

Travis Askham

Curriculum Vitae

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Education and Qualifications

2016 Ph.D. New York University
2010 M.A. University of California Los Angeles
2010 B.Sc. University of California Los Angeles

Professional Appointments

2019 – Assistant Professor, Department of Mathematical Sciences, New Jersey Institute of Technology

Publications

Journal Articles & Thesis

- [1] Peng Zheng, Travis Askham, Steven L Brunton, J Nathan Kutz, and Aleksandr Y Aravkin, A unified framework for sparse relaxed regularized regression: Sr3. *IEEE Access*, 7:1404–1423, 2019.
- [2] Travis Askham, A stabilized separation of variables method for the modified biharmonic equation. *Journal of Scientific Computing*, 76(3):1674–1697, 2018.
- [3] Travis Askham and J Nathan Kutz, Variable projection methods for an optimized dynamic mode decomposition. *SIAM Journal on Applied Dynamical Systems*, 17(1):380–416, 2018.
- [4] Manas Rachh and Travis Askham, Integral equation formulation of the biharmonic dirichlet problem. *Journal of Scientific Computing*, 75(2):762–781, 2018.
- [5] Chang Sun, Travis Askham, and J Nathan Kutz, Stability and dynamics of microring combs: elliptic function solutions of the lugiato-lefever equation. *JOSA B*, 35(6):1341–1353, 2018.
- [6] Travis Askham and Antoine J Cerfon, An adaptive fast multipole accelerated poisson solver for complex geometries. *Journal of Computational Physics*, 344:1–22, 2017.
- [7] Travis Askham, *Integral-equation methods for inhomogeneous elliptic partial differential equations in complex geometry*. Ph.D. thesis, New York University, 2016.
- [8] Travis Askham and Leslie Greengard, Norm-preserving discretization of integral equations for elliptic pdes with internal layers i: the one-dimensional case. *SIAM Review*, 56(4):625–641, 2014.

Preprints

- [1] Emily Clark, Travis Askham, Steven L Brunton, and J Nathan Kutz, Greedy sensor placement with cost constraints. *arXiv preprint arXiv:1805.03717*, 2018.
- [2] Niall M Mangan, Travis Askham, Steven L Brunton, J Nathan Kutz, and Joshua L Proctor, Model selection for hybrid dynamical systems via sparse regression. *arXiv preprint arXiv:1808.03251*, 2018.
- [3] Travis Askham, Peng Zheng, Aleksandr Aravkin, and J Nathan Kutz, Robust and scalable methods for the dynamic mode decomposition. *arXiv preprint arXiv:1712.01883*, 2017.

Honors & Awards

2016 Wilhelm Magnus Memorial Prize, Courant Institute of Mathematical Sciences
2010 Daus Award in Mathematics, University of California Los Angeles

Grants & Fellowships

2015 Dean's Dissertation Fellowship, New York University
2010–2015 Henry M. MacCracken Fellowship, New York University

Teaching Experience

University of Washington

Scientific Computing (Instructor, AMATH 481, 38 students)

Courant Institute of Mathematical Sciences

Numerical Methods I (Reader)

Analysis I (Teaching Assistant)

Ordinary Differential Equations (Teaching Assistant)

Research Experience

- 2016–2018 Research Associate, Department of Applied Mathematics, University of Washington.
Principal Investigator: J. Nathan Kutz. Project: Sparse measurements and optimal sensor placement for classification and state estimation of complex systems
- 2012–2015 Research Assistant, Courant Institute of Mathematical Sciences, New York University.
Principal Investigator: Leslie Greengard. Project: Novel methods for electromagnetic simulation and design

Invited Speaking

Department Seminars

- 2018 A Fredholm operator approach to clamped plate problems, Simon Fraser University. Burnaby, BC, Canada
- 2018 Tailored low-rank matrix approximation: two stories, NJIT. Newark, NJ, USA

Conference Activity

Participation

- 2018 Talk. A stable, kernel dependent FMM for fluid flow, ICOSAHOM, London, Greater London, UK
- 2018 Talk. Robust and scalable methods for the dynamic mode decomposition, SIAM Uncertainty Quantification conference, Garden Grove, CA, USA
- 2018 Talk. Adaptive grids for embedded integral equation based solvers, ICERM Workshop on Point Configurations. Providence, RI, USA
- 2017 Talk. Robust and scalable methods for the dynamic mode decomposition, SIAM Pacific Northwest Regional Meeting. Corvallis, OR, USA
- 2017 Talk. A stabilized FMM for fluid flow, BIRS-CMO Workshop on Creeping Flows. Oaxaca, OAX, Mexico
- 2017 Talk. Variable projection for Generalizing the Dynamic Mode Decomposition, SIAM CSE. Atlanta, GA, USA
- 2017 Talk. An algorithm for the DMD with unevenly spaced time samples, BIRS Workshop on Data-Driven Methods. Banff, Alberta, Canada
- 2016 Talk. Integral-Equation Methods for Inhomogeneous Elliptic PDEs (and applications), SIAM Annual Conference. Boston, MA, USA
- 2014 Poster. Volume Integrals in Complex Geometry: A Case Study of Poisson's Equation, CBMS-NSF Conference: Fast-Direct Solvers for Elliptic PDEs, Dartmouth College. Hanover, NH, USA
- 2013 Poster. On the discretization of integral equations for divergence-form PDEs with internal layers, Integral Equations Methods: Fast Algorithms and Applications (BIRS Workshop), Banff International Research Station. Banff, Alberta, Canada
- 2013 Talk. On the discretization of integral equations for elliptic PDEs with internal layers, Mid-Atlantic Numerical Analysis Day, Temple University. Philadelphia, PA, USA

Organization

- 2018 Mini symposium. High-Order Integral Equation Methods in Fluid Dynamics, ICOSA-HOM. London, Greater London, UK
- 2018 Mini symposium. Data-driven discovery for dynamical systems, SIAM UQ. Garden Grove, CA, USA
- 2017 Mini symposium. Data-driven characterization, control, and uncertainty quantification of dynamical systems, SIAM CSE. Atlanta, GA, USA

Service to Profession

Referee

- Elsevier *Journal of Computational Physics*
- SIAM *Scientific Computing (SISC)*, *Applied Dynamical Systems (SIADS)*
- Springer *Advances in Computational Mathematics*
- Wiley *Complexity* (Hindawi)
- IEEE *Transactions on Automatic Control (IEEE-TAC)*

Member

- SIAM (since 2011)

Software

- optdmd A MATLAB package for computing the optimized dynamic mode decomposition (available under the MIT license, github.com/duqbo/optdmd)
- RobustDMD A julia package for fitting exponential functions to data with robust penalties (available under the MIT license, github.com/UW-AMO/RobustDMD.jl)
- mbh2dfmm A Fortran package for stably computing fast sums of the modified biharmonic Green's function and modified Stokes kernels (available under a modified freeBSD license, github.com/duqbo/mbh2dfmm)

Skills

Coding

- Mastery Fortran (77-95), MATLAB
- Proficiency C99/C++, L^AT_EX, Python, julia
- Familiarity OpenMP, OpenCL (in C99), PHP, HTML

Speaking & Reading

- English (native)
- Spanish (elementary proficiency)

Biographical

- Born 1987. Walnut Creek, CA, USA
- Citizen United States