Jay A. Stotsky

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Education

Ph.D. in Applied Mathematics, Advisor: David M. Bortz
University of Colorado at Boulder, 2018

B.S. in Chemical and Biological Engineering, Magna Cum Laude
Tufts University, 2013

Experience

Postdoctoral Research Associate - School of Mathematics, University of Minnesota
Mentor: Hans Othmer, 2018 - Current

Dept. of Energy Computational Science Graduate Fellowship - University of Colorado at Boulder
Advisor: David Bortz, 2014 - 2018

Affiliate - Lawrence Berkeley National Laboratory
Advisors: Phil Colella and Daniel Martin, Summer 2016

Thesis

Mathematical and Computational Studies of the Biomechanics of Biofilms.
University of Colorado, 2018.

Teaching Experience

(Upcoming) Instructor for Math 5445 Mathematical Analysis of Biological Networks
University of Minnesota. February, 2023 - May, 2023

Instructor for Math 2443 Differential Equations and Linear Algebra
University of Minnesota, September, 2022 - December, 2022

Instructor for Math 4556 Fourier Analysis
University of Minnesota January, 2020 - May, 2020

Graduate Student Teaching Assistant for APPM 2350 Calculus III for Engineers
University of Colorado at Boulder January, 2014 - May, 2014

Graduate Student Teaching Assistant for APPM 2450 Calculus III Computer Lab
University of Colorado at Boulder January, 2014 - May, 2014

Graduate Student Teaching Assistant for APPM 2360 Introduction to Differential Equations and
Linear Algebra
University of Colorado at Boulder September, 2013 - December, 2013

Undergraduate Mentoring Experience

Joseph Hoang - Undergraduate student at the University of Minnesota. Summer, 2022 - current
Volume Regulation and Shape Deformation in Microglial Cells

Peer-Reviewed Publications

Stotsky, J. A. and Othmer, H. G. *The Role of Cytonemes and Diffusive Transport in the Establishment of Morphogen Gradients.* Submitted. Journal of Theoretical Biology (2022).

Stotsky, J. A. and Othmer, H. G. *The Effects of Internal Forces and Membrane Heterogeneity on Three-Dimensional Cell Shapes.* Accepted. Journal of Mathematical Biology (2022).

Stotsky, J. A. and Othmer, H. G. *How surrogates for cortical forces determine cell shape.* International Journal of Non-Linear Mechanics. 140 (2022): 103907.

Stotsky, J. A., Gou, J., Othmer, H. G. *A Random Walk Approach to Transport in Tissues and Complex Media: From Microscale Descriptions to Macroscale Models.* Bulletin of Mathematical Biology 83, no. 9 (2021): 1-84.

Gou, J., **Stotsky, J. A.**, and Othmer, H. G. *Growth control in the Drosophila wing disk.* Wiley Interdisciplinary Reviews: Systems Biology and Medicine 12.3 (2020): e1478.

Stotsky, J. A., and Bortz, D. M.. *A posteriori error analysis of fluid-structure interactions: Time dependent error.* Computer Methods in Applied Mechanics and Engineering 356 (2019): 1-15.

Stotsky, J. A., Dukic, V., and Bortz, D. M. *A point process model for generating biofilms with realistic microstructure and rheology.* European Journal of Applied Mathematics 29.6 (2018): 1141-1177.

Stotsky, J. A. et al. *Variable viscosity and density biofilm simulations using an immersed boundary method, part II: Experimental validation and the heterogeneous rheology-IBM.* Journal of Computational Physics 317 (2016): 204-222.

Publications in Preparation

Hoang, J., **Stotsky, J. A.**, and Othmer, H. G. *Volume Regulation and Shape Deformation in Microglial Cells.* (2022)

Presentations and Outreach

How Surrogates for Cortical Forces Determine Cell Shape CMO-BIRS conference on Cell Motility, September 28th, 2021

The Impact of Cell-Level Details on Tissue-Scale Properties Society of Math Biology Annual Meeting, UC Riverside, June 15th 2021

Transport Phenomena in Fruit Flies: How Cell-Level Details Affect Tissue Properties ICQMB Seminar, University of California Riverside, February 9th, 2021

Transport Phenomena in Fruit Flies: How Cell-Level Details Affect Tissue Properties Mathematical Biology Seminar, University of Colorado Boulder, November 30th, 2020

Simulation and Modeling of the Biomechanics of Biofilms American Mathematical Society, University of Minnesota Chapter Meeting, October 24th, 2018

Computational and Mathematical Studies of the Biomechanics of Biofilms Computational Science Graduate Fellowship Annual Conference, July 2018

Computational and Mathematical Studies of the Biomechanics of Biofilms Workshop on Mathematics for Complex Microbial Systems, Fields Institute May 8th, 2018

Computational and Mathematical Studies of the Biomechanics of Biofilms Thesis Defence, University of Colorado at Boulder May 4th, 2018

A posteriori Error Analysis of the Method of Regularized Stokeslets, Mathematical Biology Seminar, October 6th, 2017

A Statistical Model of the Arrangement of Bacteria in Biofilms, Mathematical Biology Seminar March 17th, 2017.

An Immersed Boundary Method Biofilm Model with Heterogeneous Rheology, SIAM Life Sciences, July 13th, 2016.

Simulation of Biofilms with Heterogeneous Rheology Society for Mathematical Biology, July 3rd, 2015.

The Immersed Boundary Method and its use in Biofilm Modeling Mathematical Biology Seminar October 6th, 2014. Computational Math Seminar, April 6th, 2014.

Solving the Diffusion Equation on the Sphere with the Finite Element Method and Multigrid Solvers. American Math Society - Special Session for Undergraduate Research Projects, Boston College, April 6th, 2013

Senior Honors Thesis Defense. Tufts University, May 1st, 2013.

An Efficient Method for Computational Simulation of Diffusion on the Surface of a Sphere. Tufts University Undegraduate Research Symposium. August 16th, 2012

Peer Review

Served as a peer reviewer for: ACS Infectious Diseases, International Journal for Numerical Methods in Biomedical Engineering, PLoS Computational Biology, SIAM Journal on Applied Mathematics

Honors

Recognized by the Center for Educational Innovation *Thank A Teacher* program, June 2020

Landahl Travel Grant for the Society of Mathematical Biology Annual Meeting, June 2015

Department of Energy Computational Science Graduate Fellowship, April 2014

Tufts University Class of 1898 Prize, May, 2013

Tau Beta Pi Engineering Honor Society, November, 2012

Meritorious Winner: COMAP Mathematical Contest in Modeling, April, 2012

Winner of Tufts University Elizabeth Verveer Tischler Music Competition, March, 2012

Meritorious Winner: COMAP Mathematical Contest in Modeling, April, 2011

Press Coverage

Featured in September 2021 SMB-CDEV Junior Researcher Blog Post.
https://smb-celldevbio.github.io/blog/

Featured in DEIXIS 2018 Issue. *The Biofilm Tango* by Jacob Berkowitz.
https://www.krellinst.org/doecsgf/docs/deixis/deixis2018.pdf pg.19 - 21

Software and Programming Languages MATLAB, Mathematica, C++, Linux, Latex, familiar with high-performance computing techniques