NICHOLAS G. COGAN
Florida University
Department of Mathematics

Curriculum Vitae

Contact Information

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Education

- *Ph.D.*, University of Utah, Mathematics, May, 2003.
  Dissertation: A Model of Biofilm Growth and Structural Development
  Chair: James P. Keener
- *M.S.*, Montana State University, Mathematics, May, 1996.
- *B.A.*, Texas Tech University, Mathematics, May, 1994.

Experience

- *Assistant Professor*, Department Mathematics, Florida State University, January 2006 - present.
- *Visiting Assistant Professor*, Department of Computational and Applied Mathematics, Rice University, July 2005 - December 2005.
- *Postdoctoral Fellow*, Department of Mathematics, Tulane University, July 2004 - July 2005.
- *Postdoctoral Fellow*, Center for Computational Science, Tulane University, July 2003- July 2004.
- *Postdoctoral Fellow*, Department of Mathematics, Tulane University, January 2002- July 2003.

Research Interests

- Mathematical Biology
- Fluid/Structure Interactions
- Scientific Computation
- Mathematical Physiology

External Funding

- 2007: NSF-DMS SCREMS: Improving high performance computing environment for research and education in mathematical sciences
- 2005 - 2007: NSF - DMS # 0548511(Mathematical Biology) *Modeling Biofilms: Fluid Dynamics, Reaction/Diffusion/Advection and Biomass Redistribution*

Refereed Publications

- *The Role of the Biofilm Matrix in Structural Development*
  N.G. Cogan and James P. Keener, Mathematical Medicine and Biology 21(2),147-166 (2004)
- *Modeling Physiological Resistance in Bacterial Biofilms*
  N.G. Cogan, Ricardo Cortez and Lisa J. Fauci, Bulletin of Mathematical Biology 67 (4): 831-853 (2005).
- *Pattern Formation by Bacteria-driven Flow*
  N. G. Cogan and C.W. Wolgemuth, Biophysical Journal 88 (4): 2525-2529 (2005).
- *Channel Formation in Gels*
  N.G. Cogan and James P. Keener, SIAM J. Appl. Math. 65 (6): 1839-1854 (2005).
- *Effects of Persister Formation on Bacterial Response to Dosing*
  N.G. Cogan, Journal of Theoretical Biology 238(3): 694-703 (2006) .
- *Incorporating Toxin Hypothesis into a Mathematical Model of Persister Formation and Dynamics*
  N.G. Cogan, Journal of Theoretical Biology 248 (2007): 340-349.
- *Hybrid Numerical Treatment of Two Fluid Problems with Passive Interfaces*
  N.G. Cogan, Comm. App. Math. and Comp. Sci. Vol 2., No. 1, pp. 117-133 (2007).
- *A Two-Fluid Model of Biofilm Disinfection*
  N.G. Cogan, Bulletin of Mathematical Biology, (Accepted 2007).
- *Field-Phase Models for Biofilms. II. 2-D Numerical Simulations of Biofilm-Flow Interaction*
  Tianyu Zhang, **N. G. Cogan** and Qi Wang, (Accepted 2007).
- *Phase-Field Models for Biofilm. I. Theory and 1-D Simulations*
  Tianyu Zhang, **N. G. Cogan** and Qi Wang, (In Revision 2007).
- *Regularized Stokeslets Solution for 2-D Flow in Dead-end Microfiltration: Application to Bacterial Deposition and Fouling*
  N. G. Cogan and Shankar Chellum, (In Revision 2007).

Proceedings

- *Boundary Element Analysis of Intracardiac Electrogram Sensing*
  John Alford, Nick Cogan, Charles Miller, Seth Patinkin, Bradford E.Peercy, and Noah A. Rosenberg, IMA Preprint Series # 1589 (1999).

- *Biofilm Control by Antimicrobial Agents*
  P.S. Stewart, S. Sanderson, X. Xu, J. Raquepas, and N. Cogan, In Biofilms II: Process Analysis and Applications, 2nd edition, J. D. Bryers, ed. New York: John Wiley & Sons (2000).

- *Microbial Biofilms: Persisters, Tolerance and Dosing*
  N.G. Cogan, International Symposium on Interdisciplinary Science, American Institute of Physics Conference Proceedings (2005).

Selected Presentations

- *Modeling Biofilm Disinfection: How much is enough?*, SIAM Annual Meeting. New Orleans, LA, January, 2007.

- *Fluid/Structure Interaction and Transport in a Biofilm Model*, Biofilm Mechanics Workshop, Bozeman, MT. 2007.

- *Boundary Integral Methods for Biofilm Dynamics*, Biomedical Seminar, FSU, Fall, 2007.

- *Two-fluid Model of Biofilm Disinfection*, SIAM/SMB Joint meetings. Raleigh, NC, July 2006.

- Poster: *Persisters and Biofilm Disinfection*,Center for Biofilm Engineering Technical Advisory Conference, Bozeman, Montana, June 2006.

- *Modeling Biofilm Disinfection: How much is enough?*, SIAM Annual Meeting. New Orleans, LA, January, 2007.

- *Boundary Integral Methods for Two-Fluid Systems*, Mathematics Departmental Colloquium, Duke University, Durham, North Carolina, October 2005.

- *Boundary Integral Methods Biofilms*, Mathematics Departmental Colloquium, University of Texas at Arlington, Arlington, Texas, October 2005.

- *Mathematical Treatment of Biofilm/Fluid Interactions and Disinfection*, Mathematics Departmental Colloquium, Florida State University, Tallahassee, Florida, October 2005.

- *Pattern Formation by Bacteria-driven Flow*, SIAM Annual Meeting, July 2005.

Professional Activities

- Invited Panel Member: "TIMBER (The Institute for Mathematical Biology Education and Resources) Workshop", Appalachian State, November 2-3, 2007. This was a recruiting trip for the department. The TIMBER conference is an annual conference focusing on undergraduate research in mathematical biology topics. This year the conference served as one of the outlets for the new MAA special interest group on Mathematical and Computational Biology, BIO SIGMAA. I served on a panel representing Ph.D. programs in mathematical biology along with representatives from UC Davis, NC State, UNC - Chapel Hill among others.
- Judge for Moody's Mega Math Challenge 2006 & 2007.
- Co-Organizer, Minisymposiums: Fluid/Structure Interactions in Biofluids
  Joint SIAM-SMB Conference on the Life Sciences
  Raleigh, NC, July 2006.
- Organizer, Minisymposium on Fluid/Structure Interactions
  SIAM Annual Meeting
  New Orleans, LA, July 2005.
- Co-organizer, Minisymposium on Gel Dynamics
  SIAM Applications of Dynamical Systems
  Snowbird, Utah, May 2003.
- Selected reviewer for: Bulletin of Mathematical Biology; Water Research; Physics of Fluids; SIAM Journal on Multiscale Modeling and Simulation; Mathematical Medicine and Biology; SIAM Journal on Applied Mathematics; Biophysical Journal; Journal of Theoretical Biology; Biotechnology and Bioengineering; NSF Proposal MSPA-INTERDISCIPLINARY; NSF Proposal RIG-INTERDISCIPLINARY

Professional Affiliation

- SIAM (Society for Industrial and Applied Mathematics)
- SMB (Society for Mathematical Biology)
- AMS (American Mathematical Society)