Xiaolin Wang, Ph.D

Paulson School of Engineering and Applied Sciences xiaolinwang@seas.harvard.edu
Harvard University, Cambridge, MA 02138 https://scholar.harvard.edu/wxiaolin

EDUCATION

Ph. D. in Computational Science and Engineering-Mathematics 2009-2014
Georgia Institute of Technology, Atlanta, GA
Thesis advisor: Dr. Silas Alben

B.S. in Mathematics 2005-2009
Peking University, Beijing, China
Thesis advisor: Dr. Ruo Li

RESEARCH INTERESTS

My research focuses on the area of applied and computational mathematics, with particular interests in interdisciplinary mathematical modelling, fluid dynamics, and numerical methods.

- Computational fluid dynamics: vortex dynamics, vortex wake structures, vortex-sheet methods, numerical methods for fluid-solid interactions.
- Active smart material: modelling of self-sustained piezoelectric material, applications on energy harvesting systems, passive vibration control systems.
- Mathematical biology: animal locomotion, microbial population dynamics with physical structures.

PROFESSIONAL POSITIONS

2017- Postdoctoral Fellow, School of Engineering and Applied Sciences, Harvard University.
2017-2018 Postdoctoral Fellow, Department of Mechanical Engineering, MIT.
2014-2017 Postdoctoral Fellow, Department of Mathematics, University of Michigan.
2014-2015 Postdoctoral Fellow, Department of Naval Architecture and Marine Engineering, University of Michigan.

PUBLICATIONS

Manuscripts in preparation

- Xiaolin Wang, Ken Kamrin, Chris H. Rycroft, "An Eulerian method for mixed soft and rigid body interactions in incompressible fluids." *In preparation.*

Journal Publications

1. Yan Wei, Xiaolin Wang, Jingfang Liu, Ilya Nemenman, Amoolya H. Singh, Howie Weiss, and Bruce R. Levin, "The population dynamics of bacteria in physically structured habitats and the adaptive virtue of random motility", PNAS, 108(2011): 4047-4052.
2. Xiaolin Wang, Matthew T. Osborne, and Silas Alben, "Optimizing snake locomotion on an inclined plane", Physical Review E 89.1 (2014): 012717.
3. Xiaolin Wang and Silas Alben, "The dynamics of vortex streets in channels", Physics of Fluids (1994-present) 27.7 (2015): 073603.
4. Xiaolin Wang, Silas Alben, Chenyang Li, and Yin Lu Young, "Stability and scalability of piezoelectric flags", Physics of Fluids, 28 (2016): 023601.
5. Xiaolin Wang and Silas Alben, "Dynamics and locomotion of flexible foils in a frictional environment", Proc. R. Soc. A 474 (2018): 20170503.

Conference Publications

6. Chenyang Li, Eun Jung Chae, Yin Lu Young, Xiaolin Wang, and Silas Alben. "Passive vibration control of flexible hydrofoils using piezoelectric material." In *Fourth International Symposium on Marine Propulsors (SMP, Austin, Texas, USA, 2015)*, pp. 3123-3129.

PRESENTATIONS

Invited Talks

Applied Math Colloquium, Sep. 2019, University of Maryland Baltimore County, Host: Weining Kang

CMSA Fluid Dynamics seminar, Mar. 2019, Harvard University, Host: Xiaojue Yang

Applied Mathematics Seminar, Dec. 2018, Beijing Computational Science Research Center, Host: Yang Ding

Computational Fluid Dynamics Seminar, Dec. 2018, Tsinghua University, Host: Wei-xi Huang

Applied Mathematics Seminar, Jun. 2018, Worcester Polytechnic Institute, Host: Min Wu

AIM Seminar, Feb. 2017, University of Michigan, Host: Silas Alben

Widely Applied Mathematics Seminar, Feb. 2017, Harvard University, Host: Chris H. Rycroft

Midwestern University Fluid Mechanics Retreat, Apr. 2016, Indiana.

AIM Student Seminar, Mar. 2013, University of Michigan, Host: Boran Wu

Applied Mathematics Seminar, Mar. 2012, Georgia Institute of Technology, Host: Silas Alben

Selected Contributed Talks

"An Eulerian method for mixed soft and rigid body interactions in fluids", APS March Meeting, Boston, MA, Mar. 2019

"An Eulerian method for mixed soft and rigid body interactions in fluids", APS DFD (Division of Fluid Dynamics), 2018 Annual Meeting, Atlanta, GA, Nov. 2018

"Dynamics and locomotion of flexible foils in a frictional environment", 18th U.S. National Congress for Theoretical and Applied Mechanics (USNC/TAM 2018), Chicago, IL, Jun. 2018

"Stability of piezoelectric flags", APS DFD 2015 Annual Meeting, Boston, MA, Nov. 2015

"Optimizing the snake locomotion in an incline plane", SIAM-SEAS region meeting, Melbourne, FL, Mar. 2014

"Numerical study of vorticity-enhanced heat transfer", APS DFD 2013 Annual Meeting, Pittsburgh, PA, Nov. 2013

"Numerical study of vorticity-enhanced heat transfer in a channel". APS DFD 2012 Annual Meeting, San Diego, CA, Nov. 2012

"Numerical study of vortex dynamics in a channel". Frontiers of Applied and Computational Mathematics, Newark, NJ. May 2010.

Posters

Georgia Scientific Computing Symposium, Atlanta, GA. Feb. 2014

TEACHING AND ADVISING EXPERIENCES

Lecturer/Instructor: designing class curriculum, lecturing, and assigning homework

Taught 2 courses in Paulson School of Engineering and Applied Sciences, Harvard University:

Spring 2018, Spring 2019	Physical Mathematics II (graduate)

Taught 4 courses in Department of Mathematics, University of Michigan:

Fall 2015	Calculus I (undergraduate)
Spring 2016	Differential Equations (undergraduate)
Spring 2017	Numerical Methods for Engineers and Scientists (undergraduate)
Summer 2017	Boundary Value Problems (graduate)

Taught 2 courses in Department of Mathematics, Georgia Institute of Technology:

Fall 2013	Calculus III (undergraduate)
Spring 2014	Calculus III for CS major (undergraduate)

Teaching Assistant: leading recitation classes and grading

Georgia Institute of Technology: Calculus III (Fall 2009, Spring 2010, Fall 2011, Spring 2012), Differential equations (Fall 2010, Spring 2011).

Mentoring:

a. REU student: Co-mentor with Dr. Silas Alben

1. Matthew Osborne, University of Toledo, Math major (Summer 2013 REU).
2. Angelia Wang, Brown University, Applied Math major (Summer 2015 REU).

b. Undergraduate Advisor:

1. Applied Math undergraduate advisor (Spring 2018, Spring 2019)

PROFESSIONAL ACTIVITIES

Journal reviewer: 2014-present

Physics of Fluids, Journal of Fluid Mechanics, Journal of Fluids and Structures, Journal of Computational Physics, International Journal of Heat and Fluid Flow, Fluid Mechanics Research International Journal, Journal of Vascular, Fluids.

Professional memberships: 2012-present

American Physical Society

Society for Industrial and Applied Mathematics

(Last updated: Sep. 2019)