

Courtney Davis

CONTACT INFORMATION University of Maryland Office: CSIC 4119, (301) 405-0668
Center for Scientific Computation and Mathematical Modeling Fax: (301) 314-6674
4146 CSIC Bldg #406 Email: cdavis@cscamm.umd.edu
Paint Branch Drive Website: <http://www.cscamm.umd.edu/cdavis>
College Park, MD 20742

EMPLOYMENT AND EDUCATION **University of Maryland, College Park** 2010-present
Center for Scientific Computation and Mathematical Modeling (CSCAMM)
Postdoctoral Research Associate
Mentor: Doron Levy
Research Focus: Mathematical Immunology

University of Utah 2003-2010
Ph.D., Mathematics, June 2010
Research Focus: Mathematical Biology
Advisor: Frederick Adler
M.S., Mathematics, 2005

Trinity University 2000-2003
B.A., Mathematics, 2003
B.S., Biology, 2003

Texas Academy of Mathematics and Science 1998-2000
(University of North Texas)

PUBLICATIONS C. Davis and F. Adler. *Mathematical Models of Memory CD8⁺ T-Cell Repertoire Dynamics in Response to Viral Infections*, submitted.

D. Blatter, B. Lui, D. Stone, B. Wyatt, J. Keener, C.G. Farmer, L. Crowl Erickson, C. Davis. *Using Mathematical Models To Examine How Denucleation of Mammalian Red Blood Cells Conferred an Evolutionary Advantage*, in preparation.

P. Blain, C. Davis, A. Holder, J. Silva, and C. Vinzant. 2009. *Diversity Graphs*, in Clustering Challenges in Biological Networks, eds. S. Butenko, W. Chaovalitwongse and P. Pardalos, World Scientific, 129-150.

C.G. Farmer, D. Blatter, B. Lui, D. Stone, B. Wyatt, L. Erickson, and C. Davis. *Was the Blood Gas Barrier a Constraint On Activity Metabolism and Thereby Body Size of Mesozoic Mammals?* [abstract], in 2nd International Congress of Respiratory Science, 2009 Aug 9-13, Bad Honnef, Germany: 79-80.

RESEARCH EXPERIENCE **Postdoctoral Research**, University of Maryland, College Park 2010-present
Modeling the human immune response against the bacteria *Shigella* to determine correlates of immunity and to inform *Shigella* vaccine design
Mentor: Doron Levy

Courtney Davis

RESEARCH EXPERIENCE CONTINUED	<p>Ph.D. Research, University of Utah 2005-2010 Modeled immune memory regulation and quantified memory repertoire shifts resulting from memory T-cell attrition and proliferation using differential equations, probabilistic methods, and stochastic processes <i>Advisor:</i> Frederick Adler</p> <p>Research Experience for Undergraduates Mentor, University of Utah 2008-2009 Mentored undergraduate student research looking mathematically at gas exchange and the evolution of vertebrate lung design</p> <p>RTG Summer Research, Emory University Summer 2007 Used probabilistic simulations to explore how active attrition (leading to lymphopenia) versus passive attrition (leading to homeostasis) impact the memory T-cell repertoire <i>Advisor:</i> Rustom Antia</p> <p>IGERT Summer Research, University of Utrecht Summer 2006 Created differential equation models to explain immunological and virological HIV data <i>Advisors:</i> Rob de Boer, Vitaly Gansov</p> <p>IGERT Lab Rotation, University of Utah Summer 2004 Conducted field research examining the effects of habitat fragmentation on hantavirus prevalence in rodents <i>Advisor:</i> Denise Dearing</p> <p>Undergraduate Senior Research, Trinity University 2002-2003 Developed a new technique for addressing haplotype inferencing problems in computational genetics using graph theory and optimization methods <i>Advisor:</i> Allen Holder</p> <p>REU: Modeling Complex Ecosystems, Texas A&M University Summer 2002 Developed diffusion models for population dynamics with competing species on one-dimensional landscapes <i>Advisors:</i> Jay Walton and Paulo Lima-Filho</p> <p>Merck Computational Biology and Chemistry Research Program Carnegie Mellon University Summer 2001 Mathematically modeled the minimum concentration of contrast agent needed for sufficient contrast in magnetic resonance images <i>Advisor:</i> Eric Ahrens</p> <p>Applied Optimization Group, Trinity University 2001 Developed sensitivity analysis software for linear programming <i>Advisor:</i> Allen Holder</p>
TEACHING EXPERIENCE	<p>Course Instructor, University of Maryland, College Park 2010-present</p> <ul style="list-style-type: none">• Stat 464 - Biostatistics Fall 2011• Math 130 - Calculus I for the Life Sciences Spring 2011• Math 130 - Calculus I for the Life Sciences Fall 2010

Courtney Davis

TEACHING EXPERIENCE CONTINUED	Immunology and Cancer RIT Organizer , University of Maryland Organized and informally led a research interaction team (RIT) comprised of graduate and undergraduate students that explored mathematical modeling of the immune system and of cancer dynamics 2010-2011
	Undergraduate Research Mentor , University of Utah Mentored a former REU student on extending, writing, and submitting the Mathematical Biology REU work for publication 2009-2010
	Teaching Assistant , University of Utah Math 6770 - Math Biology (Physiology) - Graduate-level course taught by James Keener Fall 2009
	Mathematical Biology Research Experience for Undergraduates Mentor University of Utah Developed the REU and mentored four undergraduate students in research looking mathematically at gas exchange and the evolution of vertebrate lung design 2008-2009
	Mathematical Biology Journal Club Advisor , University of Utah Advised first- and second-year graduate students on finding, understanding, and presenting classical and current Mathematical Biology journal articles 2007-2008
	Graduate Teaching Fellow , University of Utah Course Instructor - Full Course Responsibility 2005-2007
	<ul style="list-style-type: none">• Math 1180 - Calculus For Life Scientists II Spring 2007• Math 1170 - Calculus For Life Scientists I Fall 2006• Math 1100 - Quantitative Analysis (Business Calculus) Spring 2006• Math 1030 - Introduction To Quantitative Reasoning Fall 2005
	Mathematics Tutor , University of Utah 2005-2007
	Teaching Science and Mathematics Seminar , University of Utah Took a semester-long seminar designed to help instructors of Science and Mathematics courses improve their teaching by learning new methods for successfully conveying scientific and mathematical ideas to students Spring 2006
	Teaching Workshop Training , University of Utah Attended a two-week intensive teaching workshop where I learned new teaching approaches and gained practice and received feedback on giving lectures and writing course materials 2003
	Calculus Help Sessions Tutor , Trinity University Sole tutor for the University's Calculus help sessions offering weekly help to any student in Calculus 1-3 2002-2003
	Mathematics Grader , Trinity University 2001-2003
AWARDS AND SCHOLARSHIPS	University of Utah <ul style="list-style-type: none">• NSF Research Training Group (RTG) Fellowship, 2007-2010• Teaching Fellowship, 2005-2007• NSF Integrative Graduate Education and Research Traineeship (IGERT) Fellowship, 2003-2005

Courtney Davis

AWARDS AND SCHOLARSHIPS CONTINUED **First Place Poster Prize**
Society for Mathematical Biology Annual Meeting, 2009
“Mathematically Modeling the Impact of a Population Bottleneck on the Immune Memory Repertoire”

Barry M. Goldwater Scholarship, 2002

Outstanding Paper of the MAA Student Paper Sessions
Mathematical Association of America Texas Section Meeting, 2003
“Inferring Minimum Haplotype Sets for a Population”

Trinity University

- Graduated Summa Cum Laude
- Golden Key International Honour Society Senior Scholarship, 2002
- Trinity University President’s Scholarship, 2000-2003

SELECTED CONFERENCES AND WORKSHOPS **7th International Congress on Industrial and Applied Mathematics** July 2011
Vancouver, BC
Presentation: Toward a Vaccine: Mathematical Models of Shigella Immunity
Minisymposium Chair

Trinity University Biomathematics Seminar April 2011
Trinity University, San Antonio, TX
Invited Talk: Mathematics of Immunity

Partnership for Cancer Technology Workshop March 2011
University of Maryland/National Cancer Institute (NIH)
College Park, MD
Presentation: Modeling How Cellular Proliferation and Attrition Impact the Immune Memory Repertoire

Systems Approaches in Immunology January 2010
Santa Fe, NM
Poster: Modeling the Impact of Proliferation and Attrition on the Memory T-Cell Repertoire

Society for Mathematical Biology Annual Meeting July 2009
University of British Columbia, Vancouver, BC
Poster: Mathematically Modeling the Impact of a Population Bottleneck on the Immune Memory Repertoire
Awarded 1st Place Poster Prize

AWM Workshop for Women Graduate Students and Recent Ph.D.s July 2009
SIAM Annual Meeting, Denver, CO
Poster: Mathematically Modeling the Impact of a Population Bottleneck on the Immune Memory Repertoire

Courtney Davis

SELECTED CONFERENCES AND WORKSHOPS CONTINUED	Mathematical Perspectives on Cancer Immunology Workshop University of Utah, Salt Lake City, UT Mathematical Biology Student Workshop with Leah Keshet University of Utah, Salt Lake City, UT <i>Co-organized the workshop</i> Park City Mathematics Institute Graduate Student Workshop on Mathematical Biology Park City, UT <i>Presentation: Juvenile-Adult Matrix Model of Arrested Maturation in Tribolium Beetles</i> INFORMS Annual Meeting Atlanta, GA <i>Presentation: Haplotype Inferencing and Minimum Diversity Graphs</i> Mathematical Association of America Texas Section Meeting Sam Houston State University, Huntsville, TX <i>Presentation: Inferring Minimum Haplotype Sets for a Population</i> <i>Judged to be an Outstanding Paper of the MAA Student Paper Sessions</i> Nebraska Conference for Undergraduate Women in Mathematics University of Nebraska, Lincoln, NE Mentoring Program for Women in Mathematics Institute for Advanced Study, Princeton, NJ <i>Presentation: Models of Epidemics</i> Mathematical Association of America Texas Section Meeting University of Houston, Clear Lake, TX <i>Presentation: Calculating Rates of an Optimal Objective Function</i>	May 2008 May 2006 July 2005 2003 2003 2002 2001 2001
ACADEMIC SERVICE	Review Editorial Board , <i>Frontiers in Systems Biology</i> CMNS Postdoctoral Association Officer Computer, Mathematical, and Natural Sciences, University of Maryland, College Park Science Day , University of Utah Presented a poster at the University's Science Day and discussed Mathematics and graduate school with high school students <i>Poster: Mathematically Modeling the Impact of a Population Bottleneck on the Immune Memory Repertoire</i> Workshop Organizer , University of Utah Co-organized the 2nd Annual Mathematical Biology Student Workshop and recruited Leah Edelstein-Keshet as workshop host	2011-present 2011-2012 November 2009 May 2006
PROFESSIONAL MEMBERSHIPS	<ul style="list-style-type: none">• American Mathematical Society• Association for Women in Mathematics• Society for Industrial and Applied Mathematics• Society for Mathematical Biology	