

Blerta Shtylla**Assistant Professor**

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EDUCATION

Ph.D. in Mathematics, University of Utah, Salt Lake City UT 2011
 Dissertation: *Mathematical models of chromosome motility during mitosis*
 Adviser: James P. Keener

M.S. in Mathematics, University of Utah, Salt Lake City UT 2007

B.S. in Mathematics, Summa cum laude, Lafayette College, Easton PA 2005

PROFESSIONAL EXPERIENCE

Spring 2017 Visitor, Mathematical Biosciences Institute, Columbus, OH March 2017.

Visiting Assistant Professor, Dept of Mathematics, Harvey Mudd College, Claremont, CA 2016-2017.

Visiting Assistant Professor, Dept of Biomathematics, UCLA, Los Angeles, CA fall 2016.

Assistant Professor of Mathematics, Pomona College, Claremont, CA 2013-present

Assistant Professor of Mathematics, Mount Holyoke College, South Hadley, MA 2012-2013.

Post-Doctoral Fellow, Mathematical Biosciences Institute, Columbus, OH 2011-2012.

FELLOWSHIPS AND GRANTS

Howard Hughes Medical Institute 5C Collaborative Proposal 2017
 Pomona College
 Title: "An interdisciplinary experimental and mathematical examination of the early maturation events in *C. elegans* embryos"
 co-Principal Investigator \$13,000

National Science Foundation Grant No.1445812 2014-2016
 Division of Mathematical Sciences, Conference Awards
 Title: "International symposium on biomathematics and ecology: education and research (BEER)"
 Principal Investigator \$15,000

National Science Foundation Grant No.1358932 2012-2015
 Division of Mathematical Sciences, Program in Mathematical Biology
 Title: "Mathematical modeling of chromosome organization and segregation in bacteria"
 Principal Investigator \$130,000

University of Utah Graduate Research Fellowship 2009-2010
 University of Utah Graduate School
 Recipient Fees, tuition and stipend

PUBLICATIONS

Peer-reviewed articles

1. D. W. Morgens† and **B. Shtylla**, Stochastic Analysis of a Mammalian Circadian Clock Model: Small Protein Number Effects, 2017, *Spora: A Journal of Biomathematics*, Vol. 3 (1), pp. 86–99.
2. **B. Shtylla** Mathematical modeling of spatiotemporal protein localization patterns in *C. crescentus* bacteria: a mechanism for asymmetric FtsZ ring positioning, 2017, *Journal of Theoretical Biology*, 433, pp.8-20.
3. V. C. Coffman, M. B. A. McDermott†, **B. Shtylla**, A. T. Dawes. Stronger net posterior cortical forces and asymmetric microtubule arrays produce simultaneous centration and rotation of the pronuclear complex in the early *Caenorhabditis elegans* embryo, 2016, *Mol Biol Cell*, 27(22), pp.3550-3562
4. L. D. Waldrop, C. D. Behn, E. Braley, J. A. Drew, R. J. Full, L. J. Gross, J. A. Jungck, B. Kohler, J. C. Prairie, **B. Shtylla**, and L. A. Miller. Using active learning to teach concepts and methods in quantitative biology, 2015, *Integrative and Comparative Biology*, 5 (5), pp. 933.
5. C. Xue, **B. Shtylla**, and A. Brown. A Stochastic multiscale model that explains the segregation of axonal microtubules and neurofilaments in neurological diseases, 2015, *PLOS Computational Biology*, 11(8), pp. e1004406.
6. **B. Shtylla** and J. P. Keener. Mathematical modeling of bacterial track-altering motors: Track cleaving through burnt-bridge ratchets, 2015, *Physical Review E*, 91, pp. 042711.
7. J. P. Keener and **B. Shtylla**. A mathematical model of force generation by flexible kinetochore-microtubule attachments*, 2014, *Biophysical Journal* 106(5), pp. 998-1007.
 - *Article featured on the cover of the March 04 issue of the Biophysical Journal, and in : "Modeling Kinetochores: When form and function becomes art" on the Biophysical Society Blog at <http://biophysicalsociety.wordpress.com>
8. A. Sharma*, **B. Shtylla*** and D. Chowdhury. Distribution of lifetimes of kinetochore-microtubule attachments: interplay of energy landscape, molecular motors and microtubule (de-)polymerization, *Physical Biology*, 2014, 11, pp. 036004. *equal contribution.
9. A. Matzavinos, **B. Shtylla**, Z. Voller, S. Liu, and M. A.J. Chaplain. Stochastic modelling of chromosomal segregation: Errors can introduce correction, *Bulletin of Mathematical Biology*, 2014, 76(7), pp. 1590-1606.
10. **B. Shtylla** and J. P. Keener. A mathematical model of ParA filament-mediated chromosome movement in *Caulobacter crescentus*., *Journal of Theoretical Biology*, 2012, 307, pp. 82-95.
11. **B. Shtylla** and J. P. Keener. A mathematical model for force generation at the kinetochore-microtubule interface, *SIAM Journal on Applied Mathematics*, 2011, 71(5), pp. 1821-1848.
12. **B. Shtylla** and J. P. Keener. A mechanomolecular model for the movement of chromosomes during mitosis driven by a minimal kinetochore bicyclic cascade, *Journal of Theoretical Biology*, 2010, 263(4), pp. 455-70.
13. **B. Shtylla**, L. Traldi, and L. Zulli. On the realization of double occurrence words, *Discrete Mathematics*, 2009, 309(6), pp. 1769-1773.
14. **B. Shtylla** and L. Zulli. An extension of the Jones polynomial of classical knots, *Journal of Knot Theory and Its Ramifications*, 2006, 15, pp. 81-100.

Pre-prints

1. J. Gallaher, K. Larripa, U. Ledzewicz, M. Renardy, **B. Shtylla**, N. Tania, D. White, K. Wood, L. Zhu, C. Passey, M. Robbins, N. Bezman, S. Shelat, H. J. Cho, H. Moore. A mathematical model for tumor-immune dynamics in multiple myeloma, 2017, *submitted*.
2. J. Gallaher, K. Larripa, U. Ledzewicz, M. Renardy, **B. Shtylla**, N. Tania, D. White, K. Wood, L. Zhu, C. Passey, M. Robbins, N. Bezman, S. Shelat, H. J. Cho, H. Moore. A mathematical model for tumor-immune dynamics in multiple myeloma: Sensitivity analysis, identifiability, and numerical simulations, 2018, *in preparation*.

3. **B. Shtylla** and J. P. Keener. First passage properties of a track altering molecular motor on two tracks, 2017, *in preparation*.

†undergraduate authors

HONORS AND AWARDS

Mathematical Association of America Project NExT Fellow	2012-2014
Phi Beta Kappa, Lafayette College	2005
American Mathematical Society Waldemar J. Trjitzinsky Memorial Award	2004
Mayo Clinic Summer Undergraduate Fellowship Program Mayo Graduate School	Summer 2004
EXCEL Scholar, Mathematics Department, Lafayette College	Summer 2003
Eugene P. Chase Phi Beta Kappa Award, Lafayette College	2003

PROFESSIONAL PRESENTATIONS

<i>Research Frontiers in Biomathematics Seminar</i> UCLA, Los Angeles, CA Title: Mathematical models for asymmetric cell division	November 2017
<i>University of Utah MathBio Alumni Conference</i> University of Utah, Salt Lake City, UT Title: Intracellular spatiotemporal protein patterning in bacterial cells	July 2017
<i>Applied Math Seminar</i> California State University Northridge, CA Title: Intracellular spatiotemporal protein patterning in bacterial cells	April 2017
<i>Mathematical Biosciences Institute Visitor Seminar</i> The Ohio State University, Columbus, OH Title: Intracellular spatiotemporal protein patterning in bacterial cells	March 2017
<i>International Symposium on Biomathematics and Ecology Education and Research</i> Charleston, SC Title: Spatiotemporal protein patterns: The mathematics of cell division.	October 2016
<i>SIAM Conference on the Life Sciences</i> Boston, MA Title: Mathematical Modeling of Dividing <i>C. elegans</i> Embryo Cell Mechanics.	July 2016
<i>11th AIMS Conference on Dynamical systems, Differential Equations and Applications</i> Orlando, FL Title: Mathematical modeling of cellular nanomachines.	July 2016
<i>Mathematical Biology Seminar</i> University of California, Davis Title: Mathematical modeling of cellular nanomachines.	March 2016
<i>Opening Workshop of the Stochastic Dynamical Systems in Biology: Numerical Methods and Applications Programme at the Isaac Newton Institute</i> Cambridge, UK Title: Mathematical modeling of cellular nanomachines.	January 2016
<i>2015 Annual Meeting of the Society for Integrative and Comparative Biology</i> West Palm Beach, FL Title: Interdisciplinary team approaches to mathematical modeling.	January 2015

- 2014 Canadian Mathematical Society Summer Meeting*, Winnipeg, Manitoba, Canada June 2014
 Title: Mathematical models of force generation at the cellular nanoscale: Interplay of protein flexibility and diffusion.
- Twin WiMSoCal*, University of San Diego, San Diego CA May 2014
 Title: Quantitative approaches for intra-cellular transport machines.
- CCMS Colloquium*, Harvey Mudd College, Claremont, CA April 2014
 Title: Flexing the kinetochore muscle: Mathematical modeling of chromosome/microtubule connections
- Western Fall Sectional Meeting of the American Mathematical Society*, UC Riverside, CA November 2013
 Title: An interdisciplinary group approach to teaching Differential Equations: Experiences and challenges.
- Applied Mathematics Seminar*, Rensselaer Polytechnic Institute, Troy NY May 2013
 Title: Mathematical Models of Chromosomal Nano-Machines: A Story of Attachment and Error.
- Applied analysis and computation seminar*, University of Massachusetts at Amherst, Amherst MA April 2013
 Title: Mathematical Models of Chromosomal Nano-Machines: A Story of Attachment and Error.
- Mathematical Biology Seminar*, University of Florida, Gainesville FL March 2013
 Title: Mathematical modeling of polymer nano-machines.
- Biology Department Seminar*, Mount Holyoke College, South Hadley MA March 2013
 Title: "Which way forward? Tales of transport and control at the cellular level.
- Four College Biomathematics Consortium*, Mount Holyoke College, S. Hadley MA, October 2012
 Title: Force generation by cytoskeleton remodeling in dividing bacteria: A mathematical point of view.
- MBI 10th Anniversary Meeting*, Mathematical Biosciences Institute, The Ohio State University, Columbus OH September 2012
 Title: A model for load-dependence of mean microtubule attachment times with kinetochores: a catch-bond mechanism for error correction" (Invited Poster Presentation).
- Society for Mathematical Biology Annual Meeting*, Knoxville TN July 2012.
 Title: Stochastic Modeling of Bacterial Chromosome Segregation.
- MBI Partner Meeting*, Mathematical Biosciences Institute, The Ohio State University, Columbus OH February 2012
 Title: Mathematical Modeling of Chromosome Movement in Bacteria" (Poster Presentation).
- Center for Cell Analysis and Modeling*, University of Connecticut Health Center April 2011
 Title: A Mathematical Model of Force Generation Mechanisms at the Kinetochore/Microtubule Interface.
- Math/Stat Club Seminar*, Mathematics Department, Mount Holyoke College February 2011
 Title: Biopolymer Brownian Motors.
- 2010 MBI Workshop for Young Researchers in Mathematical Biology*, Ohio State University, Columbus OH August 2010
 Title: A Mathematical Model for Force Generation Mechanisms at the Kinetochore-Microtubule Interface (Poster Presentation).
- Biophysical Society 54th Annual Meeting*, San Francisco, CA February 2010
 Title: A Mechanomolecular Model for Chromosome Movement during Mitosis (Poster Presentation).
- GSAC Graduate Colloquium*, Mathematics Department, University of Utah, UT December 2009
 Title: Mathematical Models of One-Shot Molecular Engines.
- Nebraska Conference for Undergraduate Women in Mathematics*, University of Nebraska, Lincoln NE February 2004
 Title: Knots, Ortho-Projection Matrices and Jones Polynomials.

Summer Undergraduate Research Conference in Mathematics,
The Ohio State University, Columbus OH
Title: Knots, Ortho-Projection Matrices and Jones Polynomials.

August 2003

PROFESSIONAL WORKSHOPS AND ORGANIZED SESSIONS

Special Session ("Mathematics meets Life") at the 11th AIMS Conference on Dynamical systems, Differential Equations and Applications	July 2016
	Organizer.
Mathematical Association of America MathFest 2012, Madison WI Project NExT Program	August 2012 Funded participant.
Mathematical Biosciences Institute, The Ohio State University Robustness in Biological Systems	February 2012 Funded participant.
Mathematical Biosciences Institute, The Ohio State University Stochastic Processes in Cell and Population Biology	October 2011 Funded participant.
Mathematics Department, University of Utah Department of Mathematics Annual TA Training Workshop	August 2010 Co-organizer/workshop facilitator.
Mathematics Department, University of Utah Mathematical Perspective on Cancer Immunology	May 2008 Funded participant.
The Center for Teaching and Learning Excellence, University of Utah Developing Effective Assignments and Grading Rubrics in Higher Education	November 2007 Participant.
IGERT 3rd Annual Student Workshop, Mathematics Department, University of Utah Modeling and Simulation in the Life Sciences with Charlie S. Peskin	July 2007 Participant.
IGERT 2nd Annual Student Workshop, Mathematics Department, University of Utah Biological Polymers and Cell Motility with Leah Edelstein-Keshet	May 2006. Participant.
Institute for Advanced Study/Princeton University Program for Women in Mathematics: Analysis and Nonlinear PDEs	Summer 2004 Funded participant.

PROFESSIONAL SERVICE

Guest Editor: *Letters in Biomathematics*.

Referee: *Journal of Theoretical Biology, Journal of Mathematical Biology, Biophysical Journal, Letters in Biomathematics*