

---

**Courtney Davis**  
University of Utah  
Department of Mathematics

---

**Contact Information**

Department of Mathematics  
University of Utah  
155 South 1400 East, LCB 306  
Salt Lake City, UT 84112

*E-mail:* davis@math.utah.edu  
*Website:* [www.math.utah.edu/~davis](http://www.math.utah.edu/~davis)  
*Phone:* (801) 581-6195  
*Fax:* (801) 581-4148

**Education**

- University of Utah, 2003 – present; M.S. in Mathematics, 2005
- Trinity University, 2000 – 2003; B.A. in Mathematics, B.S. in Biology, 2003
- Texas Academy of Mathematics and Science (University of North Texas), 1998-2000

**Research Interests**

- Mathematical Immunology: mathematically modeling the homeostatic regulation of the memory CD8+ T cell compartment and evaluating various implications of compartment regulation on the memory repertoire, longevity of memory, et cetera

**Papers**

- P. Blain, C. Davis, A. Holder, J. Silva, and C. Vinzant. *Diversity Graphs*. Trinity University, Mathematics Technical report #98, San Antonio, TX, 2005, to appear in Clustering Challenges in Biological Networks, eds. S. Butenko, W. Chaovalitwongse and P. Pardalos

**Research Experience**

- Conducted research for Doctoral degree on regulation of immune memory, Advisor: Fred Adler, 2005-present
- Mathematically explored the impact of active attrition leading to lymphopenia versus passive attrition leading to homeostasis on the memory CD8+ T cell repertoire at homeostasis, Advisor: Rustom Antia, Emory University, Summer 2007
- Modeled immunological data from Davenport 2004, Advisors: Rob de Boer, Vitaly Ganusov, University of Utrecht, Summer 2006
- Field research on how habitat fragmentation affects hantavirus prevalence in rodents, Advisor: Denise Dearing, University of Utah, Summer 2004
- Trinity University Senior Research, 2002-2003, Advisor: Allen Holder – Applied optimization methods to haplotype inferencing problems in computational genetics
- Research Experience for Undergraduates: Modeling Complex Ecosystems (Landscape Topology), Texas A&M University, Summer 2002, Advisors: Jay Walton and Paulo Lima-Filho – Developed diffusion models for population dynamics with competing species on one-dimensional landscapes
- Merck Computational Biology and Chemistry Research Program, Carnegie Mellon University, Summer 2001, Advisor: Eric Ahrens – Mathematically modeled the minimum concentration of contrast agent needed for sufficient contrast in magnetic resonance images
- Applied Optimization Group, 2001, Advisor: Allen Holder, Trinity University - Developed sensitivity analysis software for linear programming

## Teaching Experience

- Mathematical Biology Research Experience for Undergraduates, Organizer and Mentor, University of Utah, 2008-2009
- Mathematical Biology Journal Club, Student Advisor, University of Utah, 2007-2008
- Calculus for Biologists II (Math 1180), Course Instructor, University of Utah, Spring 2007
- Calculus for Biologists I (Math 1170), Course Instructor, University of Utah, Fall 2006
- Quantitative Analysis (aka Business Calculus, Math 1100), Course Instructor, University of Utah, Spring 2006
- Introduction to Quantitative Reasoning (Math 1030), Course Instructor, University of Utah, Fall 2005

## Presentations of Research

- “Modeling the Homeostatic Regulation of Memory CD8+ T Cells”, Oral Qualifying Exam, University of Utah, Aug 2007
- Presentations in Group Meetings at the University of Utah:
  1. “Memory Cell Attrition”, May 2008
  2. “Models of Memory T Cell Attrition”, Apr 2008
  3. “Memory Modeling Blues”, Oct 2007
  4. “Continuous Models of Memory T-Cell Homeostatic Regulation”, Mar 2007
  5. “Memory Problems”, Nov 2006
  6. “Do Vaccines Compete for Memory?”, Apr 2006
  7. “Maintenance of Immune Memory”, Nov 2005
- Presentations at Departmental Seminars at the University of Utah:
  1. “Modeling Memory T Cell Attrition”, Math Biology Research Summit, University of Utah, Sept 2008
  2. “Attrition of Immune Memory”, Math Biology Seminar, University of Utah, Aug 2007
  3. “A Summer of Mathematical Immunology in Utrecht”, Math Biology Seminar, University of Utah, Sept 2006
  4. “The Ecology of Hantavirus in Deer Mice”, Math Biology Seminar, University of Utah, Sept 2004
- “Haplotype Inferencing and Minimum Diversity Graphs” at INFORMS, Atlanta, 2003
- “Minimum Diversity Graphs” at Trinity University, 2003
- “Inferring Minimum Haplotype Sets for a Population” at the Mathematical Association of America, Texas Section meeting, Sam Houston State University, 2003 – Judged to be an Outstanding Paper of the MAA Student Paper Sessions
- “Diffusion Models on One-Dimensional Landscapes” at Texas A&M University, 2002
- “Mathematical Modeling of the Minimum MRI Contrast Agent Concentration Needed in Tissue” at Carnegie Mellon University, 2001
- “Models of Epidemics” at the Institute for Advanced Study, 2001
- “Calculating Rates of an Optimal Objective Function” at the Mathematical Association of America, Texas Section meeting, University of Houston-Clear Lake, 2001

## Awards and Honors

- NSF Research Training Grant, University of Utah, 2007-2009
- Teaching Fellowship, University of Utah, 2005-2007
- National Science Foundation IGERT Fellowship for Graduate Study in Mathematical Biology at the University of Utah, 2003-2005
- Barry M. Goldwater Scholarship, 2002

- Golden Key International Honour Society Senior Scholarship, 2002
- Trinity University President's Scholarship, 2000-2003
- National Merit Commended Scholar, 1999

### **Additional Academic Experience**

- Cancer Immunology Workshop, University of Utah, 2008
- Mathematics Tutor, University of Utah, 2005-2007
- Co-Organizer of 2<sup>nd</sup> Annual Mathematical Biology Student Workshop with Leah Edelstein-Keshet, University of Utah, May 2006
- Park City Mathematics Institute Graduate Student Workshop on Mathematical Biology, Summer 2005
- Mathematical Biology Student Workshop with Michael Reed, University of Utah, May 2005
- Calculus Help Sessions Tutor, Trinity University, 2002-2003
- Mathematics Grader, Trinity University, 2001-2003
- Nebraska Conference for Undergraduate Women in Mathematics, 2002
- Mentoring Program for Women in Mathematics at the Institute for Advanced Study, 2001

### **Professional Memberships**

- American Mathematical Society
- Association for Women in Mathematics