

Hannah Callender, Ph.D.

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Education

- **Vanderbilt University** Nashville, TN
Ph.D. Mathematics, August 2007 **2003-2007**
 - Advisor: Mary Ann Horn, Department of Mathematics
 - Co-advisor: Glenn F. Webb, Department of Mathematics
 - Co-advisor: H. Alex Brown, Department of Pharmacology
 - Thesis: *Mathematical Modeling of Species-Specific Diacylglycerol Dynamics in the RAW 264.7 Macrophage Following Receptor Activation by Uridine 5'-Diphosphate*
- **Vanderbilt University** Nashville, TN
M.S. Mathematics, May 2003 **2001 - 2003**
 - Advisor: Mary Ann Horn
- **Wesleyan College** Macon, GA
B.A. Mathematics, May 2001 **1997 - 2001**
 - Minors in Computer Science and Music
 - Graduated with Honors, Summa Cum Laude
 - Thesis Advisor: Stephen Curry
 - Thesis: *A Survey of Numerical Methods for Solving Ordinary Differential Equations*

Academic Positions

- **Institute for Mathematics and its Applications** University of Minnesota
Postdoctoral Associate **Sept. 2007 - Present**
- **Department of Mathematics** University of Minnesota
Instructor **Aug. 2008 - Dec. 2008**
- **Department of Pharmacology** Vanderbilt University
Research Assistant **May 2004 - June 2007**
- **Department of Mathematics** Vanderbilt University
Graduate Teaching Assistant/Instructor **Aug. 2001 - June 2007**
- **NAVY ROTC** Vanderbilt University
Mathematics Tutor **Aug. 2004 - May 2004**
- **Cooperative Robotics** Oak Ridge National Laboratories
Summer Research Assistant **June 2000 - Aug. 2000**

Teaching Experience

University of Minnesota

- **Undergraduate Research Opportunities Program (UROP)** Feb. 2009 - July 2009
Research mentor to mathematics undergraduate
- **IMA Interdisciplinary Research Experience for Undergraduates** June 2009 - July 2009
Mentor to REU team working on Objective Molecular Dynamics
- **Department of Mathematics Instructor** Aug. 2008 - Dec. 2008
Linear Algebra and Differential Equations for IT students 1 section

Vanderbilt University

- **Department of Mathematics TA** Aug. 2001 - Dec. 2006
Calculus I 1 section
Calculus II 1 section
Calculus for Engineers II 2 sections
- **Department of Mathematics Instructor** Aug. 2002 - June 2007
Calculus I 2 sections
Calculus for Engineers I 3 sections
Calculus II 1 section
- **NAVY ROTC Tutor** Aug. 2002 - June 2007
Algebra II
Calculus I, II, and III
Calculus for Engineers I and II

Other Research Experience

- **Department of Curriculum and Instruction** University of Minnesota
Conduct research on Model Eliciting Activities (MEAs) Sept. 2008 - Present
- **Workshop on Mathematical Aspects of Computational Biology** Mathematical Sciences Research Institute
Workshop Participant June 2006

Publications

- Callender, H. L. and Othmer, H. G. Slipping and gripping: A microscopic model of focal adhesion dynamics. In preparation.
- Callender, H. L., Horn, M. A., DeCamp, D. L., Sternweis, P. C., Brown, H. A. 2009. Modeling Species-Specific Diacylglycerol Dynamics in the RAW 264.7 Macrophage. Submitted.
- Callender, H. L. and Horn, M. A. 2009. Mathematical modeling and analysis of a signaling pathway in macrophages. *J. Biol. Dynamics*. In print.
- Callender, H. L., Forrester, J. S., Ivanova, P., Preininger, A., Milne, S., Brown, H. A. 2007. Quantification of diacylglycerol species from cellular extracts by electrospray ionization mass spectrometry using a linear regression algorithm. *Anal. Chem.* 79 (1) 263-272.

- Callender, H. L. Mathematical Modeling of Species-Specific Diacylglycerol Dynamics in the RAW 264.7 Macropages Following P2Y₆ Receptor Activation by Uridine 5-Diphosphate. 2007. Ph.D. Thesis, Vanderbilt University.
URL <http://etd.library.vanderbilt.edu/ETD-db/available/etd-06212007-223551/>

Presentations

- JULY 2009 Modeling Integrin Activation in Initial Cell Movement, *AWM Minisymposium on Models in Mathematical Biology, in conjunction with SIAM Annual Meeting*, Denver, Colorado.
- JUNE 2009 A Mathematical Model of Integrin Clustering in Motile Cells, *Symposium on Biomathematics and Ecology Research and Education*, Izmir, Turkey.
- APR 2009 Adventures in Biomath: From Cell Signaling to Motility, *University of Richmond Math & Computer Science Departmental Colloquium Series*, Richmond, Virginia.
- APR 2009 Opportunities in Mathematical Biology: Experiences and Aspirations of an IMA Postdoc, *University of Minnesota Undergraduate Math Club Seminar*, Minneapolis, Minnesota.
- JAN 2009 A Model of Cellular Motility: Focusing on the “Feet” of the Cell, *Joint Mathematics Meetings*, Washington, D.C.
- NOV 2008 Mathematical Modeling Leads to New Discoveries in Cellular Signaling Pathways, *UC Merced Applied Math Seminar*, Merced, California.
- OCT 2008 Modeling the Development of Nascent Focal Adhesions as a First Step in Understanding the Beginning Stages of Cell Motility, *AMS Sectional Meeting*, Huntsville, Alabama.
- APR 2008 Modeling Cell Motility: A Focus on Focal Adhesions, *NSF site visit to IMA*, Minneapolis, Minnesota.
- MAR 2008 Math + Biology = Infinite Possibilities, *East Tennessee State University Seminar for STEP students*, Johnson City, Tennessee.
- DEC 2007 Using Mathematical Modeling to Make Testable Predictions of Cellular Signaling Pathways, *IMA Postdoc Seminar*, Minneapolis, Minnesota.
- NOV 2007 Modeling Species-Specific Diacylglycerol Dynamics in the RAW 264.7 Macrophage, *AMS Sectional Meeting*, Murfreesboro, Tennessee.
- MAY 2007 Mathematical Modeling of Species-Specific Diacylglycerol Dynamics in the RAW 264.7 Macrophage Following P2Y₆ Receptor Activation by Uridine 5'-Diphosphate, *Vanderbilt University Dissertation Defense*, Nashville, Tennessee.
- APR 2007 Using Mathematical Models to Predict the Future, *Vanderbilt University Undergraduate Seminar in Mathematics*, Nashville, Tennessee.
- JAN 2007 Modeling Uridine 5'-Diphosphate Signaling Pathways in Macrophages, *Murray State University Biomathematics Seminar*, Murray, Kentucky.
- JAN 2007 Purinergic Receptor Signaling in the RAW 264.7 Macrophage: Modeling Species-Specific Diacylglycerol Dynamics Following Receptor Activation by Uridine 5'-Diphosphate, *Joint Mathematics Meetings*, New Orleans, Louisiana.
- NOV 2006 Modeling Small Molecule Dynamics in Macrophages Downstream Purinergic Receptor Stimulation, *Vanderbilt Analysis and Biomathematics Seminar*, Nashville, Tennessee.
- AUG 2006 Mathematical Modeling of Cellular Signaling in Macrophages: Understanding the Pathways, *Vanderbilt Institute of Chemical Biology Retreat*, Nashville, Tennessee.

- JULY 2006 Mathematical Modeling of Cellular Signaling: Lipid Signaling Kinetics, *Joint SIAM Conference on the Life Sciences*, Raleigh, North Carolina.
- JULY 2006 Mathematical Modeling of Cellular Signaling in Macrophages: Understanding the Pathways, *AWM workshop at annual SIAM meeting*, Boston, Massachusetts.
- FEB 2006 Mathematical Modeling of the UDP Pathway in RAW 264.7 Cells, *Wesleyan College Math and Science Divisional Seminar Series*, Macon, Georgia.
- NOV 2005 Mathematical Modeling of the UDP Pathway in RAW 264.7 Cells, *Vanderbilt Pharmacology Department Works in Progress Seminar*, Nashville, Tennessee.
- NOV 2005 Computational Lipidomics: Mathematical Modeling of the UDP Pathway in RAW 264.7 Cells, *Southeastern Regional Lipid Conference*, Cashiers, North Carolina.
- OCT 2005 Computational Lipidomics: Mathematical Modeling of the UDP Pathway in RAW 264.7 Cells, *Vanderbilt Pharmacology Retreat*, Burns, Tennessee.
- APR 2005 Mathematical Modeling of Second Messenger Signaling, *Vanderbilt Graduate Student Research Day*, Nashville, Tennessee.

Awards, Grants, & Honors

- [Association for Women in Mathematics \(AWM\)](#) – Recipient of travel award to attend AWM workshop held jointly with the Annual meeting of the Society for Industrial and Applied Mathematics held in Denver, CO, Summer 2009
- [Symposium on Biomathematics and Ecology Research and Education \(BERE\)](#) – Recipient of postdoctoral travel award to attend BERE symposium in Izmir, Turkey, Summer 2009
- [Vanderbilt University](#) – Bjarni Jonsson Award for Research in Mathematics, May 2007
- [Vanderbilt Graduate School](#) – Recipient of travel award to attend AMS National Meetings in New Orleans, LA, January 2007
- [Association for Women in Mathematics \(AWM\)](#) – Recipient of travel award to attend AWM workshop held jointly with the Annual meeting of the Society for Industrial and Applied Mathematics held in Boston, MA, Summer 2006
- [Society for Mathematical Biology \(SMB\)](#) – Recipient of travel award to attend the annual meeting for SMB held jointly with the Society for Industrial and Applied Mathematics Life Sciences conference held in Raleigh, NC, Summer 2006
- [Vanderbilt University](#) – College of Arts and Science Graduate Student Research Award, Summer 2006
- Summer research support from Vanderbilt professor's National Science Foundation grant, Summer 2002
- [Phi Kappa Phi](#) – Graduate Fellowship Recipient, May 2001
- [Phi Kappa Phi](#) – Lifetime membership, May 2001
- [Wesleyan College](#) – Lise Meitner Award in Physics, May 2001
- [Wesleyan College](#) – Division of Natural Sciences and Mathematics Outstanding Senior, May 2001
- [Wesleyan College](#) – Departmental Award in Mathematics and Computer Science, May 2001
- [Wesleyan College](#) – Monroe Scholar, Aug 2000 – May 2001
- [Wesleyan College](#) – Scholarship for Leadership, Aug 1998
- Dean's List, 1997 – 2001

Professional Training

- MAY 2009 *Integrated Course Design*, Preparing Future Faculty Spring Retreat, University of Minnesota Center for Teaching and Learning
- APR 2009 *Career Options for Women in Mathematical Sciences*, IMA Special Workshop, University of Minnesota
- MAR 2009 *Teaching with Technology for the First Time*, Preparing Future Faculty Workshop, University of Minnesota Center for Teaching and Learning
- FALL 2008 *Research in Mathematics Education Seminar*, University of Minnesota Department of Curriculum and Instruction
- AUG 2008 *Teaching Enrichment Series*, University of Minnesota Center for Teaching and Learning
– *How (and Why) to Shift From Instructor-Centered to Student-Centered Teaching*
– *Teaching With Technology*
– *PowerPoint Reconsidered*
– *Teaching Through Active Lectures*
– *Diversity of Learners: Understanding Learning Styles to Improve Your Teaching*
– *Pathways to a Successful First Day, First Month, First Semester at the U*
- SPRING 2005 *Professional Development Seminar*, Vanderbilt University Department of Mathematics
- JAN 2003 *GradSTEP (Graduate Student Teaching Event for Professional Development)*, Vanderbilt University Center for Teaching
- AUG 2001–
MAY 2002 *Graduate Student Teaching Seminar*, Vanderbilt University Department of Mathematics
- AUG 2001 *Teaching Assistant Orientation*, Vanderbilt University Center for Teaching

Community Involvement

- FEB 2008–
AUG 2008 *Volunteer/Mathematics Tutor*, Minneapolis Neighborhood Involvement Program (NIP)
- AUG 2003–
MAY 2007 *Organizer*, Vanderbilt University Undergraduate Seminar in Mathematics
- AUG 2001–
MAY 2002 *Graduate Student Council Representative*, Department of Mathematics, Vanderbilt University

Professional Affiliations

- Member of the [American Mathematical Society](#)
- Member of the [Mathematical Association of America](#)
- Member of the [Association for Women in Mathematics](#)
- Member of the [Society for Mathematical Biology](#)
- Member of the [Society for Industrial and Applied Mathematics](#)

Computer Skills

- Microsoft Word, Excel, Powerpoint, Outlook
- MATLAB, SIMULINK, Mathematica, COMSOL, URDME, LaTeX, and SPLUS