Daniel F. Fortunato

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RESEARCH AREAS

Fast methods for partial differential equations, spectral methods, *hp* element methods, fast direct solvers, computational fluid & solid mechanics, and multigrid methods

EDUCATION

Harvard University 2015–2020
Ph.D. in Applied Mathematics
M.S. in Applied Mathematics
Advisors: Chris Rycroft, Alex Townsend

Tufts University 2009–2013
B.S. in Mathematics, Computer Science
Honors: *summa cum laude*, Highest Honors in Thesis
Advisor: Christoph Börgers

PROFESSIONAL EXPERIENCE

Flatiron Institute New York, NY
Flatiron Research Fellow 2020–present
Research Associate Summer 2019

Lawrence Berkeley National Laboratory Berkeley, CA
Affiliate Summer 2017

Walt Disney Animation Studios Burbank, CA
Graduate Associate Summer 2016

Wolfram Research Somerville, MA
Developer 2014–2015
Junior Developer 2013–2014

Apple Inc. Cupertino, CA
Software Engineering Intern Summer 2012

AWARDS & HONORS

Leslie Fox Prize for Numerical Analysis (Second Prize) 2019
Institute of Mathematics and its Applications

Copper Mountain Student Paper Competition Winner 2019
19th Copper Mountain Conference on Multigrid Methods

Certificate of Distinction in Teaching 2018
Derek Bok Center, Harvard University

National Defense Science & Engineering Graduate Fellowship 2016–2019
U.S. Air Force Research Laboratory

Phi Beta Kappa Society 2013

Tufts University

Ralph S. Kaye Memorial Prize 2013
Tufts University

Benjamin G. Brown Scholarship 2013
Tufts University

JOURNAL PUBLICATIONS

[5] P. Miller, D. Fortunato, C. Muratov, L. Greengard, and S. Shvartsman, *Forced and spontaneous symmetry breaking in cell polarization*, Nat. Comput. Sci., 2 (2022), pp. 504–511, https://doi.org/10.1038/s43588-022-00295-0.

[4] D. Fortunato, N. Hale, and A. Townsend, *The ultraspherical spectral element method*, J. Comput. Phys., 436 (2021), pp. 110087, https://doi.org/10.1016/j.jcp.2020.110087.

[3] D. Fortunato and A. Townsend, *Fast Poisson solvers for spectral methods*, IMA J. Numer. Anal., 40 (2020), pp. 1994–2018, https://doi.org/10.1093/imanum/drz034.

[2] D. Fortunato, C. Rycroft, and R. Saye, *Efficient operator-coarsening multigrid schemes for local discontinuous Galerkin methods*, SIAM J. Sci. Comput., 41 (2019), pp. A3913–A3937, https://doi.org/10.1137/18M1206357.

[1] A. Mijailovic, B. Qing, D. Fortunato, and K. Van Vliet, *Characterizing viscoelastic mechanical properties of highly compliant polymers and biological tissues using impact indentation*, Acta Biomater., 71 (2018), pp. 388–397, https://doi.org/10.1016/j.actbio.2018.02.017.

PRESENTATIONS

SIAM Conference on Computational Science and Engineering, Amsterdam	February 2023
SIAM Annual Meeting, Pittsburgh, PA	July 2022
Outstanding Challenges in Computational Methods for Integral Equations, Oaxaca	May 2022
Fast Direct Solvers, Purdue University	October 2021
Flatiron-Wide Algorithms & Mathematics, Flatiron Institute	October 2021
ICOSAHOM 2020, Vienna, Austria	July 2021
Numerical Analysis and PDE Seminar, University of Delaware	May 2021
SIAM Conference on Computational Science and Engineering, Fort Worth, TX	March 2021
Canadian Mathematical Society Winter Meeting	December 2020
Sidney Fernbach Fellowship Seminar, Lawrence Livermore National Laboratory	February 2020
Numerical Methods for Partial Differential Equations Seminar, MIT	December 2019
Numerical Analysis Seminar, Flatiron Institute	July 2019
28th Biennial Numerical Analysis Conference, Glasgow, UK	June 2019
19th Copper Mountain Conference on Multigrid Methods, Copper, CO	March 2019
SIAM Conference on Computational Science and Engineering, Spokane, WA	February 2019
Scientific Computing and Numerical Analysis Seminar, Cornell University	November 2018
ICOSAHOM 2018, London, UK	July 2018
SIAM Conference on Computational Science and Engineering, Atlanta, GA	February 2017
SIAM Student Chapter, Tufts University	November 2014

TEACHING EXPERIENCE

Harvard University, *Teaching Fellow*

- AM 205: Advanced Scientific Computing: Numerical Methods I — Fall 2019
- AM 225: Advanced Scientific Computing: Numerical Methods II — Spring 2018

Tufts University, *Teaching Assistant*

- COMP 170: Computation Theory — Spring 2012
- COMP 15: Data Structures — Spring 2011
- COMP 11: Introduction to Computer Science — Fall 2010

SKILLS

Languages: C++11, C, MATLAB, Mathematica, Python, LaTeX
Technologies: BLAS, LAPACK, Git, OpenMP

PROFESSIONAL ACTIVITIES

Referee for: Journal of Computational Physics, Journal of Scientific Computing, Advances in Computational Mathematics, IMA Journal of Numerical Analysis, SIAM Journal on Matrix Analysis and Applications

Member of SIAM and AMS