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,, Bulletin of Mathematical Biology, 70(3) pp. 800-819 (2008)

- *Field-Phase Models for Biofilms. II. 2-D Numerical Simulations of Biofilm-Flow Interaction*
  Tianyu Zhang, **N. G. Cogan** and Qi Wang, Communications in Computational Physics, 4(1) pp: 72-101 (2008)

- *Phase-Field Models for Biofilm. I. Theory and 1-D Simulations*
  Tianyu Zhang, **N. G. Cogan** and Qi Wang, SIAM J. Appl. Math. Volume 69, Issue 3, pp. 641-669 (2008)

- *Regularized Stokeslets Solution for 2-D Flow in Dead-end Microfiltration: Application to Bacterial Deposition and Fouling*
  N. G. Cogan and Shankar Chellum, Journal of Membrane Science 318(1-2) pp: 379-386 (2008)

- *Failure of antibiotic treatment in microbial populations,*
  Patrick De Leenheer and **N. G. Cogan**, Journal of Mathematical Biology (In Press)

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

- *Extending Boundary Integral Methods to Biofilm Dynamics*, University of California-Davis, Mathematical Biology Seminar, Spring '08.

- *Simulating Biofilm Growth and Dynamics in a Flowing Environment*, University of Cincinnati Mathematics Department Colloquium, Spring '08.

- *A Model of Persister Formation and Dynamics*, Conference on Mathematical Tools and Multiscale behavior in Biological Processes, Montana State University Summer '08.

- *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.

- *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.

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

Professional Activities

- Judge for Moody's Mega Math Challenge 2006-2008.

- 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)