

# Shilpa Khatri

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## CONTACT INFORMATION

Department of Mathematics  
CB 3250, Phillips Hall  
Chapel Hill, NC 27599 USA

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<http://www.unc.edu/~khatri>

## EMPLOYMENT

**Joint Applied Mathematics and Marine Sciences Fluids Lab, Department of Mathematics,  
University of North Carolina at Chapel Hill (UNC-CH)**

Postdoctoral Fellow, Aug 2011 -

**Computational Science and Engineering Laboratory,  
Swiss Federal Institute of Technology Zurich (ETHZ)**

Postdoctoral Fellow, Dec 2009 - July 2011

## EDUCATION

**Courant Institute of Mathematical Sciences, New York University (NYU)**

Ph.D. in Mathematics, Sept 2009

- Thesis: A Numerical Method for Two Phase Flows with Insoluble and Soluble Surfactants
- Advisor: Anna-Karin Tornberg
- National Defense Science and Engineering Graduate Fellow

M.S. in Mathematics, May 2005

**University of North Carolina at Chapel Hill (UNC-CH)**

B.S. in Mathematics (applied math option), Minor in Chemistry, May 2003

## PUBLICATIONS

S. Khatri, L. Waldrop, and L. Miller, *Odorant molecule capture by marine and terrestrial crabs*, in preparation.

R. Camassa, C. Falcon, S. Khatri, R. McLaughlin, B. White, and S. Yu, *A predictive theory for a porous sphere settling through stratified fluids*, in preparation.

S. Khatri and A.-K. Tornberg, *An embedded boundary method for soluble surfactants with interface tracking for two phase flows*, *Journal of Computational Physics*, 256:768-790, 2014.

R. Camassa, S. Khatri, R. M. McLaughlin, J. C. Prairie, B. L. White, and S. Yu, *Retention and entrainment effects: Experiments and theory for porous spheres settling in sharply stratified fluids*, *Physics of Fluids*, 25:081701, 2013.

J. C. Prairie, K. Ziervogel, C. Arnosti, R. Camassa, C. Falcon, S. Khatri, R. McLaughlin, B. L. White, and S. Yu, *Delayed settling of marine snow at sharp density transitions driven by fluid entrainment and diffusion-limited retention*, *Marine Ecology Progress Series*, 487:185-200, 2013.

R. Camassa, S. Khatri, R. McLaughlin, K. Mertens, D. Nenon, C. Smith, and C. Viotti, *Numerical simulations and experimental measurements of dense-core vortex rings in a sharply stratified environment*, *Computational Science & Discovery*, 6:014001, 2013.

S. Khatri and A.-K. Tornberg, *A numerical method for two phase flows with insoluble surfactants*, *Computers & Fluids*, 49:150-165, 2011.

S. Khatri, *A Numerical Method for Two Phase Flows with Insoluble and Soluble Surfactants*, Doctorate thesis, Courant Institute of Mathematical Sciences, New York University, 2009.

S. Khatri and A.-K. Tornberg, *A numerical method for soluble surfactants on moving interfaces*, *Proceedings in Applied Mathematics and Mechanics, Special Issue: Sixth International Congress on Industrial and Applied Mathematics and GAMM Annual Meeting*, 7:1024509-1024510, 2007.

S. Khatri, *Surface Stress Induced Entrainment in Stratified Fluids*, Honors thesis, Dept. of Mathematics, University of North Carolina at Chapel Hill, 2003

INVITED  
TALKS

Department of Mathematics, College of Charleston, Charleston, SC, USA (Feb 24, 2014)

Department of Mathematics, University of Louisville, Louisville, KY, USA (Feb 21, 2014)

Science Seminar Series, Sarah Lawrence College, Bronxville, NY, USA (Feb 18, 2014)

Applied Mathematics, School of Natural Sciences, University of California, Merced, CA, USA (Feb 10, 2014)

Department of Mathematics and Statistics, California State University, Long Beach, CA, USA (Jan 31, 2014)

Department of Mathematics, State University of New York at New Paltz, New Paltz, NY, USA (Jan 24, 2014)

Applied Math Lab Seminar, Courant Institute of Mathematical Sciences, New York University, New York, NY, USA (Dec 12, 2013)

Applied and Computational Mathematics Seminar, University of Wisconsin-Madison, Madison, WI, USA (Oct 18, 2013)

Seminario di Fisica Matematica, University of Milano-Bicocca, Milan, Italy (Mar 8, 2013)

Kolloquium Thermo- und Fluidodynamik, ETHZ, Zurich, Switzerland (Mar 6, 2013)

Banff International Research Station, Workshop on Thin Liquid Films and Fluid Interfaces: Models, Experiments and Applications, Banff, Canada, USA (Dec 11, 2012)

Graduate Math Association Visions Seminar, UNC-CH, Chapel Hill, NC, USA (Nov 12, 2012)

Differential Equations Seminar and Applied Math Club, North Carolina State University, Raleigh, NC, USA (Nov 7, 2012)

International Conference on Numerical Methods in Multiphase Flows, Pennsylvania State University, State College, PA, USA (Jun 14 2012)

Frontiers in Applied and Computational Mathematics 2012, New Jersey Institute of Technology, Newark, NJ, USA (May 19, 2012)

Lunch Bunch Seminar, Marine Sciences, UNC-CH, Chapel Hill, NC, USA (Mar 28, 2012)

Applied Mathematics and Analysis Seminar, Duke University, Durham, NC, USA (Mar 26, 2012)

Fields Institute, Workshop on Surfactant Driven Thin Film Flows, Toronto, Canada (Feb 23, 2012)

Applied Mathematics Colloquium, UNC-CH, Chapel Hill, NC, USA (Jan 13, 2012)

WingX Project, Systems Biology of the Drosophila Wing, part of SystemsX.ch, the Swiss Initiative in Systems Biology, Zurich, Switzerland (Dec 01, 2010)

Computational Science and Engineering Laboratory, ETHZ, Zurich, Switzerland (Apr 07, 2009)

Frontiers in Applied and Computational Mathematics 2008, New Jersey Institute of Technology, Newark, NJ, USA (May 19, 2008)

2008 Spring Eastern American Mathematical Society Meeting, Courant Institute, New York, NY, USA (Mar 16, 2008)

Numerical Analysis, Royal Institute of Technology (KTH), Stockholm, Sweden (Aug 30, 2007)

Department of Information Technology, Uppsala University, Uppsala, Sweden (Aug 22, 2007)

Linné Flow Center Seminar, Royal Institute of Technology (KTH), Stockholm, Sweden (Apr 12, 2007)

CONTRIBUTED  
TALKS

Joint Mathematics Meetings, Baltimore, MD, USA (Jan 16, 2014)

American Physical Society, 66th Annual Division of Fluid Dynamics Meeting, Pittsburgh, PA, USA (Nov 26, 2013)

American Physical Society, 65th Annual Division of Fluid Dynamics Meeting, San Diego, CA, USA (Nov 18, 2012)

International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, (Jul 18 2007)

Offshore Mechanics and Arctic Engineering Conference, Vancouver, Canada, (Jun 2004)

POSTERS AND  
VIDEOS

Les Houches Physics School, Microscale Interactions in Aquatic Environments, Les Houches, France  
(Mar 10-15, 2013)

23rd International Congress of Theoretical and Applied Mechanics, Beijing, China (Aug 19-24, 2012)

American Physical Society, 64th Annual Division of Fluid Dynamics Meeting, Baltimore, Maryland,  
USA (Nov 20-22, 2011)

Opening Workshop for Program on Random Media, Statistical and Applied Mathematical Sciences  
Institute (SAMSI), Research Triangle Park, NC, USA (September 24, 2007)

HONORS AND  
AWARDS

2013 Service Award for outstanding service and dedication to science education and  
outreach (Office of Postdoctoral Affairs, UNC-CH)  
2003–2008 Henry MacCracken Fellowship (Graduate School of Arts and Sciences, NYU)  
2003–2006 National Defense Science and Engineering Graduate Fellowship (DoD)  
2003 Highest Honors in Mathematics and Distinction (UNC-CH)  
2003 The Archibald Henderson Prize in Mathematics, Chancellor’s Award (UNC-CH)

TEACHING  
EXPERIENCE

Spring 2014 Lecturer, First Course in Differential Equations (2 sections) (UNC-CH)  
Spring 2013 Lecturer, First Course in Differential Equations (UNC-CH)  
Fall 2012 Lecturer, Going with the Flow: the Mathematics of Fluid Dynamics (UNC-CH)  
Spring 2012 Lecturer, First Course in Differential Equations (UNC-CH)  
Spring 2012 Teaching Assistant, Fish Gotta Swim, Birds Gotta Fly: The Mathematics and  
the Mechanics of Moving (UNC-CH)  
Fall 2011 Lecturer, Calculus of Functions of Several Variables (UNC-CH)  
Spring 2011 Colecturer, Numerical Methods for Partial Differential Equations (ETH)  
Spring 2010 Colecturer, Simuations using Particles (ETH)  
Fall 2007 Lecturer, Linear Algebra (NYU)  
Summer 2002 Grader, Calculus of Functions of Several Variables (UNC-CH)  
Fall 2001 Teaching Assistant, Introduction to Scientific Programming (UNC-CH)

MENTORING OF  
STUDENTS

May 2013 - current Sarah Spivey, UNC-CH undergraduate  
May 2013 - current Claudia Falcon, UNC-CH graduate  
Fall 2012 - current Lauren Colberg, UNC-CH undergraduate  
Fall 2012 - current Holly Arrowood, UNC-CH graduate  
May 2012 - current Arthur Wood, UNC-CH undergraduate  
July 2013 - Dec 2013 Graham O’Conner, UNC-CH undergraduate (independent study course)  
Fall 2011 - Dec 2012 David Nenon, UNC-CH undergraduate

EXTENDED  
PROFESSIONAL  
TRAVEL

Winter, 2010 California Institute of Technology, Pasadena, CA, USA  
AY 2006–07 Royal Institute of Technology (KTH), Stockholm, Sweden  
Feb. 2008  
Summers 2008,2009

ACTIVITIES  
ORGANIZED

Aug 2014 Minisymposium at SIAM Conference on Nonlinear Waves  
and Coherent Structures coorganizer  
2011-2014 Applied Math Seminar coorganizer (UNC-CH)  
Aug 2013 Chacha Days Finale coorganizer (UNC-CH)  
May 2013 Summit on Women in Science coorganizer (UNC-CH)  
Spring 2006 cSplash coorganizer (NYU)  
2003-2006 Graduate Student/Postdoc Seminar coorganizer (NYU)

SERVICE/  
ACTIVITIES

Fall 2013 - current AWM graduate student mentor (mentee: Francesca Bernardi) (UNC-CH)  
Fall 2011 - current Joint Fluids Lab project coordinator and website management (UNC-CH)  
April Volunteer at NC Science Expo (UNC-CH)  
2012,2013,2014

May 2012	Future Faculty Fellowship Program, Center for Faculty Excellence (UNC-CH)
May 2012	Volunteer at Sonya Kovalevsky Day for Middle/High School Girls (UNC-CH)
Springs 2008,2009	cSplash lecturer (NYU)
Summer 2005	Canada/USA Mathcamp mentor
2002-2003	Shodor Education Foundation Intern