**MEREDITH L. GREER**

205 Hathorn HallBates CollegeLewiston, Maine 04240mgreer@bates.edu

**EDUCATION**

**Vanderbilt University**, Nashville, Tennessee. M.S., Ph.D., Mathematics

**University of Delaware**, Newark, Delaware. B.A., *cum laude,* Mathematics

**PROFESSIONAL EXPERIENCE**

**Professor of Mathematics,** Bates College, 2020-present, Lewiston, Maine

**Program Chair, Digital and Computational Studies**, Bates College, 2019-present

**Division Chair, Natural Sciences and Mathematics**, Bates College, 2016-2017

**Department Chair, Mathematics**, Bates College, 2011-2015

**Associate Professor of Mathematics,** Bates College, 2008-2020, Lewiston, Maine

**Assistant Professor of Mathematics,** Bates College, 2002-2008, Lewiston, Maine

**Ph.D. student and Teaching Assistant,** Vanderbilt University, 1997-2002, Nashville, Tennessee

**Summer Hire,** The Aerospace Corporation, 2000, Colorado Springs, Colorado

**Instructor of English as a Second Language,** Yale Academy of Language Education, 1995-1996, Taegu, South Korea

**PUBLICATIONS**

*(Italics denote authors who contributed to publications as undergraduates.)*

**Predicting the effects of climate change on freshwater cyanobacterial blooms requires consideration of the complete cyanobacterial life cycle** (2020) Kathryn L. Cottingham, Kathleen C. Weathers, Holly A. Ewing, Meredith L. Greer, Cayelan C. Carey. Journal of Plankton Research vol. 43(1), pp. 10-19. <https://doi.org/10.1093/plankt/fbaa059> .

**Reviews: *500 Examples and Problems of Applied Differential Equations*** (2020) Meredith L. Greer. The American Mathematical Monthly vol. 127(7), 668-671, <https://doi.org/10.1080/00029890.2020.1764825> .

**“New” cyanobacterial blooms are not new: two centuries of lake production are related to ice cover and land use** (2020) Holly A. Ewing, Kathleen C. Weathers, Kathryn L. Cottingham, Peter R. Leavitt, Meredith L. Greer, Cayelan C. Carey, Bethel G. Steele, *Alyeska U. Fiorillo*, and John P. Sowles. Ecosphere vol. 11(6). <https://doi.org/10.1002/ecs2.3170>.

**Paying Our Dues: The Role of Professional Societies in the Evolution of Mathematical Biology Education** (2020) Meredith L. Greer, Olcay Akman, Timothy D. Comar, Daniel Hrozencik, Jonathan E. Rubin. Bulletin of Mathematical Biology vol. 82. <https://doi.org/10.1007/s11538-020-00728-9> .

**Emergence of oscillations in a simple epidemic model with demographic data** (2020) Meredith L. Greer, Raj Saha, *Alex Gogliettino, Chailin Yu, Kyle Zollo-Venecek*. Royal Society Open Science vol. 7. <https://doi.org/10.1098/rsos.191187> .

**Engaging Crisis: Immersive, interdisciplinary learning in mathematics and rhetoric** (2019) Meredith L. Greer and Stephanie Kelley-Romano. Journal of Humanistic Mathematics vol. 9(2). <https://scholarship.claremont.edu/jhm/vol9/iss2/4> .

**Interdisciplinarity and inclusivity: natural partners in supporting students** (2019) Meredith L. Greer. PRIMUS (Problems, Resources, and Issues in Mathematics Undergraduate Studies). DOI: 10.1080/10511970.2018.1488782 .

**Functions and their derivatives in SIR models** (2018) Meredith L. Greer. SIMIODE: A Systemic Initiative for Modeling Investigations & Opportunities with Differential Equations. Online publication: "6-007-S-FunctionsAndDerivativesInSIRModels," <https://www.simiode.org/resources/4884> .

**Mathematical epidemiology goes to college** (2018) Meredith L. Greer, *Ella Livesay*. Math Horizons vol. 25, pp. 8-11.

**Modeling Pitch Trajectories in Fastpitch Softball** (2015) *Jean M. Clark*, Meredith L. Greer, Mark D. Semon. Sports Engineering vol. 18, pp. 157-164.

**Cyanobacteria as biological drivers of lake nitrogen and phosphorus cycling** (2015)Kathryn L. Cottingham, Holly A. Ewing, Meredith L. Greer,Cayelan C. Carey, and Kathleen C. Weathers. Ecosphere vol. 6, pp. 1-19.

**Spatial and temporal variability in recruitment of the cyanobacterium *Gloeotrichia echinulata* in an oligotrophic lake** (2014)Cayelan C. Carey, Kathleen C. Weathers, Holly A. Ewing, Meredith L. Greer, Kathryn L. Cottingham. Freshwater Science vol. 33 no. 2, pp. 577-592.

**Collaborative understanding of cyanobacteria in lake ecosystems** (2013) Meredith L. Greer, Holly A. Ewing, Kathryn L. Cottingham, Kathleen C. Weathers. College Mathematics Journal vol. 44 no. 5, pp. 376-385.

**Planning for the Long Term** (2013) Meredith L. Greer. Appears in the MAA Notes volume Undergraduate Mathematics for the Life Sciences: Models, Processes, and Directions, eds. Glenn Ledder, Jenna P. Carpenter, and Timothy D. Comar.

**Senior Seminar: Across a Department and Across the Years** (2013)Meredith L. Greer and Chip Ross. PRIMUS (Problems, Resources, and Issues in Mathematics Undergraduate Studies), vol. 23, pp. 347-358.

**Students in Differential Equations and Epidemiology model a campus outbreak of pH1N1** (2012) Meredith L. Greer and Karen A. Palin. Journal of Microbiology & Biology Education vol. 13, pp. 183-185

**The Effect of Mixing Events on the Dynamics of pH1N1 Outbreaks at Small Residential Colleges** (2012)Meredith L. Greer and Karen A. Palin. Journal of American College Health vol. 60, no. 6, pp. 485-489.

**New Expectations for the Training of Medical Students** (2009)Meredith L. Greer. FOCUS vol. 29, no. 5, p. 20.

**New Expectations for the Training of Medical Students: An Undergraduate Preparation Perspective** (2009)Meredith L. Greer. SMB Newsletter vol. 22, no. 3, pp. 8-9.

**Blogs Hit Classroom: Students Start Reading** (2008) Meredith L. Greer and *Benjamin Reed.* PRIMUS (Problems, Resources, and Issues in Mathematics Undergraduate Studies) vol. 18, no. 2, pp. 139-148.

**Effects of General Incidence and Polymer Joining on Nucleated Polymerization in a Model of Prion Proliferation** (2007)Meredith L. Greer, Pauline van den Driessche, Lin Wang, and Glenn F. Webb. SIAM Journal on Applied Mathematics vol. 68, pp. 154-170.

**A Mathematical Analysis of the Dynamics of Prion Proliferation** (2006) Meredith L. Greer, Glenn F. Webb, and Laurent Pujo-Menjouet. Journal of Theoretical Biology vol. 242, pp. 598-606.

**Plague or Prediction?** (2006) Meredith L. Greer. FOCUS vol. 26, no. 2, pp. 4-5.

**Determining If Two Solid Ellipsoids Intersect** (2003) Salvatore Alfano and Meredith L. Greer. Journal of Guidance, Control, and Dynamics, vol. 26, no. 1, pp. 106-110.

**Determining If Two Ellipsoids Share the Same Volume** (2002)Salvatore Alfano and Meredith L. Greer. Advances of the Astronautical Sciences, vol. 109, pp. 771-783.

**INVITED TALKS**

**Paying Our Dues: The Role of Professional Societies in the Evolution of Mathematical Biology Education.** Society for Mathematical Biology Annual Meeting: Minisymposium on Highlights of the Special Issue of BMB on Mathematical Biology Education, June 14, 2021, held virtually

**A Time to Play, A Space for Action: Mathematical Biology as an Undergraduate Program**. St. Olaf College (talk presented virtually), April 8, 2021

**Coronavirus Panel.** March 10, 2020, Lewiston, Maine

**Oscillation in Mathematical Epidemiology***.*Plenary Lecture at International Symposium on Biomathematics and Ecology Education and Research (BEER),October 5, 2019, LaCrosse, Wisconsin.

**Math Fundamentals: One Model at a Time***.*Society for Mathematical Biology Annual Meeting: Education Mini-Symposium, July 25, 2019, Montreal, Canada.

**Discovering Mathematics Through Epidemiological Models.** Battles Lecture at Northeast Section Meeting of the Mathematical Association of America, May 31, 2019, Fitchburg, Massachusetts

**Functions Applied: Precalculus Concepts Via Scientific Uses.** International Symposium on Biomathematics and Ecology Education and Research (BEER),October 6, 2018, Tempe, Arizona

**An Undergraduate Course in Mathematical Epidemiology***.*Society for Mathematical Biology Annual Meeting: Education Mini-Symposium, July 19, 2017, Salt Lake City, Utah

**Agent-based Models in Ecology and Epidemiology**. Unity College Math Colloquium,March 15, 2016, Unity, Maine

**The DEs To Your Heart.** University of Maine Math Colloquium, April 15, 2015, Orono, Maine

**The DEs To Your Heart.** Colby College Math Colloquium,November 24, 2014, Waterville, Maine

**Ebola Information Panel.** October 28, 2014, Lewiston, Maine

**Roller Coaster Math.** Plenary Lecture at Northeastern Section of the Mathematical Association of America Fall Meeting, November 22, 2013, Norton, Massachusetts

**Collaboration, Cyanobacteria, and Compartmental****Modeling.** Mathematics Awareness Lecture/MAA Dinner Meeting, October 28, 2013, Boston, Massachusetts

**The DEs to Your Undergrad’s Heart.** Southeastern-Atlantic Regional Conference on Differential Equations, September 22, 2013, Knoxville, Tennessee

**Roller Coasters, Infectious Disease, and Mathematics.** Alumni College at Bates, June 10, 2012, Lewiston, Maine

**Project NExT Panel on Successful Capstone Projects.** Joint Mathematics Meetings*,*January 4-7, 2012, Boston, Massachusetts

**Toward understanding the role of *Gloeotrichia echinulata* in eutrophication of lakes: early modeling results.** University of New Brunswick,October 14, 2010, Fredericton, Canada

**Can cyanobacterial blooms in nutrient-poor lakes accelerate eutrophication? Perspectives from modeling.** Canadian Mathematical Society Summer Meeting,June 6, 2010, Fredericton, Canada

**Building Math Models in Biology***.* Connecticut College, February 19, 2008, New London, Connecticut

**Building Math Models in Biology.**Colby College, September 17, 2007, Waterville, Maine

**Prion Disease Modeling: Interaction of Infectious and Noninfectious Proteins***.* University of Alberta, April 25, 2006, Edmonton, Canada

**Prion Disease Modeling: Interaction of Infectious and Noninfectious Proteins.** Harvey Mudd and Pomona Colleges, March 29, 2006, Claremont, California

**Protein Population Interactions in Prion Diseases.**University of British Columbia, February 8, 2006, Vancouver, Canada

**Interaction of Infectious and Noninfectious Proteins in Prion Disease: Models, Simulations, and Steady State Study.** Canadian Mathematical Society Annual Meeting, December 11, 2005, Victoria, Canada

**Roller Coaster Mathematics.** United States Military Academy, October 6, 2005, West Point, New York

**Threshold Conditions in a Model of Prion.** DiseaseInternational Society for Analysis, its Applications and Computation, July 25-30, 2005, Catania, Italy

**Saving Satellites.** Hobart and William Smith Colleges, April 15, 2005, Geneva, New York

**Prion Proliferation: Modeling, Analysis, and Impact.**CBB (Colby, Bates, Bowdoin) Mathematics Seminar, November 12, 2004, Bowdoin College

**A Mathematical Analysis of Prion Proliferation.** American Mathematical Society Southeast Region Fall Meeting, October 15-17, 2004, Nashville, Tennessee

**From Periodic Locusts to Mad Cow Disease: Translating Nature Into Mathematics.** Connecticut College Majors Seminar, February 17, 2004, New London, Connecticut

**Satellites, Ellipsoids, and Eigenvalues.** Bates Mathematics Department Seminar, November 6, 2002, Lewiston, Maine

**Mad Cows and Hungry Locusts.** Vanderbilt University Mathematics Seminar for Undergraduates, March 28, 2001, Nashville, Tennessee

**HTML for Beginners.** Vanderbilt University Mathematics Department, February 8, 2001, Nashville, Tennessee

**CONTRIBUTED PRESENTATIONS**

**Teaching Mathematical Epidemiology in the Time of COVID-19.** Joint Mathematics Meetings, January 6-9, 2021, held virtually

**Estimating Parameters and Responding to Questions During an Outbreak: Modeling Ebola in Fall 2014.** Joint Mathematics Meetings, January 6-9, 2016, Seattle, Washington

**A 2016 Calendar of Math in Berlin: Twelve Historical Moments That Influence Us Today***.* Joint Mathematics Meetings, January 6-9, 2016, Seattle, Washington

**Combining Forces: Math and Bio Students Join to Study H1N1***.* MathFest**,** August 2-4, 2012, Madison, Wisconsin

**Life Cycle Dynamics of *Gloeotrichia echinulata* and connections to nutrient cycling*.*** Society for Mathematical Biology Annual Meeting,July 25-28, 2012, Knoxville, Tennessee

**Senior Seminar, Across a Department and Across the Years** (with Chip Ross).Joint Mathematics Meetings,January 4-7, 2012, Boston, Massachusetts

**Roller Coasters and the Mathematics Behind Them.** MathFest**,** August 10-12, 2006, Knoxville, Tennessee

**Threshold Conditions in an ODE Model of Prion Disease** (poster). Society for Mathematical Biology Annual Meeting,July 18-22, 2005, Dresden, Germany

**A Mathematical Analysis of Prion Proliferation***.*AWM Workshop as part of SIAM Annual Meeting, July 11-16, 2004, Portland, Oregon

**Steady State Analysis of Prion Proliferation.** Joint Conference of MPD 7 and DESTOBIO 3, June 21-25, 2004, Trento, Italy

**Math Camp: A Language Immersion Class***.* Joint Mathematics Meetings, January 6-10, 2004, Phoenix, Arizona

**Prion Dynamics Modelled, Displayed, and Analyzed.** Society for Mathematical Biology Annual Meeting, August 5-9, 2003, Dundee, Scotland

**A Population Model of Prion Dynamics.** Joint Mathematics Meetings, January 15-18, 2003, Baltimore, Maryland

**Saving Satellites***.*Regional Meeting of the Mathematical Association of America, November 22-23, 2002, Framingham, Massachusetts

**A Population Model of Prion Dynamics**(poster). The Society for Mathematical Biology Annual Meeting, July 15-19, 2001, Hilo, Hawaii

**A Population Model of Prion Dynamics** (poster). AWM Workshop as part of SIAM Annual Meeting, July 9-11, 2001, San Diego, California

**GRANTS**

**STEM Faculty-Student Research Award (Bates internal award).** *The Spread of the Birther Conspiracy as an Epidemiological Model*. April-May 2019: $2368

**Howard Hughes Medical Institute (Bates internal award)** *Critical Issues in Mathematics Education 2019: Mathematical Modeling in K-16: Community and Cultural Contexts* at Mathematical Sciences Research Institute. March 6-8, 2019: $1260

**Faculty Scholarship Award (Bates internal award)** *Agent Based Modeling: Strengthening Classroom Teaching and Research Possibilities*. July-December 2017: $1,444.76

**Sherman Fairchild Foundation faculty-student summer research grant (Bates internal award)** *Mathematical Models of National Healthcare Approaches.* June-August 2017: $4736

**Mellon Innovation Fund (Bates internal award)** *Mathematical Modeling of* Gloeotrichia echinulata*.* 2010-2011; used mainly in Summer 2011: $11,554

**CBB Mellon Grant for Math/Bio Seminar Series (Bates internal award)** 2007-2008 academic year: $8500

**Ladd Gift (Bates internal award)** 2004-2005 academic year: $3000

**AWM Workshop as part of SIAM Annual Meeting** July 11-16, 2004, Portland, Oregon. Conference attendance and travel funded by AWM for accepted participants

**Howard Hughes Medical Institute IV (Bates internal award)** Curriculum development grant awarded December 2004: $12000

**Howard Hughes Medical Institute IV (Bates internal award)** Curriculum development grant awarded May 2003: $7756

**The Society for Mathematical Biology** **Travel Grant** Annual meeting, July 15-19, 2001, Hilo, Hawaii

**AWM Workshop as part of SIAM Annual Meeting** July 9-11, 2001, San Diego, California. Conference attendance and travel funded by AWM for accepted participants

**COURSES TAUGHT AT BATES**

**Mathematics**

MATH 102: Mathematics Across the Sciences

MATH 105: Calculus 1

MATH 110: Great Ideas in Mathematics (as part of the Bates Summer Scholars

Program)

MATH 205: Linear Algebra

MATH 206: Multivariable Calculus

MATH 218: Numerical Analysis (now MATH 355A)

MATH 219: Differential Equations

MATH 255B: Mathematical Modeling

MATH 255F: Agent-Based Modeling with NetLogo

MATH 301: Real Analysis

MATH 395E: Wavelets and Their Applications (a Senior Seminar)

MATH 495J: Advanced Topics in Biomathematics (a Senior Seminar)

MATH s21: Introduction to Abstraction (“Math Camp”)

MATH s45K: Roller Coasters: Theory, Design, and Properties

**Cross-listed between Biology and Mathematics**

BI/MA 255A: Mathematical Models in Biology

**First-Year Seminar**

FYS 405: Zombies: Can Math Help?

**Fall Semester Abroad program**

BSAG 010: Culture, Controversy, Cryptography, Calculus

**UNDERGRADUATE THESES ADVISED**

* Mathematical Modeling of the Influenza Pandemic of 1918
* An Examination of the Presence and Biological Implications of Bifurcations Located Within a Continuous-Time Model of Nucleated Polymerization
* Epidemiological Impact of ART in Burkina Faso, South Africa, and Uganda
* An Analysis of the Motion of Fastpitch Softball Pitches
* Probabilities Associated with RISK©
* A Mathematical Model of the Fall 2009 H1N1 Pandemic at Bates College
* Statistical Methods of Wavelet Analysis with Applications to Ecological Time-Series
* Using Community Structure Networks to Model Heterogeneous Mixing in Epidemics, and a Potential Application to HIV in Washington, D.C.
* A Survey of Wavelet Theory and Methods Suited for Time Series Analysis
* Wavelets and Musical Acoustics
* Ranking College Basketball Teams Using Methods from Linear Algebra
* A Mathematical Examination for Modeling the Pelagic Phase of *Gloeotrichia echinulata*
* Modeling H1N1 at Bates with an Agent-Based Simulation
* The Intersection of Mathematics and Germany: A Chronology
* A Network Theory Approach to Math Epidemiology & Healthcare Effectiveness
* Studying Smallpox Oscillations with Changing Population Sizes
* The Spread of the Birther Conspiracy as an Epidemiological Model
* Modeling the 2016 Mumps Outbreak at Bates with Agent-based Models
* The Spread of the Mumps in Immigration Detention Centers Across the United States
* Matchings in Graphs
* Population Dynamics: A Comparison of the Ricker, Logistic, Beverton-Holt and Hassell Models
* Mathematical Model of Tumor Cell Growth: Optimal personalized medicine with combinational treatment for glioblastoma

**SELECTED COMMITTEES AND APPOINTMENTS AT BATES**

* Chair of Digital and Computational Studies Program, 2019-2021
* Curriculum Review Committee, 2018-present (committee chair starting 2020)
* Chair of Division of Natural Sciences and Mathematics, 2016-2017
* Faculty Scholarship Committee, 2013-2016
* Chair of Mathematics Department, 2011-2015
* Faculty Review Board, 2011-2016
* Women’s Track and Cross Country Liaison, 2012-present
* SLQ Implementation Committee, 2006-2010
* Q (quantitative) Course Approval, 2006-2013
* Women and Gender Studies Program Committee, 2006-2012
* Committee on Personnel, 2010-2011
* Phi Beta Kappa chapter, President 2008-2010, Vice President 2006-2008
* President’s Institutional Planning and Advisory Committee, 2004-2005
* Teaching Evaluation Committee, 2003-2005
* Hughes Student-Faculty Research Grant Committee, 2003-2005

**OTHER ACTIVITIES**

**Development and Use of Open Educational Resources in Higher Education**, April 26, 2019, Lewiston, Maine: Panelist

**DEMARC (Differential Equations Model and Resource Creators) workshop,** July 15-21, 2018, at Manhattan College, NYC

**Sectional Meeting of the American Mathematical Society**, September 24-25, 2016, Brunswick, Maine: Organized special session titled “Mathematics and Statistics Applied to Biology and Related Fields”

**The Society for Mathematical Biology Annual Meeting,** July 27-30, 2009, Vancouver, Canada

**Mathematical Association of America, Northeast Section, Fall Meeting,** November 17, 2007, Framingham, Massachusetts: Accompanied a presenting undergraduate

**The Society for Mathematical Biology Annual Meeting,** July 31-August 3, 2007, San Jose, California

**MathFest 2007,** August 3-5, 2007, San Jose, California

**Bioinformatics in the Undergraduate Curriculum Workshop,** July 19, 2007, Lewiston, Maine

**The Society for Mathematical Biology Annual Meeting,** July 31-August 4, 2006, Raleigh, North Carolina

**Bioinformatics Mini-Workshop,** August 22, 2005, Lewiston, Maine

**Mathematical Association of America, Northeast Section, Spring Meeting,** June 17-18, 2005, Lewiston, Maine

**Hudson River Undergraduate Mathematics Conference,** April 30, 2005, Williamstown, Massachusetts: Accompanied six Bates students

**Joint Mathematics Meeting,** January 5-8, 2005, Atlanta, Georgia

**MathFest 2004,** August 12-14, 2004, Providence, Rhode Island: Co-organized a special session and served as panel chair

**Legacy of R. L. Moore Conference,** March 12-14, 2004, Austin, Texas

**Joint Mathematics Meetings,** January 6-10, 2004, Phoenix, Arizona

**MathFest 2003,** July 31-August 2, 2003, Boulder, Colorado

**Bioinformatics Conference at Dickinson College,** March 21-22, 2003, Carlisle, Pennsylvania

**MathFest 2002,** August 1-3, 2002, Burlington, Vermont

**Joint Mathematics Meetings,** January 6-9, 2002, San Diego, California

**Horizons in Combinatorics,** May 21-24, 2001, Nashville, Tennessee

**DESTOBIO,** August 23-27, 2000, West Lafayette, Indiana

**HONORS AND PROFESSIONAL ACTIVITIES**

**Mathematical Moments Consultant**, September 2014

Consulted for *Going Over the Top*, about roller coasters; link and podcast here:

<http://www.ams.org/samplings/mathmoments/mm114-roller-coasters-podcast>

**American Mathematical Society,** member since 1997

**The Society for Mathematical Biology,** member since 2000

Travel and Meeting Funding Grants Committee chair, 2006-2017

Scientific Committee Member and Webmaster for the 2007 Annual Meeting

**Mathematical Association of America,** member since 2002

Project NExT, 2003-2004 (Sky Dot)

Member of Committee on George Pólya Awards, 2013-2016

Chair of Committee on George Pólya Awards, 2016-2017

Member of Committee on Carl B. Allendoerfer Awards, 2018-2022

Chair of Committee on Carl B. Allendoerfer Awards, 2020-2022

**PRIMUS (Problems, Resources, and Issues in Mathematics Undergraduate Studies),**

editorial board member 2006-2015

**Association for Women in Mathematics,** member since 1997

**Patent** and **Company Invention Award,** for new technique developed at The Aerospace

Corporation in summer 2000

**Phi Beta Kappa,** member since 1995; vice president of Bates College chapter, 2006-2008;

president of Bates College chapter, 2008-2010