, USA | (734)389-5876 jeremyhoskins@uchicago.edu http://www.jghoskins.com |
|------------------------|---|---|
| Research Interests | Numerical analysis, inverse problems, mathematical physics, optics | |
| Employment | 7/2020- Assistant Professor, University of Chicago7/2017-7/2020 Gibbs Assistant Professor, Yale University | |
| Education | 09/2012-05/2017 Ph.D., Mathematics, University of Michigan with A. Gilbert and J. Schotland | |
| | 09/2011-12/2012 M.Sc., Mathematics, University of British Columbia with G. Bluman and A. Shevyakov | |
| | 07/2007-05/2011 B.Sc., Hono Columbia | rs Mathematics and Physics, University of British |
| Selected awards | • US National Academy of Science Kavli Fellow (2022) | |
| | • Proquest Distinguished Dissertation Award (2017) | |
| | • Peter Smereka Prize (best . (2017) | Applied Mathematics thesis), University of Michigan |
| | • Rackham Predoctoral Fello | wship (2014-2015) |
| | • NSERC Postgraduate Scho | larship PGS D (2014-2015) |
| | • Rackham International Stu | dent Fellowship (2013) |
| Publications | Hoskins JG, Quan H, & S landscape functions to appea (2024). | teinerberger S. Magnetic Schrödinger operators and ar - Communications in Partial Differential Equations |
| | 2. Askham T, Borges C, Hosk the reconstruction of obsta of Scientific Computing (20 | ins JG, & Rachh M. Random walks in frequency and cles with cavities from multi-frequency data <i>Journal</i> 24). |
| | 3. Hur Y, Hoskins JG, Lindsey via tensor train sketching A | y M, Stoudenmire EM, Khoo Y. Generative modeling pplied and Computational Harmonic Analysis (2023). |
| | 4. Bal G, Hoskins JG, & Wa models of topological insula | ng Z. Asymmetric transport computations in Dirac ators <i>Journal of Computational Physics</i> (2023). |
| | 5. Hoskins JG, Rachh M, & S antichiral waveguide arrays | chotland JC. Quantum electrodynamics of chiral and $Optics \ Letters \ (2023).$ |
| | 6. Hoskins JG, Kaye J, Rach method for the simulation of of Computational Physics (| hh M, Schotland JC. A fast, high-order numerical of single-excitation states in quantum optics. <i>Journal</i> 2023). |
| | 7. Chen Y, Hoskins JG, Kho networks. <i>Journal of Comp</i> | o Y, & Lindsey M. Committor functions via tensor <i>vutational Physics</i> (2023). |
| | Greengard P, Hoskins JG, for posterior inference of tw (2023). | Margossian C, Gelman A, Vehtari A. Fast methods wo-group normal-normal models. <i>Bayesian Analysis</i> |

- 9. Hoskins JG, Schotland JC. Analysis of the inverse Born series: an approach through geometric function theory. *Inverse Problems: Emerging Talents special issue* (2022).
- Hoskins JG, & Steinerberger S. A Semicircle Law for Derivatives of Random Polynomials. International Mathematics Research Notices (2022)
- Hoskins JG, & Kabluchko Z. Dynamics of zeroes under repeated differentiation. Experimental Mathematics (2021)
- Hoskins JG,& Rachh M. On the discretization of Laplace's equation with Neumann boundary conditions on polygonal domains. *Journal of Computational Physics: X* (2020)
- 13. Hoskins JG, & Steinerberger S. Towards Optimal Gradient Bounds for the Torsion Function in the Plane. *Journal of Geometric Analysis* (2020)
- Chung FJ, Hoskins JG, & Schotland JC. A Transport Model for Multi-Frequency Acousto-Optic Tomography. *Inverse Problems* (2020), 36.
- Chung FJ, Hoskins JG, & Schotland JC. On the Transport Method for Hybrid Inverse Problems. In Mathematical & Numerical Approaches for Multi-Wave Inverse Problems L. Beilina et al. (eds.) Springer, (2020).
- Hoskins JG & Rachh, M. On the solution of Laplace's equation in the vicinity of triple-junctions. *Pure and Applied Analysis* (2020), 2(2).
- 17. Chung FJ, Hoskins JG, & Schotland JC. Coherent acousto-optic tomography with diffuse light. *Optics Letters* (2020), 45(7).
- 18. Mirza IM, Hoskins JG, & Schotland JC. Dimer chains in waveguide quantum electrodynamics. *Optics Communications* (2020), 463(2).
- Hoskins JG, Rokhlin V, & Serkh K. On the Numerical Solution of Elliptic Partial Differential Equations on Polygonal Domains. SIAM Journal of Scientific Computing (2019), 41(4).
- Linderman G, Rachh M, Hoskins JG, Steinerberger S, & Kluger Y. Fast interpolationbased t-SNE for improved visualization of single-cell RNA-seq data. *Nature Meth*ods (2019), 16(3).
- Hoskins JG, Kraisler J, & Schotland JC. Radiative transport in quasi-homogeneous random media. JOSA A (2018) 35(11).
- Hoskins JG, Musco C, Musco C, & Tsourakakis CE. Inferring Networks from Random Walk-based Node Similarities. Conference on Neural Information Processing Systems (NIPS 2018).
- Mirza IM, Hoskins JG, & Schotland JC. Chirality, band structure, and localization in waveguide quantum electrodynamics. Phys Rev. A. (2017), 96.
- Hoskins JG, & Schotland JC. Acousto-optic effect in random media. Phys Rev. E. (2017), 95(3).
- 25. Chung FJ, Gilbert AC, Hoskins JG, & Schotland JC. Optical tomography on graphs. *Inverse Problems* (2017) 33 (5).
- Gilbert AC, Hoskins JG, & Schotland JC. Diffuse scattering on graphs. J. Linear Algebra Appl. (2016), 496 (1) 1-35.
- Hoskins JG & Bluman G. Higher order symmetries and integrating factors for ordinary differential equations. J. Math. Anal. Appl. (2016), 435(1) 133-161.
- Esfandiarei M, Fameli N, Choi YY, Tehrani AY, Hoskins JG, & van Breemen C (2013). Waves of calcium depletion in the sarcoplasmic reticulum of vascular smooth muscle cells: an inside view of spatiotemporal Ca2+ regulation. *PLoS* One, 8 (2).

| Asghari P, Scriven DR, Hoskins JG, Fameli N, van Breemen C, & Moore ED (2012). The structure and functioning of the couplon in the mammalian car- diomyocyte. <i>Protoplasma</i>, 249 (1 Supplement): 31-38. |
|---|
| 1. Bal G, Hoskins JG, Quinn S, & Rachh M. Integral formulation of Dirac singular waveguides. |
| 2. Hoskins JG, Rachh M, & Wu B. On quadrature for singular integral operators with complex symmetric quadratic forms |
| 3. Bal G, Hoskins JG, Quinn S, & Rachh M. Integral formulation of Klein-Gordon singular waveguides. |
| 4. Greengard P, Hoskins JG, Marshall NF, & Singer A. On a linearization of quadratic Wasserstein distance. |
| 5. Hoskins JG, Kaye J, Rachh M, & Schotland J. Analysis of single-excitation states in quantum optics |
| 6. Gopal G, Hoskins JG, & Rokhlin V. On the inverse scattering problem for radially-symmetric domains in two dimensions |
| 7. Hoskins JG, & Rokhlin V. A fast adaptive algorithm for two-dimensional scattering from a radially-symmetric potential $% \mathcal{A}$ |
| 8. Hoskins JG. On the Numerical Solution of Transmission Problems for the Laplace equation on Polygonal Domains |
| There and back again: computational methods in fast algorithms and inverse problems, RPI Math Colloquium (2024). Edge Effects at Insulator Interfaces, Imaging and Sensing Seminar (2023). There and back again: computational methods in fast algorithms and inverse problems, University of Chicago CCAM (2023). Fast algorithms for interfaces in boundary integral equations, Workshop on Mathemat- ical Trends in Medical Imaging - UChicago (2023). Edge effects at insulator interfaces, Modern Applied and Computational Analysis - ICERM (2023). Edge effects at insulator interfaces, AIMS - Wilmington (2023). Single-excitation quantum optics, Princeton PACM Colloquium (2023). Single-excitation quantum optics, NYU Applied Math Seminar (2023). Towards optimal gradient bounds for torsion functions in the plane, UIUC Probability Seminar (2021). On the Numerical Solution of Elliptic PDEs on Polygonal Domains, CU Boulder Ap- plied Math Colloquium (2021). Multi-wave and multi-frequency inverse problems, Flatiron Institute - New York (2020). Elliptic PDEs on Regions with Corners, University of Chicago (2020). Multiple Junctions and Transmission Problems in Elliptic PDEs, SIAM CSE - Spokane (2019). On the Numerical Solution of Elliptic PDEs on Polygonal Domains, SIAM- Portland (2018). Combinatorial Inverse Problems, Applied Inverse Problems - Helsinki (2015). Diffuse Optical Tomography and Inverse Problems on Graphs - Inverse Problems Work- shop - University of Michigan (2014) Combinatorial Inverse Problems and Discrete Diffuse Optical Tomography - University of Michigan (2014). An exact solution for a Wave Equation using Symmetry Methods and Nonlocally Re- lated Sustems - University of British Columbia (2012). |
| |

PROFESSIONALWorkshop organizer: Computational Tools for PDEs with Complicated Boundaries and
Interfaces, Flatiron Institute (2024)
Minisymposium organizer: Fast algorithms for wave propagation and its applications,
ICIAM - Valencia (2019)
Minisymposium organizer: Fast algorithms for wave propagation and its applications,
Applied Inverse Problems - Grenoble (2019).
Minisymposium organizer: High-order discretizations and quadratures for integral equa-
tion methods, SIAM CSE -Spokane (2019).

TEACHING

UNIVERSITY OF CHICAGO, DEPARTMENT OF STATISTICS (CCAM)

- FALL 2023: Course Instructor Fast Algorithms
- SPRING 2023: Course Instructor Applied Approximation Theory
- WINTER 2023: Course Instructor Numerical Partial Differential Equations
- FALL 2022: Course Instructor Scientific Computing in Python
- SPRING 2022: Course Instructor Applied Partial Differential Equations
- WINTER 2022: Course Instructor Numerical Partial Differential Equations
- WINTER 2022: Course Instructor Numerical Linear Algebra
- Spring 2021: Course Instructor Fast Algorithms
- WINTER 2021: Course Instructor Numerical Partial Differential Equations

YALE UNIVERSITY, DEPARTMENT OF MATHEMATICS

- SPRING 2020: Course Instructor Introduction to Functional Analysis (325)
- FALL 2019: Course Instructor Linear Algebra with Applications (222)
- SPRING 2019: Course Instructor Introduction to Functional Analysis (325)
- FALL 2018: Course Instructor Ordinary Differential Equations (246)
- FALL 2017: Course Instructor Multivariable Calculus (120)

UNIVERSITY OF MICHIGAN, DEPARTMENT OF MATHEMATICS

- FALL 2016: Course Instructor -Integral Calculus (116)
- WINTER 2014: Recitation Instructor Differential Equations (216)
- FALL 2014: Course Instructor -Integral Calculus (116)
- WINTER 2013: Course Instructor -Integral Calculus (116)
- FALL 2012: Course Instructor Differential Calculus (115)

UNIVERSITY OF BRITISH COLUMBIA, DEPARTMENT OF MATHEMATICS

- WINTER 2012: Tutorial Instructor Ordinary Differential Equations with Applications to Chemical Engineering
- FALL 2011: Workshop Leader Differential Calculus with Physical Applications