

VIRGINIA B. PASOUR

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CURRENT POSITION

Program Manager, Biomathematics, Army Research Office, Durham, NC, Oct, 2009-present.
Developed Army Research Office's new program in Biomathematics (~\$11M/yr)

Currently

- Identify promising new areas of basic research in Biomathematics
- Work with external researchers to formulate, fund, and manage projects in these areas
- Coordinate with other government program managers/agencies to achieve the most revolutionary new insights in the field with minimum duplicated effort
- Help transition funded basic research to Army and other government scientists

Thrust areas

- Fundamental Laws of Biology
- Multiscale modeling/Inverse Problems
- Hybrid Modeling

Some significant scientific efforts

- Ecology of the Skin Microbiome
- Bacterial Spore Germination
- Microbial Forensics and Multiple Input-Multiple Output Data Association Methods
- Neural Foundations of Learning
- Resilience and Robustness in Ecological Decision-Making
- Cognitive Fatigue

Adjunct Assistant Professor, UNC-Chapel Hill, Chapel Hill, NC, January, 2014-2020.

EDUCATION

Cornell University

Ph.D. in Applied Mathematics, January, 2007.
M.S. in Applied Mathematics, August, 2003.
Dissertation: Computation and Analytical Perspectives on the Drift Paradox Problem in a Freshwater Embayment
Supervisor: Stephen Ellner, Department of Ecology and Evolutionary Biology

North Carolina State University

Coursework in Biomathematics, Department of Statistics, 1997-1999.

University of North Carolina at Chapel Hill

M.S. in Biostatistics, December, 1995.
Thesis: Censored Power Calculations Using Fixed Means and Estimated Variances.
Supervisor: Keith Muller

University of Canterbury, Christchurch, NZ

Coursework in Mathematics and Engineering as a Rotary Graduate Fellow, 1992.

Wake Forest University, Winston-Salem, N.C.

Bachelor of Science in Mathematics, May, 1991. Valedictorian.

EMPLOYMENT HISTORY

Postdoctoral Associate, Duke University, Durham, NC, August, 2008-September, 2009.

Used mathematical and statistical approaches to understand the evolution of infectious disease.
Supervisor: Katia Koelle

Assistant Adj Professor/Assistant Researcher, UCLA, LA, CA, January, 2007-June, 2008.

Taught one lower- or upper-divisional mathematics course per quarter.
Studied mathematical models of crime hot spots using computation and analysis.
Supervised undergraduate (REU) and graduate student research projects.
Supervisors: Andrea Bertozzi and Lincoln Chayes

Research Assistant, Cornell University, Ithaca, NY, January, 2002-August, 2003.

Developed two-part research plan to study bio-physical interactions in fresh water embayments as part of an NSF Lake Ontario Biocomplexity project.
Supervisor: Steve Ellner

Visiting Researcher, Tokyo University of Fisheries, Japan, July-August, 1998.
Through an NSF-sponsored program, participated in field work and mathematical modeling of the effect of turbulence on marine organism aggregation.
Supervisor: Hidekatsu Yamazaki

Programmer, IBM, Research Triangle Park, N.C., August, 1996-August, 1998.
Helped test token ring media modules in the 8260 Switching Hub.
Debugged media module code in C/C++.

Statistician, Research Triangle Institute, RTP, N.C., November, 1995-August 1996.
Used SAS and SUDAAN programming packages to perform data management tasks and statistical analyses.
Selected samples for economic survey.
Instructed fellow statisticians in the use of Splus software.

Visiting Fellow, Australian National University, Canberra, Australia, June-August, 1994.
Collaborated with faculty members on a statistical methodology problem involving chi-squared reduction factor in the presence of correlated survey data.
Supervisor: Sue Wilson

Intern, IBM, Research Triangle Park, N.C., January-August, 1993; June, 1991-January, 1992, May-August, 1990; May-August, 1989.
Wrote, tested C code for the LAN Network Manager Server component of a bridge/router product.
Helped write and test a graphical simulator to be used in testing a high bandwidth communications product.
Wrote microcode for the 9370 Work Station Controller.
Tested and debugged microcode and wrote documentation for the 3174 Systems Controller.

TEACHING EXPERIENCE

Assistant Adjunct Professor, Math Department, UCLA, January, 2007-June, 2008.

- Differential Equations (Math 33B) – Winter Quarter, 2007
- Applied Numerical Methods (Math 151A) – Spring Quarter, 2007
- Differential Equations (Math 135) – Fall Quarter, 2007
- Integration and Infinite Series (Math 31B) – Winter Quarter, 2008
- Applied Numerical Methods (Math 151B) – Spring Quarter, 2008

Instructor, Calculus II, Cornell University, NY, August-December, 2005.
Prepared and gave lectures, in-class assignments, and tests and graded tests.
Incorporated technology (Blackboard and Maple T.A.) into the course.

Teaching assistant, Vector Calculus, Cornell University, NY January-May, 2005.
Held semi-weekly help sessions for two sections of vector calculus for engineers.
Graded weekly homeworks and helped create and grade exams.

Instructional Teaching Assistant, Calculus II, Cornell University, NY, August-December, 2004.
Prepared and gave lectures, quizzes, and tests.
Graded quizzes and tests.

Teaching Assistant, Dynamic Models in Biology, Cornell University, NY, January-August, 2004.
Held daily office hours to assist students with course concepts and Matlab programming.
Graded homework and exams.

Instructional Teaching Assistant, Calculus II, Cornell University, NY, August-December, 2003.
Prepared and gave lectures, quizzes, and tests.
Graded quizzes and tests.

Teaching Assistant, Cornell University, Ithaca, NY, August-December, 2001.
Held semi-weekly help sessions for two sections of second semester engineering calculus.
Graded weekly homeworks and helped create and grade exams.

Grader, University of North Carolina – Chapel Hill, Chapel Hill, NC, January-May, 1995.
Held weekly help sessions for graduate-level survey sampling course.
Graded weekly homeworks.

**SELECTED
PRESENTATIONS**

- Pasour, V.**, Interplay of Fluid Dynamics and Macrophytes and their Impact on Plankton Dynamics, poster, 2016 Ocean Sciences Meeting, February 21-26, 2016, New Orleans.
- Pasour, V.B.**, and Miller, L.A., Impact of Macrophytes on Plankton Movement, AMS Fall Southeastern Section Meeting, November 8-9, 2014, Greensboro, NC.
- Pasour, V.B.**, and Miller, L., Population Scale Effects of Macrophytes on Plankton Mobility, 2014 SIAM Conference on the Life Sciences, August 4-7, 2014, Charlotte, NC.
- Pasour, V.**, and Miller, L., Interaction in Aquatic Environments due to Macrophytes, Ecole de Physique des Houches program on Microscale interactions in aquatic environments, March 10-15, 2013, Les Houches, France.
- Pasour, V.B.** and Miller, L.A., Flow through Flexible, Deforming Macrophytes, 2012 SIAM Conference on the Life Sciences, August 7-10, 2012, San Diego, CA.
- Pasour, V.B.**, and Miller, L.A., Mixing caused by flow through flexible, deforming macrophytes, 2012 **ASLO** Aquatic Sciences Meeting, July 8-13, 2012, Otsu, Japan.
- Pasour, V.**, Miller, L, and Ellner, S. Influence of macrophytes on biological residence time in a flow-through system, 2011 Annual Meeting of The Society for Mathematical Biology and 8th European Conference on Mathematical and Theoretical Biology, June 28 – July 2, 2011, Krakow, Poland.
- Pasour, V.B.**, and Miller, L. Interplay of Fluid Dynamics and Macrophytes and their Impact on Plankton Dynamics, 2012 Ocean Sciences Meeting, February 22-26, 2010, Portland, OR.
- Pasour, V.**, Mattingly, J., and Koelle, K. A Dimensionless Number for Viral Evolution, International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, July 27-30, 2009, Vancouver, CA.
- Pasour, V. B.**; Ellner, S. P.; Cowen, E. A.: The Effect of Macrophytes on the Drift Paradox Problem, **ASLO** Aquatic Sciences Meeting 2009, January 25-30, 2009, Nice, France.
- Pasour, V.**, Determining the fate of plankton using an individual-based model. **ECMTB2005** Conference Proceedings, Evolution and Ecology section, 2005.
- Pasour, V.**, Ellner, S., and Cowen, E. What determines the fate of plankton?, poster, **ECMTB2005**, Vol. 2, p.2-152, July 18-22, 2005, Dresden, Germany.
- Pasour, V.**, Cowen, A., and Ellner, S., Influences of Vertical Migration on Biological Retention Time in a Flow-through System, **IAGLR** Great Lakes Need Great Watersheds, p.121, May 24-28, 2004, Waterloo, Canada.
- Pasour, V.**, Rueda, F., Ellner, S., and Cowen, A., To what extent can plankton behavior affect its destiny?, **ASLO** Ocean Research Conference, February 15-20, 2004, Honolulu, HI.
- Pasour, V.**, Rueda, F., Ellner, S., and Cowen, A., Interaction of Plankton Behavior and Hydrodynamics in Freshwater Embayment, poster, **ASLO** Aquatic Sciences Meeting, February 9-14, 2003, Salt Lake City, UT.
- Arend, K.K., Doyle, R., and **Pasour, V.**, What IS biocomplexity? Perspectives from the Lake Ontario Biocomplexity project, Invited talk, Biocomplexity and Biogeochemistry Initiative Fall 2002 Seminar Series, December 6, 2002, Cornell University, Ithaca, NY.
- Pasour, V.**, Modeling nutrient, phytoplankton, zooplankton interactions across the residence time gradient, Lake Ontario Biocomplexity Team Meeting, March 15, 2002, Tompkins-Cortland Community College, Dryden, NY.
- Fisher, K.E., Cowen, E.A., and **Pasour, V.**, Wavelet Variance and Fractal Interpolation Techniques for Characterizing Patch Structures, poster, **ASLO** Aquatic Sciences Meeting, February 12-16, 2001, Albuquerque, NM.
- Best, J., **Pasour, V.**, Tisch, N., and Castillo-Chavez, C., Delayed density dependence and the dynamic consequences of dispersal between patches, poster, International Conference on Mathematics in Biology and Annual Meeting of the Society for Mathematical Biology, August 3-5, 2000, Salt Lake City, UT.
- Pasour, V.** and Yamazaki, H., Extensions to a Lagrangian model of animal aggregation, poster, Department of Energy Computational Science Graduate Fellowship Conference, July 15-17, 1999, Washington, D.C.
- Pasour, V.**, How does extreme weather affect Little Penguin populations?, poster, Modeling Biological Systems Poster Session , December 1, 1997, NCSU, Raleigh, NC.

TECHNICAL PUBLICATIONS

- Senter, Michael D., Guy, Bob, Zhang, Calvin, Ozalp, Kemal, **Pasour, Virginia**, and Miller, Laura. The hydrodynamics of metachronal paddling in brine shrimp, submitted to *Royal Society Open Science*.
- Ozalp, M. K., Miller, L. A., Dombrowski, T., Braye, M., Dix, T., Pongracz, L., Howell, R., Klotsa, D., **Pasour, V.**, Strickland, W., C. (2019) Experiments and agent based models of zooplankton movement within complex flow environments, *Biomimetics* 10(5), doi:10.3390/biomimeticsxx010005.
- Samson, J.E.,..., and **Pasour, V.B.**, editors (2019) Editorial: Canopies in Aquatic Ecosystems: Integrating Form, Function, and Biophysical Processes, *Frontiers in Marine Science*, section Marine Ecosystem Ecology.
- Strickland, C., Miller, L.A., Santhanakrishnan, A., Hamlet, C., Battista, N., and **Pasour, V.** (2017) Three-dimensional low Reynolds number flows near biological filtering and protective layers, *Fluids*, 2(62), doi:10.3390/fluids2040062.
- Strickland, C., **Pasour, V.**, and Miller, L. (2016) Low Reynolds number flow near tiny leaves, stems, and trichomes. *Bulletin of the American Physical Society*, 61.
- Strickland, C., Bourouiba, L., Brown, C., Childs, L., Ho, A., Jenkins, E., Kristensen, N., Kumar, S., **Pasour, V.**, Samson, J., Shipman, P., Taylor, D., Waldrop, L., Zhu, L., and Miller, L., The fluid physics of long distance dispersal and its significance to ecology and epidemiology. In revision. Preprint available here: <https://drive.google.com/file/d/0B4mLG2SPb-tbUmVHZFI4UWFvSTQ/view?usp=sharing>.
- Greenman, J.V., and **Pasour, V.B.** (2012) Threshold dynamics for periodically forced ecological systems: the control of population invasion and exclusion. *Journal of Theoretical Biology*, 295, 154-167.
- Koelle, K., Ratmann, O., Rasmussen, D., **Pasour, V.**, and Mattingly, J. (2011) A dimensionless number for understanding the evolutionary dynamics of antigenically variable RNA viruses. *Proc. Roy. Soc. B*, 278(1725), 3723-3730.
- Greenman, J.V., and **Pasour, V.B.** (2010) Phase control of resonant systems: reinforcement and interference. *Journal of Theoretical Biology*, 278(1), 74-86.
- Pasour, V.**, and Ellner, S. (2010) Computational and Analytic Perspectives on the Drift Paradox. *SIAM Journal on Applied Dynamical Systems*, 9(2), 333-356.
- Short, M.B., D'Orsogna, M.R., **Pasour, V.B.**, Tita, G.E., Brantingham, P.J., Bertozzi, A.L., and Chayes, L.B. (2008) A statistical model of criminal behavior, *Mathematical Models and Methods in Applied Sciences*, Vol. 18 Suppl., 1249-1267.
- Muller, K.E., and **Pasour, V.B.** (1997) Bias in linear model power and sample size due to estimating variance. *Communications in Statistics: Theory and Methods*, 26(4), 838-51.

GRANT FUNDING

- Granting Agency: US Army Research Office
Title: Mathematical Models of the Individual and Collective Fluid Dynamics of Brine Shrimp Swimming
Dates: 05/01/2020 – 04/30/2023
Total Award: \$276,268
- Granting Agency: US Army Research Office
Title: Mathematical Modeling of Macrophyte-flow Interactions and the Resulting Zooplankton Distributions
Dates: 08/01/2015 – 07/30/2018
Total Award: \$254,838

WORKSHOP, MINISYMPOSIUM, AND SPECIAL ISSUE ORGANIZATION

- Workshop "Computational Psychiatry," organized with Dr. Tom Chou (UCLA), Dr. Maria D'Orsogna (Cal State, Northridge), Dr. Marti Jett (Army Medical Command), Dr. John Murray (Yale), and Shashaank Vattikuti (National Institutes of Health (NIH)) and held at IPAM at UCLA in February, 2020.
- Topic Editor for Research Topic "Canopies in Aquatic Ecosystems: Integrating Form, Function, and Biophysical Processes" in *Frontiers in Marine Science*, organized with Julia Samson (UNC), Dr. Brian White (UNC), Dr. Marco Ghisalberti (Western Australia), Dr. Matthew Adams (Queensland), Dr. Matthew Long (Woods Hole), Dr. Matthew Reidenbach (UVA), and Dr. Uri Shavit (Technion).
- Session "Canopies in Aquatic Ecosystems: Integrating Form, Function, and Biophysical Processes" organized with Julia Samson (UNC) and Dr. Brian White (UNC) at ASLO 2017 held in Honolulu, Hawai'i, in February-March, 2017.
- Workshop "Mathematics and the Quest for Fundamental Principles of Biology," organized with Dr. Fred Adler (Utah) and held in Salt Lake City, UT, in December, 2015.
- Workshop "Neurobiology of Expertise," organized with Dr. Fred Gregory (ARO) and held at NIMBioS (UT-Knoxville) in March, 2015.
- Mini-symposium "Marine Fluid-Structure Interactions: Organs and Ecosystems" at 2012 SIAM Conference on the Life Sciences held in San Diego, CA, in June, 2012.
- Workshop "Numerical Methods, Biological Inspired Algorithms and Multi Objective Optimization," organized with Dr. Kunigal Shivakumar (NC A&T) and Dr. Bruce LaMattina (ARO) and held in Williamsburg, VA, in June, 2011.
- Workshop "Microbial Data Exploitation: State-of-the-Art and Future Directions," organized with Dr. Adam Arkin (UC – Berkeley) and Dr. Wally Buchholz (ARO) and held at Lawrence Berkeley National Laboratory in August, 2010.
- Mini-symposium "Mathematical Modeling in Life Sciences: Control and Optimization" at 2012 SIAM SEAS 2010 organized with Dr. Abdessamad Tridane (ASU) in Raleigh, NC, in March, 2010.

**FUNDING PANEL
AND PROPOSAL
REVIEWER**

National Science Foundation (NSF)
Department of Energy (DOE)
National Institutes of Health, member of Interagency Modeling and Analysis Group (NIH, IMAG)
Air Force Office of Scientific Research (AFOSR)
Defense Advanced Research Projects Agency (DARPA)
Office of Naval Research (ONR)
Institute for Collaborative Biotechnologies (ICB)
Defense Threat Reduction Agency (DTRA)
US Army Engineer Research and Development Center (ERDC)
US Army Medical Research and Materiel Command (USAMRMC)
West Point Network Science Center
Army High Performance Computing Research Center (AHPCRC)
Department of Homeland Security (DHS)

HONORS

Achievement Medal for Civilian Service
Cornell University
 International Association for Great Lake Research Scholarship
 IGERT fellowship (nonlinear dynamics)
 Mathematical biology fellowship
North Carolina State University
 DOE Computational Science Graduate Fellowship
 Monbusho Summer Program: Research Experience Fellowship for young Foreign Researchers
 Sigma Xi
UNC – Chapel Hill
 Pogue Fellowship
 Delta Omega
Wake Forest University
 Rotary Graduate Fellowship
 Phi Beta Kappa
 Pi Mu Epsilon
 Omicron Delta Kappa

**PROFESSIONAL/
VOLUNTEER
ACTIVITIES**

Member
 Society for Industrial and Applied Mathematics, Life Sciences Activity Group
 American Mathematical Society
 American Society for Limnology and Oceanography
 Society for Mathematical Biology
 European Society for Mathematical and Theoretical Biology
 American Geophysical Union
 International Association for Great Lakes Research
 Daughters of the American Revolution (member of Executive Board)
 RTP Rotary Club
Volunteer
 Prepared treat bags of cookies and candy for traveling service- men and women
 Collected school supplies, helped build a playground and other charitable activities as Rotarian
 Serve as judge for various junior science competitions and a speed mentor
 Active member of Winds of Hope, a volunteer flute group serving nursing homes, etc.
 Assisted in math and science classes at MacCormick Secure Facility for juvenile felons
 Led school groups on nature walks for Cayuga Nature Center
 Helped with Expanding Your Horizons workshops for middle school girls at Cornell
 Served as an 'elf' for The Elves Program at Cornell, providing clothes and toys to local children

REFERENCES

Laura Miller, Professor
Department of Applied Mathematics
University of Arizona
(919) 943-2434
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Mou-Hsiung (Harry) Chang, (former) Program Manager, Probability and Statistics
Mathematical Sciences Division
US Army Research Office
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