David M. Bortz

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Education

Ph.D. (2002), M.S. (2000)	Applied Mathematics, Advisor: H.T. Banks North Carolina State University, Raleigh, NC
B.A. (1997)	Computational and Applied Mathematics Rice University, Houston, TX

Professional Experience

2021 – pres.	Professor, Department of Applied Mathematics University of Colorado, Boulder
2020 – pres.	COVID-19 modeling team State of Colorado
2016	Visiting Scholar, Department of Mathematics Duke University
2013 – 2021	Associate Professor, Department of Applied Mathematics University of Colorado, Boulder
2009	Lecturer, Mathematical Biology Summer School University of Graz, Austria
2006 – 2013	Assistant Professor, Department of Applied Mathematics University of Colorado, Boulder
2002 – 2006	Post-doctoral Assistant Professor, Department of Mathematics University of Michigan, Ann Arbor
1998 – 2002	GAANN Fellow and RA with H.T. Banks North Carolina State University
1997 – 1998	RA with C.T. Kelley North Carolina State University

Honors

2021	U. Colorado Outstanding Research Collaboration - COVID-19 Resilience Award
2019	U. Colorado Marinus Smith Award Nomination for distinguished mentoring & teaching
2019	U. Colorado Graduate School Outstanding Faculty Mentor Award
2018	U. Colorado Marinus Smith Awardee for distinguished mentoring & teaching
2016	SAMSI Research Fellow
2008	U. Colorado Council on Research & Creative Work Junior Faculty Award
2003	U. Michigan Horace H. Rackham Faculty Fellowship
1998-2001	DOEd GAANN Computational Science Fellow
1998	Argonne National Laboratory Givens Associate
1997	N.C. State Univ. Center for Research in Scientific Computation Fellow

Press

2023 CU Arts & Sciences Magazine
October 23 - *Researchers strive to help models learn from 'noisy' data*

2022 CU Boulder Today
October 26 - *New study shows how to learn the equations of cell migration*
CU Arts & Sciences Magazine
October 19 - *CU Boulder joins national effort to advance nuclear fusion research*

2021 Colorado Newsline
September 21 - *1 in 99 people in Colorado estimated to be infectious with COVID-19*
KDVR FOX31
March 1 - *Model suggests COVID-19 may have been in Colorado as early as January 2020*

2020 UCHealth Today
December 15 - *The first COVID-19 case likely in Colorado way before March*
Wall Street Journal
October 8 - *Coronavirus Hit the U.S. Long Before We Knew*
5280 Magazine
September 1 - *So You Think You Had COVID-19 Before March?*
Politico
June 16 - *What Colorado is getting right about reopening*
Colorado Engineer Magazine
Fall 2020 - *Informing Policymaking Through Mathematical Modeling*
CU Boulder Today
June 12 - *Mathematician on the front lines of Colorado's coronavirus response*
May 6 - *Scientists shed light on essential carbon-fixing machinery in bacteria*
March 23 - *Even single-celled organisms need their space: Squished bacteria may shut down photosynthesis*
Colorado Springs Gazette
April 10 - *Colorado's slowdown in coronavirus growth a sign that social distancing has worked, doctors say*
March 28 - *Coronavirus in Colorado: Experts begin sharing stark predictions*

2018 DEIXIS, The DOE CSGF Annual: *The Biofilm Tango*

2015 CU Arts & Sciences Support of Education Through Technology (ASSETT) interview: *Survivor Strategies: Teaching Large Enrollment*

2012 CU Arts & Sciences Magazine: *For cleaner water, NSF taps CU applied mathematician*
Infection Control Today: *Researchers Discover How Bloodstream Infections Begin*

2008 NIGMS Computing Life: *Tracking Bacteria in the Blood*

Campus Affiliations

2019 – pres. Professor (courtesy), Department of Computer Science

2011 – pres. Interdisciplinary Quantitative Biology (IQBio) Faculty

2010 – pres. Renewable & Sustainable Energy Institute (RASEI) Affiliate

2011 – 2020 BioFrontiers Institute Task Force Member

Preprints

A. Tran, X. He, D. A. Messenger, Y. Choi, and **D. M. Bortz**. Weak-Form Latent Space Dynamics Identification. *arXiv:2311.12880*, (submitted), Nov. 2023.

D. A. Messenger, J. W. Burby, and **D. M. Bortz**. Coarse-Graining Hamiltonian Systems Using WSINDy. *arXiv:2310.05879*, (submitted), Oct. 2023.

D. A. Messenger and **D. M. Bortz**. Asymptotic consistency of the WSINDy algorithm in the limit of continuum data. *arXiv:2211.16000*, (submitted), Nov. 2022.

L. R. Baker, M. Gordon, B. P. Ziemba, V. Gershuny, J. J. Falke, and **D. M. Bortz**. Learning diffusion coefficients, kinetic parameters, and the number of underlying states from a multi-state diffusion process: Robustness results and application to PDK-1/PKCα dynamics. *arXiv:2206.07999*, (submitted), June 2022.

S. L. Altus, J. C. Cameron, and **D. M. Bortz**. Asymptotic Analysis of a General Multi-Structured Population Model. *arXiv:2204.10517*, (submitted), Apr. 2022.

Articles

[1] **D. M. Bortz**, D. A. Messenger, and V. Dukic. Direct Estimation of Parameters in ODE Models Using WENDy: Weak-form Estimation of Nonlinear Dynamics. *Bull. Math. Biol.*, 85(110), 2023.

[2] D. A. Messenger, G. E. Wheeler, X. Liu, and **D. M. Bortz**. Learning Anisotropic Interaction Rules from Individual Trajectories in a Heterogeneous Cellular Population. *J. R. Soc. Interface*, 19(195):20220412, Oct. 2022.

[3] D. A. Messenger and **D. M. Bortz**. Learning mean-field equations from particle data using WSINDy. *Physica D*, 439:133406, Nov. 2022.

[4] J. M. Wentz, J. C. Cameron, and **D. M. Bortz**. Analytical Singular Value Decomposition for a Class of Stoichiometry Matrices. *SIAM J. Matrix Anal. Appl.*, 43(3):1109–1147, Sept. 2022.

[5] G. E. Wheeler, A. Purkayastha, E. N. Bunker, **D. M. Bortz**, and X. Liu. Protocol for Analysis and Consolidation of TrackMate Outputs for Measuring Two-Dimensional Cell Motility using Nuclear Tracking. *J. Vis. Exp.*, 178:e62885, Dec. 2021.

[6] D. A. Messenger and **D. M. Bortz**. Weak SINDy: Galerkin-Based Data-Driven Model Selection. *Multiscale Model. Simul.*, 19(3):1474–1497, 2021.

[7] J. M. Wentz and **D. M. Bortz**. Boundedness of a class of discretized reaction-diffusion systems. *SIAM J. Appl. Math.*, 81(5):1870–1892, 2021.

[8] D. A. Messenger and **D. M. Bortz**. Weak SINDy For Partial Differential Equations. *J. Comput. Phys.*, 443:110525, Oct. 2021.

[9] A. G. Buchwald, J. Bayham, j. adams, **D. M. Bortz**, K. Colborn, O. Zarella, M. Buran, J. Samet, D. Ghosh, R. Herlihy, and E. J. Carlton. Estimating the impact of state-wide policies to reduce the spread of SARS-CoV-2 in Colorado in real-time. *Emerg. Infect. Dis.*, 27(9), June 2021.

[10] H. J. Dudley, Z. J. Ren, and **D. M. Bortz**. Competitive Exclusion in a DAE Model for Microbial Electrolysis Cells. *Math. Biosci. Eng.*, 17(5):6217–6239, 2020.

[11] A. G. Buchwald, j. adams, **D. M. Bortz**, and E. J. Carlton. Infectious Disease Transmission Models to Predict, Evaluate, and Improve Understanding of SARS-COV-2 Trajectory and Interventions. *Ann. Am. Thorac. Soc.*, 17(10):1204–1206, Oct. 2020.

[12] N. C. Hill, J. W. Tay, S. L. Altus, **D. M. Bortz**, and J. C. Cameron. Life cycle of a cyanobacterial carboxysome. *Sci. Adv.*, 6(19):eaba1269, 2020.

[13] K. A. Moore, S. Altus, J. W. Tay, J. B. Meehl, E. B. Johnson, **D. M. Bortz**, and J. C. Cameron. Mechanical regulation of photosynthesis in cyanobacteria. *Nat. Microbiol.*, 5:757–767, Mar. 2020.

[14] J. A. Stotsky and **D. M. Bortz**. A Posteriori Error Analysis of Fluid-Stucture Interactions: Time Dependent Error. *Comput. Methods Appl. Mech. Eng.*, 356:1–15, Nov. 2019.

[15] J. T. Nardini and **D. M. Bortz**. The influence of numerical error on parameter estimation and uncertainty quantification for advective PDE models. *Inverse Probl.*, 35(6):065003, May 2019.

[16] H. J. Dudley, L. Lu, Z. J. Ren, and **D. M. Bortz**. Sensitivity and Bifurcation Analysis of a Differential-Algebraic Equation Model for a Microbial Electrolysis Cell. *SIAM J. Appl. Dyn. Syst.*, 18(2):709–728, 2019.

[16] J. A. Stotsky, V. Dukic, and **D. M. Bortz**. A point process model for generating biofilms with realistic microstructure and rheology. *Eur. J. Appl. Math.*, 29(6):1141–1177, Dec. 2018.

[17] E. P. Kightley, A. Pearson, J. A. Evans, and **D. M. Bortz**. Fragmentation of biofilm-seeded bacterial aggregates in shear flow. *Eur. J. Appl. Math.*, 29(6):1062–1078, Dec. 2018.

[18] J. M. Wentz, A. R. Mendenhall, and **D. M. Bortz**. Pattern Formation in the Longevity-Related Expression of Heat Shock Protein-16.2 in Caenorhabditis elegans. *Bull. Math. Biol.*, 80(10):2669–2697, 2018.

[19] J. T. Nardini and **D. M. Bortz**. Investigation of a Structured Fisher's Equation with Applications in Biochemistry. *SIAM J. Appl. Math.*, 78(3):1712–1736, 2018.

[20] V. Dukic and **D. M. Bortz**. Uncertainty Quantification Using Probabilistic Numerics: Application to Models in Mathematical Epidemiology. *Inverse Probl. Sci. Eng.*, 28(2):223–232, 2018.

[21] I. Mirzaev and **D. M. Bortz**. A numerical framework for computing steady states of structured population models and their stability. *Math. Biosci. Eng.*, 14(4):933–952, Aug. 2017.

[22] **D. M. Bortz**. Characteristic Roots for Two-Lag Linear Delay Differential Equations. *Discrete Contin. Dyn. Syst. B*, 21(8), Oct. 2016.

[23] I. Mirzaev, E. C. Byrne, and **D. M. Bortz**. An Inverse Problem for a Class of Conditional Probability Measure-Dependent Evolution Equations. *Inverse Probl.*, 32(9):095005, Sept. 2016.

[24] J. A. Stotsky, J. F. Hammond, L. Pavlovsky, E. J. Stewart, J. G. Younger, M. J. Solomon, and **D. M. Bortz**. Variable viscosity and density biofilm simulations using an immersed boundary method, Part II: Experimental validation and the heterogeneous rheology-IBM. *J. Comput. Phys.*, 316:204–222, July 2016.

[25] J. T. Nardini, D. A. Chapnick, X. Liu, and **D. M. Bortz**. Modeling keratinocyte wound healing: Cell-cell adhesions promote sustained migration. *J. Theor. Biol.*, 400:103–117, July 2016.

[26] D. D. Keck and **D. M. Bortz**. Generalized sensitivity functions for size-structured population models. *J. Inverse Ill-Posed Probl.*, 24(3):309–321, June 2016.

[27] I. Mirzaev and **D. M. Bortz**. Laplacian dynamics with synthesis and degradation. *Bull. Math. Biol.*, 77(6):1013–1045, June 2015.

[28] S. Sircar, E. Aisenbrey, S. J. Bryant, and **D. M. Bortz**. Determining equilibrium osmolarity in poly(ethylene glycol)/chondrotin sulfate gels mimicking articular cartilage. *J. Theor. Biol.*, 364(7 January):397–406, 2015.

[29] S. M. Kissler, C. Cichowitz, S. Sankaranarayanan, and **D. M. Bortz**. Determination of personalized diabetes treatment plans using a two-delay model. *J. Theor. Biol.*, 359:101–111, Oct. 2014.

[30] S. Sircar, J. G. Younger, and **D. M. Bortz**. Sticky surface: Sphere–sphere adhesion dynamics. *J. Biol. Dyn.*, 9(Supp. 1):76–89, Aug. 2014.

[31] J. F. Hammond, E. Stewart, J. G. Younger, M. J. Solomon, and **D. M. Bortz**. Variable Viscosity and Density Biofilm Simulations using an Immersed Boundary Method, Part I: Numerical Scheme and Convergence Results. *Comput. Model. Eng. Sci.*, 98(3):295–340, 2014.

[32] G. Lambert, A. Bergman, Q. Zhang, **D. M. Bortz**, and R. Austin. Physics of biofilms: The initial stages of biofilm formation and dynamics. *New J. Phys.*, 16(4):045005, Apr. 2014.

[33] S. Sircar and **D. M. Bortz**. Impact of flow on ligand-mediated bacterial flocculation. *Math. Biosci.*, 245(2):314–321, Oct. 2013.

[34] A. E. Satorius, J. Szafranski, D. Pyne, M. Ganesan, M. J. Solomon, D. W. Newton, **D. M. Bortz**, and J. G. Younger. Complement C5a Generation by Staphylococcal Biofilms. *Shock*, 39(4):336–342, Apr. 2013.

[35] E. C. Conrad, Y.-Y. Hsu, **D. M. Bortz**, and J. G. Younger. Spatiotemporal Dynamics of Complement C5a Production within Bacterial Extracellular Polymeric Substance. *J. Innate Immun.*, 5(2):114–123, 2013 (cover art).

[36] C. W. Curtis and **D. M. Bortz**. Propagation of fronts in the Fisher-Kolmogorov equation with spatially varying diffusion. *Phys. Rev. E*, 86(6), Dec. 2012.

[37] M. M. Thornton, H. M. Chung-Esaki, C. B. Irvin, **D. M. Bortz**, M. J. Solomon, and J. G. Younger. Multicellularity and Antibiotic Resistance in Klebsiella pneumoniae Grown Under Bloodstream-Mimicking Fluid Dynamic Conditions. *J. Infect. Dis.*, 206(4):588–595, Aug. 2012.

[38] J. F. Hammond and **D. M. Bortz**. Analytical solutions to Fisher's equation with time-variable coefficients. *Appl. Math. Comput.*, 218(6):2497–2508, Nov. 2011.

[39] E. Byrne, S. Dzul, M. Solomon, J. Younger, and **D. M. Bortz**. Postfragmentation density function for bacterial aggregates in laminar flow. *Phys. Rev. E*, 83(4):041911, Apr. 2011.

[40] S. P. Dzul, M. M. Thornton, D. N. Hohne, E. J. Stewart, A. A. Shah, **D. M. Bortz**, M. J. Solomon, and J. G. Younger. Contribution of the Klebsiella pneumoniae Capsule to Bacterial Aggregate and Biofilm Microstructures. *Appl. Environ. Microbiol.*, 77(5):1777–1782, Mar. 2011.

[41] C. M. Nypaver, M. M. Thornton, S. M. Yin, D. O. Bracho, P. W. Nelson, A. E. Jones, **D. M. Bortz**, and J. G. Younger. Dynamics of Human Complement–Mediated Killing of *Klebsiella pneumoniae*. *Am. J. Respir. Cell Mol. Biol.*, 43(5):585–590, Nov. 2010.

[42] H. M. Chung, M. M. Cartwright, **D. M. Bortz**, T. L. Jackson, and J. G. Younger. Dynamical System Analysis of Staphylococcus Epidermidis Bloodstream Infection. *Shock*, 30(5):518–526, Nov. 2008 (cover art).

[43] **D. M. Bortz**, T. L. Jackson, K. A. Taylor, A. P. Thompson, and J. G. Younger. Klebsiella pneumoniae Flocculation Dynamics. *Bull. Math. Biol.*, 70(3):745–768, Apr. 2008.

[44] **D. M. Bortz** and P. W. Nelson. Model Selection and Mixed-Effects Modeling of HIV Infection Dynamics. *Bull. Math. Biol.*, 68(8):2005–2025, Nov. 2006.

[45] M. S. Ciupe, B. L. Bivort, **D. M. Bortz**, and P. W. Nelson. Estimating kinetic parameters from HIV primary infection data through the eyes of three different mathematical models. *Math. Biosci.*, 200(1):1–27, Mar. 2006.

[46] I. Ben-David, S. E. Price, **D. M. Bortz**, C. F. Greineder, S. E. Cohen, A. L. Bauer, T. L. Jackson, and J. G. Younger. Dynamics of Intrapulmonary Bacterial Growth in a Murine Model of Repeated Microaspiration. *Am J Respir Cell Mol Biol*, 33(5):476–482, Nov. 2005.

[47] H. T. Banks and **D. M. Bortz**. A parameter sensitivity methodology in the context of HIV delay equation models. *J. Math. Biol.*, 50(6):607–625, June 2005.

[48] H. T. Banks and **D. M. Bortz**. Inverse problems for a class of measure dependent dynamical systems. *J. Inverse Ill-Posed Probl.*, 13(2):103–121, Apr. 2005.

[49] **D. M. Bortz** and P. W. Nelson. Sensitivity analysis of a nonlinear lumped parameter model of HIV infection dynamics. *Bull. Math. Biol.*, 66(5):1009–1026, Sept. 2004.

[50] H. T. Banks, **D. M. Bortz**, and S. E. Holte. Incorporation of variability into the modeling of viral delays in HIV infection dynamics. *Math. Biosci.*, 183(1):63–91, May 2003.

[51] **D. M. Bortz**, A. D. Rubio, H. T. Banks, A. B. Cain, and R. C. Smith. Control of open bay acoustics by harmonic mass injection. *Int. J. Aeroacoustics*, 1(1):65–81, Jan. 2002.

[52] A. B. Cain, A. D. Rubio, **D. M. Bortz**, H. T. Banks, and R. C. Smith. Optimizing Control of Open Bay Acoustics. *Proc. AIAA*, 1928, June 2000.

[53] I. Ambats, **D. M. Bortz**, A. Connolly, A. Derlicki, M. Derrick, W. Kahle, S. Magill, D. Mikunas, B. Musgrave, J. Schlereth, R. Stanek, and J. Thron. Studies of hadron-electron separators for the ZEUS barrel calorimeter. *Nucl. Instrum. Methods Phys. Res. Sect. Accel. Spectrometers Detect. Assoc. Equip.*, 368(2):364–377, Jan. 1996.

Book Chapters

[54] **D. M. Bortz**. Chapter 17: Modeling and simulation for nanomaterials in fluids: Nanoparticle self-assembly. In V. Tewary and Y. Zhang, editors, *Modeling, Characterization, and Production of Nanomaterials: Electronics, Photonics and Energy Applications*, volume 73 of *Woodhead Publishing Series in Electronic and Optical Materials*, pages 419–441. Woodhead Publishing Ltd., Cambridge, UK, 2015.

[55] H. T. Banks, **D. M. Bortz**, G. A. Pinter, and L. Potter. Chapter 6: Modeling and Imaging Techniques with Potential for Application in Bioterrorism. In H. T. Banks and C. Castillo-Chavez, editors, *Bioterrorism: Mathematical Modeling Applications in Homeland Security*, pages 129–154. SIAM, Philadelphia, PA, 2003.

[56] **D. M. Bortz** and C. T. Kelley. Chapter 5: The Simplex Gradient and Noisy Optimization Problems. In *Computational Methods in Optimal Design and Control*, pages 77–90. Birkhäuser, Boston, MA, 1998.

Refereed Conference Abstracts

[57] D. A. Messenger, E. Dall'Anese, and **D. M. Bortz**. Online Weak-form Sparse Identification of Partial Differential Equations. In *Proc. Third Math. Sci. Mach. Learn. Conf.*, volume 190 of *Proceedings of Machine Learning Research*, pages 241–256. PMLR, 2022.

[58] T. Kushner, **D. M. Bortz**, D. Maahs, and S. Sankaranarayanan. A Data-Driven Approach to Artificial Pancreas Verification and Synthesis. In *Proc. 9th ACMIEEE Int. Conf. Cyber-Phys. Syst.*, ICCPS '18, pages 242–252, Porto, Portugal, 2018. IEEE Press.

[59] T. Kushner, **D. M. Bortz**, D. Maahs, and S. Sankaranarayanan. Personalized Data-Driven Verification and Synthesis for Artificial Pancreas Controllers. *Diabetes Technol. Ther.*, 20:A36–A37, Feb. 2018.

[60] **D. M. Bortz**. Eigenvalues for a two-lag linear delay differential equation. *IFAC-PapersOnLine*, 48(12):13–16, 2015.

[61] E. C. Conrad, A. E. Satorius, P. Sharma, **D. M. Bortz**, and J. G. Younger. The Host Response to Line Sepsis: Experimental and Computational Analysis of Complement Activation against Coagulase-Negative Staphylococcal Biofilms. *Ann. Emerg. Med.*, 62(4):S153, Oct. 2013.

[62] J. G. Younger, M. M. Thornton, C. Babcock, H. M. Chung-Esaki, **D. M. Bortz**, and M. J. Solomon. Bloodstream-like fluid dynamic conditions promote multicellularity and antibiotic resistance in Klebsiella pneumoniae. *Shock*, 37(1):58, 2012.

[63] M. M. Thornton, D. N. Hohne, M. J. Solomon, **D. M. Bortz**, and J. G. Younger. Bacterial aggregation during growth under low shear: Implications for bacteremia. *Shock*, 31(7):22, 2009.

[64] S. Yin, C. M. Nypaver, D. O. Bracho, M. Lee, **D. M. Bortz**, A. E. Jones, and J. G. Younger. A real-time assay for identifying complement-mediated bacterial killing defects in septic patients. *Shock*, 31:85, 2009.

[65] **D. M. Bortz** and A. J. Christlieb. Random Numerical Discretizations. In *Abstr. Int. Conf. Inverse Probl. Model. Simul.*, pages 29–30, Fethiye, Turkey, 2008.

[66] D. Li, D. N. Hohne, **D. M. Bortz**, J. Bull, and J. G. Younger. Modeling bacterial clearance from the bloodstream using computational fluid dynamics and Monte Carlo simulation. *J. Crit. Care*, 22(4):344, 2007.

[67] H. M. Chung, M. M. Cartwright, A. P. Thompson, T. L. Jackson, **D. M. Bortz**, and J. G. Younger. Neutropenic Staphyloccocus Epidermidis Bacteremia in a Multicompartment Pharmacokinetic System. *Acad. Emerg. Med.*, 14(5, Suppl. 1):S178–S179, 2007.

[68] J. G. Younger, H. M. Chung, M. M. Cartwright, **D. M. Bortz**, and T. L. Jackson. Neutropenic S. epidermidis bacteremia modeled as a pharmacodynamic system. *Shock*, 27(Supp. 1):68–69, June 2007.

[69] D. R. Nemergut, **D. M. Bortz**, and S. C. Reed. Genomic network modeling: An approach to predict net ecosystem processes from microbial community structure data. In *Ecol. Soc. Am. Annu. Meet.*, 2007.

[70] **D. M. Bortz**, T. L. Jackson, and J. G. Younger. Estimation and identification of Klebsiella pneumoniae flocculation dynamics. In *Abstr. Int. Conf. Inverse Probl. Model. Simul.*, pages 15–17, Fethiye, Turkey, 2006.

[71] **D. M. Bortz**. Accurate Model Selection Computations. *J. Crit. Care*, 21(4):359, 2006.

[72] J. G. Younger, K. A. Taylor, A. P. Thompson, and **D. M. Bortz**. Bacterial Multicellular Structures and the Genesis of Septic Emboli. *Acad. Emerg. Med.*, 13(5S):S152, May 2006.

[73] H. M. Chung, T. L. Jackson, **D. M. Bortz**, M. M. Cartwright, and J. G. Younger. Multiple-compartment bacterial clearance kinetics during murine bacteremia. *J. Crit. Care*, 21(4):359–360, 2006.

[74] J. G. Younger, K. A. Taylor, A. P. Thompson, and **D. M. Bortz**. Quantification and modeling of aggregate bacterial growth in suspension: Implications for Bacteremia. *Shock*, 25(Supp. 1):79–80, 2006.

[75] I. Ben-David, S. E. Price, S. E. Cohen, **D. M. Bortz**, T. L. Jackson, and J. G. Younger. Complement C3 is necessary for early suppression of intrapulmonary bacterial growth. *Shock*, 23(Supp. 3):79–80, 2005.

[76] A. L. Bauer, **D. M. Bortz**, D. Gammack, I. Ben-David, A. Stein, T. L. Jackson, and J. G. Younger. Virulence of Klebsiella pneumoniae predicted by nonlinear biodistributive mathematical model. *Shock*, 21(Supp. 2):29, 2004.

Non-Refereed Publications

[77] S. H. Friedman, A. R. A. Anderson, **D. M. Bortz**, A. G. Fletcher, H. B. Frieboes, A. Ghaffarizadeh, D. R. Grimes, A. Hawkins-Daarud, S. Hoehme, E. F. Juarez, C. Kesselman, R. Merks, S. M. Mumenthaler, P. K. Newton, K.-A. Norton, R. Rawat, R. C. Rockne, D. Ruderman, J. Scott, S. S. Sindi, J. L. Sparks, K. Swanson, D. B. Agus, and P. Macklin. MultiCellDS: A community-developed standard for curating microenvironment-dependent multicellular data. *bioRxiv:090456*, Nov. 2016.

[78] S. H. Friedman, A. R. A. Anderson, **D. M. Bortz**, A. G. Fletcher, H. B. Frieboes, A. Ghaffarizadeh, D. R. Grimes, A. Hawkins-Daarud, S. Hoehme, E. F. Juarez, C. Kesselman, R. M. H. Merks, S. M. Mumenthaler, P. K. Newton, K.-A. Norton, R. Rawat, R. C. Rockne, D. Ruderman, J. Scott, S. S. Sindi, J. L. Sparks, K. Swanson, D. B. Agus, and P. Macklin. MultiCellDS: A standard and a community for sharing multicellular data. *bioRxiv:090696*, Dec. 2016.

[79] I. Mirzaev and **D. M. Bortz**. Criteria for linearized stability for a size-structured population model. *arXiv:1502.02754*, Feb. 2015.

[80] D. D. Keck and **D. M. Bortz**. Numerical simulation of solutions and moments of the Smoluchowski coagulation equation. *arXiv:1312.7240*, Dec. 2013.

[81] **D. M. Bortz** and A. J. Christlieb. Scandalously Parallelizable Mesh Generation. *arXiv:1103.5268*, Mar. 2011.

[82] **D. M. Bortz**, A. D. Rubio, H. T. Banks, A. B. Cain, and R. C. Smith. Reduced order modeling in control of open cavity acoustics. Technical Report CRSC-TR00-18, Center for Research in Scientific Computation, North Carolina State University, Raleigh, NC, 2000.

[83] **D. M. Bortz**, R. D. Guy, J. Hood, K. Kirkpatrick, and V. Nguyen. Modeling HIV Infection Dynamics using Delay Equations. In P. Gremaud, Z. Li, R. C. Smith, and H. T. Tran, editors, *Proc. 2000 IMMW*, Raleigh, NC, 2000.

[84] A. S. Bondarenko, **D. M. Bortz**, and J. J. Moré. COPS: Large-Scale Nonlinearly Constrained Optimization Problems. Technical Report ANL/MCS-TM-237, Argonne National Laboratory, Argonne, IL, 1998.

[85] P. Barnes, **D. M. Bortz**, S. Frank, I. Loladze, E. Packard, and M. Santhanam. Power Transformer Clearance Checking. In F. Reitich, J. S. Scroggs, and H. T. Tran, editors, *Proc. 1997 IMMW*, Raleigh, NC, 1998.

Patents

2023 **D.M. Bortz**, V. Dukic, and D.A. Messenger, *Generalized Function Learning Machine*, patent applied for, Dec. 2023.

2019 J.C. Cameron, N.C. Hill, J.W. Tay, S. Altus, and **D.M. Bortz**, *Methods for Measuring and Optimizing the Structure, Location, and Activity of Natural and Engineered Microcompartments, Organelles, and Macromolecules*, patent applied for, Dec. 2019.

Funding

PI: 2023-2028 NIH-NIGMS MIRA R35GM149335
Data-Driven & Science-Informed Methods for the Discovery of Biomedical Mechanisms & Processes
Total: $1,881,471

PI: 6/2023 AMD/Xilinx University Program (FPGA equipment donation)

CU PI: 9/2022–8/2027 DOE MMICC DE-SC0023346 (Lead PI: A. Christlieb)
Center for Hierarchical and Robust Modeling of Non-Equilibrium Transport (CHaRMNET)
CU portion: $1,320,000 Total: $15,000,000

PI: 7/2021–6/2024 NSF MODULUS MCB-2054085 (Co-PI: J. Cameron)
Data-Driven Structured Population Modeling for Prediction of Complex Photosynthetic Phenotypes
Total: $787,000

Subcontract PI: 4/2020–6/2023 State of Colorado 202000011320 (PI: J. Samet)
COVID-19 Epidemic Modeling for the Colorado Department of Public Health and Environment
CU portion: $294,246

Co-PI: 6/2018–1/2023 NSF Comp. & Comm. Foundations CCF-1815983 (PI: S. Sankaranarayanan)
Rigorous Synthesis and Verification of Decisions Using Data-Driven Models
CU-APPM portion: $41,526 Total: $499,570

Consultant: 12/2017–6/2018 HRL
Multi-Static Cognitive Radar Processor

PI: 7/2017–5/2023 NSF/NIH Joint DMS/NIGMS Math Bio Initiative R01GM126559 (Co-I: X. Liu, V. Dukic)
Epithelial Cell Migration: Model selection for mechanistic model development
Total: $1,540,000

PI: 1/2017–7/2017 RASEI Seed Grant (Co-PI: J. Cameron)
The Impact of Carboxysome Age and Inheritance on Metabolic Heterogeneity in Populations of Photosynthetic Microbes
Total: $17,819

Consultant: 4/2016–8/2017 Leidos

Consultant: 4/2015–12/2015 Exelis

Co-PI: 10/2014–9/2017 NSF Cyber-Physical Systems CPS-1446900 (PI: S. Sankaranarayanan)
In-Silico Functional Verification of Artificial Pancreas Control Algorithms
CU-APPM portion: $86,342 Total: $615,404

PI: 8/2012–8/2017 NSF Math Biology DMS-1225878 (UM PI: J. Younger)
Collaborative Research: Microbial Flocculation Dynamics
CU portion: $323,415 Total: $485,866

Consultant: 1/2012–8/2015 HRL/ONR N00014-12-C-0027
Ultra Wideband Cognitive Channelizer

Subcontract PI: 10/2011–12/2015 NIH-NIGMS R01GM069438 (PI: J. Younger)
Complement C5a in Human Sepsis
CU portion: $143,679 Total: $1,666,662

Consultant: 9/2011–10/2013 HRL/DARPA/AFRL FA8650-11-C-7158
Cognitive radio Low-energy signal Analysis Sensor ICs (CLASIC)

PI: 5/2011 NVIDIA Academic Partner Grant (GPU equipment donation)

CU PI: 10/2009–9/2014 NSF CDI-Type II PHY-0940991 (PI: M. Solomon)
Collaborative Research: Flow-induced fragmentation mechanisms in bacterial biofilms by hierarchical modeling of polymeric, interfacial and viscoelastic interactions
CU portion: $375,565 Total: $1,924,018

PI: 12/2008–6/2011 DOD-AFOSR FA9550-09-1-0404 (Co-PI: A. Christlieb)
Solving Differential Equations with Random Ultra-Sparse Numerical Discretizations
CU portion: $95,960 Total: $154,321

Subcontract PI: 6/2009–4/2013 NIH-NIGMS R01GM081702 (PI: J. Younger)
Biomechanics of Bloodstream Infections
CU portion: $385,440 Total: $2,120,694

Subcontract PI: 1/2009–1/2011 DOE-NREL KXEA-3-33606-41
Applied Mathematics Research for High Performance Systems Biology
CU portion: $104,359

Subcontract PI: 7/2005–6/2009 NIH-NIGMS R01GM069438 (PI: J. Younger)
C5a in defense against murine Gram-negative pneumonia
CU portion: $75,000, Total: $1,506,129

Co-PI: 1/2006–12/2006 Univ. of Michigan: New Initiatives
Characterization of Bacterial Aggregates using Dynamic Light Scattering
(graduate student funding at U. Michigan)

Invited Presentations

2023: University of Washington Data-driven methods seminar, Seattle, WA
Georgia Tech School of Mathematics, Atlanta, GA
Northwestern University Engineering Science & Applied Mathematics Colloquium, Evaston, IL
SIAM Conference on Applications of Dynamical Systems, Portland, OR
Pfizer Biologics Modeling Group Seminar
Indian Institute of Science Systems Biology seminar, Bangalore, India
ICIAM, Tokyo, Japan

2022: University of Warwick Fusion Research Group Seminar
Tsinghua University Machine Learning and Differential Equations Seminar
SIAM Conference on Mathematics of Data Science
Michigan State Computational Mathematics, Science and Engineering Colloquium

2021: Los Alamos National Lab Machine Learning Reading Group

2020: SIAM Life Sciences, Garden Grove, CA (cancelled due to COVID-19)
U. Colorado-Boulder Applied Math Colloquium: Boulder, CO
AMS Western Sectional Meeting, Fresno, CA (cancelled due to COVID-19)

2019: International Conference on Computational & Methodological Statistics, London, UK

2018: Math & Stat Challenges in Bridging Model Development, Parameter Identification and Model Selection in the Biological Sciences, Banff International Research Station, Banff, Canada
Workshop on Microbial Systems Modeling, Fields Institute: Toronto, Canada
U. Colorado-Boulder Mathematical Biology Seminar: Boulder, CO

2016: SIAM Conference on the Life Sciences: Boston, MA

2015: 12th IFAC Workshop on Time Delay Systems: Ann Arbor, MI

2014: Colorado School of Mines Mathematics & Statistics Colloquium: Golden, CO
SIAM Conference on the Life Sciences: Charlotte, NC
Michigan State Science at the Edge Seminar Series: East Lansing, MI

2013: GPU Technology Conference: San Jose, CA ($\sim$ 30% acceptance rate)

2012: DARPA MTO/CLASIC Program Review: Detroit, MI
U. Colorado-Boulder Computational Mathematics Seminar: Boulder, CO
SMB Annual Meeting: Knoxville, TN
S. Hills Middle School Career Day: Boulder, CO

2011: Virginia Tech Mathematics Colloquium: Blacksburg, VA
Michigan State Applied Mathematics Seminar: East Lansing, MI
AFOSR Computational Math Program Review: Arlignton, VA
DARPA MTO/CLASIC Kickoff Meeting: Arlington, VA
Int. Congress of Industrial & Applied Math.: Vancouver, Canada
Math Methods & Modeling in Life Sci. & Biomed.: Sile, Turkey
S. Hills Middle School Career Day: Boulder, CO

2010: Purdue Applied Math Seminar: West Lafayette, IN
AFOSR Computational Math Program Review: Arlington, VA
NSF Soft Matter Workshop: Fort Collins, CO
SIAM Life Sciences: Pittsburgh, PA
ISBA: Benidorm, Spain
SIAM SE-Atlantic Section Conf.: Raleigh, NC
Purdue Grad Student Lunch Seminar: West Lafayette, IN
Michigan State Pi Mu Epsilon Induction Speaker: East Lansing, MI

2009: U. Chicago Computation Institute Seminar: Chicago, IL
U. Wisconsin Applied Mathematics Seminar: Madison, WI
Arizona State Mathematical Biology Seminar: Tempe, AZ

Iowa State Applied Mathematics Seminar: Ames, IA
Colorado State Inverse Problems Seminar: Fort Collins, CO
U. Graz Applied Math: Graz, Austria
SIAM Annual Meeting: Denver, CO
Math Mod. & Ana. of Pop. in Bio. Sys.: Hunstville, AL
U. Graz Math Biology Summer School: Graz, Austria
U. Michigan Math Camp: Ann Arbor, MI

2008: Penn State Pritchard Fluid Mechanics Seminar: University Park, PA
Colorado State Applied Mathematics Seminar: Fort Collins, CO
U. Colorado-Boulder Bioinformatics Seminar: Boulder, CO
U. Colorado-Boulder Dynamics Seminar: Boulder, CO
U. Colorado-Colorado Springs Joint Math and Biology Seminar: Colorado Springs, CO
U. Louisiana-Lafayette Lloyd Roeling Mathematics Conference: Lafayette, LA
Society for Engineering Science: Urbana, IL
SIAM Life Sciences Meeting: Montreal, Canada
SIAM Annual Meeting: San Diego, CA
SAMSI Meta-Analysis Workshop: RTP, NC
Inverse Problems in Math & Sci.: Fethiye, Turkey
Conf. on Math in the Life & Bio. Sciences: Raleigh, NC
Pikes Peak Regional Undergrad Math. Conf.: Colorado Springs, CO
U. Colorado-Boulder SIAM Student chapter: Boulder, CO
Nat. Renewable Energy Lab.: Golden, CO

2007: U. Colorado-Denver Center for AIDS Research: Denver, CO
Math Modeling & Comp. Methods in Sci. &Eng.: Kobe, Japan
Int. Conference on Complexity in Acute Illness: Long Beach, CA
Society for Mathematical Biology Annual Meeting: San Jose, CA
Int. Congress of Industrial & Applied Math.: Zurich, Switzerland
Conf. on Comp. & Math. Methods in Science & Engineering: Chicago, IL
Conf. on Math in the Life & Bio. Sciences: Blacksburg, VA
Young Investigator Workshop at MBI: Columbus, OH
Approx. Methods for Design & Control: Buenos Aires, Argentina
AMS Sectional Meeting: Tucson, AZ

2006: Washington State Mathematics Colloquium: Pullman, WA
U. Cincinnati Mathematics Colloquium: Cincinnati, OH
U. Michigan Mathematical Biology Seminar: Ann Arbor, MI
Clemson Mathematics & Statistics Colloquium: Clemson, SC
U. Pittsburgh Mathematics Colloquium: Pittsburgh, PA
Texas Tech Mathematics Colloquium: Lubbock, TX
Michigan State Applied Mathematics Seminar: East Lansing, MI
U. Wyoming Mathematics Colloquium: Laramie, WY
U. Rochester Biostatistics and Computational Biology Seminar: Rochester, NY
U. Colorado-Boulder Colloquium: Boulder, CO
U. Colorado-Boulder Dynamics Seminar: Boulder, CO

AMS Sectional Meeting: Cincinnati, OH
Int. Conference on Complexity in Acute Illness: Washington, DC
SIAM Life Sciences Meeting: Raleigh, NC
SIAM Annual Meeting: Boston, MA
Inv. Prob. in Modeling & Sim.: Fethiye, Turkey
MAA Michigan Section: Grand Rapids, MI
U. Michigan Mathematics Summer Scholars: Ann Arbor, MI

2005: U. Michigan Mathematical Biology Seminar: Ann Arbor, MI
Arizona State Mathematics & Statistics Colloquium: Tempe, AZ
Virginia Tech Mathematics Colloquium: Blacksburg, VA
U. Iowa Mathematics Colloquium: Iowa City, IA
Case Western University Mathematics Colloquium: Cleveland, OH
SIAM Annual Meeting: New Orleans, LA

2004: U. Michigan Mathematical Biology Seminar: Ann Arbor, MI
Int. Conf. on Complexity in Acute Illness: Pittsburgh, PA
Michigan State Applied Mathematics Seminar: East Lansing, MI
Society for Mathematical Biology Annual Meeting: Ann Arbor, MI
SIAM Life Sciences Meeting: Portland, OR
Conference on Dyn. Sys. & Diff. Eqns.: Pomona, CA

2003: Biocomplexity V: South Bend, IN
CCBS VIII: Bozeman, MT
IPAM Conf. on Applied Inverse Problems: Lake Arrowhead, CA
U. Michigan VIGRE Scientific Computing Seminar: Ann Arbor, MI
U. Michigan Mathematical Biology Seminar: Ann Arbor, MI

2002: SIAM Life Sciences Meeting: Boston, MA
NCSU Grad Student Applied Math Seminar: Raleigh, NC
Mathematics and Molecular Biology VII: Santa Fe, NM
U. Pierre et Marie Curie Lab. d'Analyse Num.: Paris, France
Future Directions in Distributed Parameter Systems: Raleigh, NC
AIAA 2000: Maui, HI
NCSU Grad Student Numerical Analysis: Raleigh, NC

Mentoring

Postdoc Mentor
Daniel Messenger, 2022-current, **Heidelberg Forum Attendee**
Brendan Fry (informal), 2015-2016
post-CU position: faculty at the Metroplitan State University at Denver
Sarthok Sircar, 2012-2014
post-CU position: faculty at the University of Adelaide
Chris Curtis (informal), 2011-2013
post-CU position: faculty at San Diego State University

Graduate Advisor - Applied Mathematics

- April Tran, PhD 2026, **Rudy Horne Fellowship**
- Daniel Messenger, PhD 2022
  - post-graduation: postdoctoral researcher in APPM at Colorado
- Lewis Baker, PhD 2021, **DOE CNLS GRA**
  - post-graduation: Data Scientist at Amyris
- Sabina Altus, PhD 2021, **NSF MSGI Award, CU Summer Dissertation Fellowship**
  - post-graduation: postdoctoral researcher in APPM at Colorado and CDPHE
- Harry Dudley, PhD 2020, **DOE Givens Associateship**
  - post-graduation: postdoctoral researcher in APPM at Colorado
- Jacqueline Wentz, IQBio certificate, PhD 2020, **NSF GRFP Award**
  - post-graduation: postdoctotral researcher in Aerospace at Colorado
- Jay Stotsky, PhD 2018, **DOE CSGF Award**
  - post-graduation: postdoctoral researcher at Minnesota
- John Nardini, IQBio certificate, PhD 2018, **NSF GRFP Honorable Mention**
  - post-graduation: postdoctoral fellow at SAMSI, faculty at TCNJ
- Inom Mirzaev, PhD 2017
  - post-graduation: postdoctoral fellow at MBI, Data Scientist at Twitter
- Dustin Keck, PhD 2014
  - post-graduation: faculty at the Air Force Academy
- Stephen Kissler, MS 2014, **Gates-Cambridge Fellow**, **Heidelberg Forum Attendee**
  - post-graduation: Gates Scholar at Cambridge in Applied Math
- Jason Hammond, PhD 2012
  - post-graduation: Researcher at AFRL-Kirtland AFB
- Erin Byrne, PhD 2011
  - post-graduation: postdoc at Harvey Mudd, faculty at Olin College

Committee Member

- A. Hirst, Aerospace Eng. PhD
- R. Tan, Applied Math PhD
- E. Ellefsen, Applied Math PhD
- T. Kushner, Computer Science PhD 2020
- P. Shaffery, Applied Math PhD 2020
- S. Shrestha, Applied Math PhD 2019
- E.P. Kightley, Applied Math PhD 2019
- Y. Chen, Applied Math PhD 2014
- T. Galanthay, Applied Math PhD 2013
- S. Orlofske, Ecol.&Evol. Bio. PhD 2013
- D. O'Connor, Civil, Env.&Arch. Eng. PhD 2012
- J. Mann, Civil, Env.&Arch. Eng. MS 2011
- K. Snyder, Applied Math PhD 2011
- J. Falk, Elec. Eng. MS 2009
- T. Caldwell, Elec. Eng. MS 2009
- A. Barker, Applied Math PhD 2009
- D. Simpson, Applied Math PhD 2008
- N. Aragon, Applied Math PhD 2008
- W. Mao, Applied Math PhD 2007

IQBio Rotation Mentor

- Ethan Hobbs, Fall 2018
- Antony Pearson, Spring 2015
- Vicky Li, Winter 2013/2014
- David Brazel, Winter 2013/2014
- Anna Broido, Fall 2012
- Ryan Langendorf, Fall 2012

External PhD Examiner

Wang Jin, Mathematical Sciences, Queensland University of Technology, Australia, PhD 2017
Aurora Armiento, Mathematics, U. Paris Diderot, France, PhD 2016
Hedia Fgaier, Mathematics& Statistics, U. Guelph, Canada, PhD 2010

Undergrad Mentor
Mckenna Partridge, 2021
Sarah Stoeck, 2014-2015, **UROP Award**
Zachary Thoutt, 2014
Sam Hsu, 2012-2014, **UROP Award**
Noor Tell, 2012 SMART program
Victoria Gershuny, 2011-14, **UROP Award**, **DOD NDSEG Award**
post-graduation: graduate student at U. Arizona
Stephen Kissler, 2011-14, **Provost Award**, **Distinguished Senior Award**
post-graduation: graduate student at Cambridge University
Ben Noe, 2011-12, **UROP Award**
Martin Sotola, 2011-12, **UROP Award**
Dua Chaker, 2011, **Provost Award**
Toni Klopfenstein, 2009-10, **UROP Award**
Matanya Horowitz, 2009-10, **NSF GRFP Award**
post-graduation: graduate student at Cal Tech
Kami Wilson, 2008
post-graduation: graduate student at Northwestern
Anna Lieb, 2007-08, **Goldwater scholar**, **Churchill scholar**, **NSF GRFP Award**
post-graduation: graduate student at UC-Berkeley
Greg Carlson, 2007

Teaching

University of Colorado-Boulder
Differential Equations with Linear Algebra (APPM 2360)
Matrix Methods and Applications (APPM 3310)
Fourier Series and Boundary Value Problems (APPM 4350/5350)
Modeling in Math Biology (APPM 4390/5390)
Numerical Methods II (APPM 4660)
Data-Driven Modeling (APPM 4720/5720)
Mathematical Biology Seminar (APPM 8400)
Foundations of Quantitative Biology (PHYS 7810)
Module on Mathematical Epidemiology and Stochastic Modeling

University of Michigan-Ann Arbor
Honors Applied Calculus II (MATH 156)
Honors Applied Calculus IV (MATH 256)
Boundary Value Problems for PDEs (MATH 454)
Mathematical Modeling (MATH 462)
Mathematical Modeling in Biology (MATH 463)
Introduction to Numerical Methods (MATH 471)

North Carolina State University
Differential Equations I (MATH 341)

Service

Editorial Activities:
2012-pres. Associate Editor, Mathematical Biosciences & Engineering
2022-2023 Bulletin of Mathematical Biology Collection Editor:
Data-driven Methods for Biological Modeling
2013-2016 Associate Editor, SIAM Undergraduate Research Online

Grant Reviews:
2021 NSF Mathematical Biology
2014 NSF Mathematical Biology
2012 Army Research Office Biomathematics
Netherlands Organisation for Scientific Research (NWO)
2011 Louisiana Board of Regents
2009 Joint NSF/NIH Program (Applied Mathematics & Mathematical Biology - DMS/NIGMS)
2006 NSF Division of Environmental Biology

University of Colorado-Boulder Campus Service:
2010-pres. IQ Biology Faculty Member
2009-pres. Renewable and Sustainable Energy Institute Affiliate
2011-2020 BioFrontiers Task Force Member
2014-2017 Boulder Campus Cyberinfrastructure Board
2013-2014 IQBiology Graduate Admissions
2012-2013 IQBiology Graduate Admissions
BioFrontiers Faculty Search Committee
2011-2012 IQBiology Graduate Admissions

University of Colorado-Boulder Department of Applied Mathematics Service:
2022-2023 Graduate Committee Member
Preliminary Exam Committee for Partial Differential Equations
Awards Committee Chair
2021-2022 Graduate Committee Member
Preliminary Exam Committee for Partial Differential Equations
Primary Unit Evaluation Committee Chair
Awards Committee Chair
2020-2021 Preliminary Exam Committee for Partial Differential Equations
Professional Masters Degree Committee Member
Post-tenure Review Committee Member
Primary Unit Evaluation Committee Member
2019-2020 Post Tenure Review Committee
Multi-year hiring advisory committee
Preliminary Exam Committee for Numerical Analysis
Award Committee

Professional Masters Degree Committee
2018-2019 Faculty Search Committee (chair)
Chair's advisory committee
Multi-year hiring advisory committee
Preliminary Exam Committee for Numerical Analysis
Primary Unit Evaluation Committee
Post Tenure Review Committee
Award Committee
Professional Masters Degree Committee
2017-2018 Faculty Search Committee (chair)
Managed APPM Professional Masters Degree
Chair's advisory committee
Multi-year hiring advisory committee
Primary Unit Evaluation Committee
2016-2017 Created APPM Professional Masters Degree
Preliminary Exam Committee for Partial Differential Equations
2015-2016 Professional Masters Degree Committee (chair)
Hiring Plans Committee
Primary Unit Evaluation Committee
Faculty Search Committee
Graduate Committee
2014-2015 Professional Masters Degree Committee (chair)
Hiring Plans Committee
Academic Prioritization Committee
Faculty Search Committee
School of Mathematical Sciences Committee
2013-2014 Faculty Search Committee
Graduate Committee
Preliminary Exam Committee for Partial Differential Equations
2012-2013 Graduate Committee
Preliminary Exam Committee for Partial Differential Equations
2011-2012 Graduate Committee
Undergraduate Committee
2010-2011 Department Colloquium Committee (chair)
2009-2010 Created Mathematical Biology course APPM 4390/5390
http://mathbio.colorado.edu/index.php/APPM_4390/5390
Preliminary Exam Committee for Numerical Analyis
Undergraduate Committee
2008-2009 Faculty Search Committee
Undergraduate Committee
2007-2008 Undergraduate Committee
2006-2007 Faculty Search Committee

Scientific Meeting Minisymposium Organization:
2020 SIAM Conference on the Life Sciences, Garden Grove, CA

MS{1,12,23}: Data-Driven Creation of Mathematical Models for Biological Systems
2017 Society for Mathematical Biology Annual Meeting, Salt Lake City, UT
MS32: Stage-Structured Population Models in Biology
2016 SIAM Conference on the Life Sciences, Boston, MA
MS56: Microscale Cellular Modeling and Emergent Macroscale Growth Dynamics
2015 Society for Mathematical Biology Annual Meeting, Atlanta, GA
E3: Stability Analysis and Inverse Problem for Structured-population Dynamics
F4: Migration & Signalling Waves in Cellular Biology
I5: Advances in Models for Biological Aggregation & Fragmentation
K3: Modeling & Simulation of the Biomechanics of Heterogenous Biomaterials
2014 SIAM Conference on the Life Sciences, Charlotte, NC
MS{8,18}: Structured Population Dynamics: Modeling, Estimation, & Validation
2012 Society for Mathematical Biology Annual Meeting, Knoxville, TN
MS2: Modeling, simulation, & validation of the biomechanics of microbial communities
MS31: Experimental Design for Dynamical System Models in Biology
2011 International Council of Industrial and Applied Mathematics, Vancouver, BC, Canada
MS193: Scandalously Parallelizable Methods for ODE/PDE Simulations
2009 SIAM Annual Meeting, Denver, CO
MS{3,10}: Biofilm-Flow Interactions
MS71: Modeling of Large-Scale Metabolic Networks
2008 SIAM Conference on the Life Sciences, Montreal, QC, Canada
MS9: Biofilms: Fragmentation & Control, Part II
2007 International Council of Industrial and Applied Mathematics, Zurich, Switzerland
IC/MP928/025: New directions in PDE simulations
2004 Society for Mathematical Biology Annual Meeting, Ann Arbor, MI
MS4: Dynamical System Modeling of Gene Expression & Regulatory Dynamics
2003 SIAM Annual Meeting, Montreal, QC, Canada
MS48: Applications of Delay Differential Equations to Mathematical Biology
2002 SIAM Conference on the Life Sciences, Boston, MA
MS14: Modeling & Control in HIV

Scientific Reviewing:

- ACS Nano
- American Journal of Physiology: Endocrinology and Metabolism
- Applied Mathematical Modeling
- Ars Combinatoria
- Bulletin of Mathematical Biology
- Cambridge Univ. Press Book Proposals
- Calcolo
- Chaos
- Communications in Computational Physics
- Computer Aided Verification
- Computer Methods in Applied Mechanics and Engineering
- Computers and Mathematics with Applications
- Dynamical Systems and Applications
- European Journal of Applied Mathematics
- IEEE Trans. Biomedical Engineering
- International Journal of Mathematics
- Inverse Problems in Science and Engineering
- Journal of Applied Physics
- Journal of Biological Dynamics
- Journal of Computational and Applied Mathematics
- Journal of Computational Physics
- Journal of Critical Care
- Journal of General Virology
- Journal of Inverse and Ill-Posed Problems
- Journal of Mathematical Analysis and Applications
- Journal of Mathematical Biology
- Journal of Nonlinear Analysis B
- Journal of Numerical Mathematics: Theory, Methods and Applications
- Journal of the Royal Society Interface
- Journal of Theoretical Biology
- Mathematical Biosciences
- Mathematical Biosciences and Engineering
- Mathematics and Computers in Simulation
- Multiscale Modeling and Simulation
- Numerical Functional Analysis and Optimization
- Neural Computing and Applications
- Neural Networks
- Optimization and Engineering
- Physica A
- Physica D
- Physics Letters A
- Physical Review Research
- Proceedings of the National Academy of Sciences USA
- Proceedings of the Royal Society A: Math., Phys., & Eng. Sciences
- PLoS: Computational Biology
- PLoS: Medicine
- PLoS: ONE
- Quarterly of Applied Mathematics
- Science Advances
- SIAM Book Proposals
- SIAM Applied Dynamical Systems
- SIAM Journal on Applied Mathematics
- Theoretical Biology and Medical Modelling