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## **EDUCATION**

- Ph.D., Mathematics, University of Houston, Houston, Texas, 2002  
Dissertation: *Computation of Bifurcating Rotating Waves For The Fitzhugh-Nagumo Equations On Circular Domains of One and Two Dimensions*, Advisor: Dr. Giles Auchmuty
- M.S., Applied Mathematics, University of Houston, Houston, Texas, 1993
- B.S., Physics, University of California, Los Angeles, California, 1987

## **RESEARCH INTERESTS**

- In general, I am interested in the modeling and simulation of a variety of problems from mathematical biology. In particular, I create and analyze nonlinear dynamical models (differential equations) of biological systems from ecology and neurophysiology that involve time and/or space dependent behavior. The objective of my research is to better understand and predict complex biological phenomena using (when possible) computationally tractable mathematical models.

## **EXPERIENCE**

- *Assistant Professor of Mathematics*, Sam Houston State University, 2006-present
- *VIGRE (Vertical Integration of Research and Education) Postdoctoral Fellow*, Tulane University, 2003-2006
- *Community College Mathematics Instructor*, San Jacinto Community College, 1994-2003
- *High School Mathematics Teacher*, Alvin Senior High School, 1993-1994
- *Teaching Fellow*, University of Houston, 1992-1993
- *Software Systems Engineer*, CAE Link Flight Simulation, 1988-1990 and Eagle Technical Services, 1990-1991

## TEACHING

- Instructor of record for differential equations (both partial and ordinary), linear algebra, numerical methods, calculus (all levels), pre-calculus (algebra and trigonometry), finite mathematics, college algebra, and remedial mathematics
- Designed and taught *Introduction to Math Biology*, an interdisciplinary class for senior and graduate level students in mathematics, bio-engineering, and biology
- Faculty advisor for two undergraduate honors theses
- Co-facilitator of a summer REU program in Applied Mathematics
- Experience with using a variety of types of technology in the classroom involving computer algebra systems (MATLAB, Mathematica, XPPAUT, and Berkely Madonna) and calculators (graphing and non-graphing)

## RESEARCH PUBLICATIONS

### In Process

- John G. Alford, Robert Matlock, *Eradication of the Screwworm Fly By Sterile Fly Release Method*
- John G. Alford, *A Model of Waveblock in Excitable Media With Border Zone Parameter Sets*

### Submitted

- John G. Alford, *Bifurcation Structure of Rotating Wave Solutions of FitzHugh-Nagumo Equations*, Communications in Nonlinear Science and Numerical Simulation

### Published

- John G. Alford, Giles Auchmuty, *Rotating Wave Solutions of the FitzHugh-Nagumo Equations*, Journal of Math Biology, Vol. 53, No. 5, Springer Berlin/Heidelberg 2006.
- John Alford, Nick Cogan, Charles Miller, Seth Patinkin, Bradford E. Percy, Noah Rosenburg. *Boundary Element Analysis of Intracardiac Electrogram Sensing*, IMA Preprint Series #1589, August 1998.

## TALKS, PRESENTATIONS, WORKSHOPS

### Oral Presentations

- *Deterministic Models of Initiation and Propagation of Unidirectional Excitations in Excitable Media*
  - Contributed Paper, AMS/MAA Joint Meetings, Special Session on Applications of Mathematics, January 7, 2008
  - Contributed Paper, Third Annual Texas Undergraduate Mathematics Conference, November 3, 2007
  - Second Workshop on Constructive Function Theory, Sam Houston State University, October 27, 2007
- AMS Fall Central Section Meeting #1020, Special Session on Mathematical Modeling of Biological Systems, III, *A Reaction-Diffusion Model for Eradication of the Screwworm Fly by Sterile Insect Release Method*, University of Cincinnati, October 22, 2006
- The 25th Annual Southeastern-Atlantic Regional Conference on Differential Equations, Contributed Paper, *Eradication of the Screwworm Fly by Sterile Insect Release Method*, University of Dayton, October 7, 2005
- 2004 SIAM Annual Meeting, Special Session on Applications of Reaction-Diffusion Equations in Mathematical Biology, *Effects of Diffusion and Stimuli on Bifurcating Rotating Waves in Excitable Media*, New Orleans, Louisiana, July 14, 2005
- AMS Spring Central Sectional Meeting #1006, Special Session on Partial Differential Equation and its Applications in Biomedical Study, II, *Effects of Diffusion and Stimuli on Bifurcating Rotating Waves in Excitable Media*, Texas Tech University, April 9, 2005
- 2004 SIAM Conference on the Life Sciences, Contributed Paper, *Bifurcating Rotating Wave Solutions of the FitzHugh Nagumo Equations*, Portland, Oregon, July 13, 2004
- The 25th Annual Southeastern-Atlantic Regional Conference on Differential Equations, Contributed Paper, *Bifurcating Rotating Wave Solutions of the FitzHugh Nagumo Equations on a Ring*, Kennesaw State University, October 18, 2003
- VIGRE Applied Mathematics Seminar, (series of talks) Tulane University, Fall and Spring 2003

- Mathematical Modeling in Industry - A Workshop for Graduate Students at the Institute For Mathematics and Its Applications (IMA) Summer Program, *Boundary Element Analysis of Intracardiac Electrogram Sensing*, University of Minnesota, July 1998

#### Poster Presentations

- *A Reaction-Diffusion Model for Eradication of the Screwworm Fly by Sterile Insect Release Method* (poster presentation), at the Workshop for Young Researchers in Mathematical Biology, The Ohio State University, March 12-15, 2007

### **SERVICE/PROFESSIONAL**

- Currently the department faculty representative for Pi Mu Epsilon (national mathematics honor society)
- Committee work:
  - hiring (department chair and faculty)
  - honors and awards
  - textbook selection
  - student success initiatives
  - community college district-wide remedial final exam creation
  - community college district-wide remedial program evaluation
  - SACS accreditation review preparation
- Co-organized a mini-symposium with Robert Matlock titled *Applications of Reaction-Diffusion Equations in Mathematical Biology*, at SIAM annual meetings, New Orleans, Louisiana, July 2005.
- Organized weekly VIGRE seminars at Tulane University (Spring semester 2003).

### **MEMBERSHIPS**

- Mathematical Association of America (MAA)
- Society for Mathematical Biology (SMB)
- Sigma Xi, The Scientific Research Society
- Sigma Pi Sigma, Society of Physics Students