

# XIAOJIA WANG

Postdoctoral Assistant Professor

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## PROFESSIONAL APPOINTMENTS

**Postdoctoral Assistant Professor**

*Department of Mathematics, University of Michigan, Ann Arbor, MI*

**Aug. 2022 –**

*Mentor: Prof. Silas Alben*

## EDUCATION

**Purdue University, West Lafayette**

*Ph.D. in Mechanical Engineering*

*GPA: 4.0/4.0*

**Aug. 2018 – Aug. 2022**

*Advisor: Ivan C. Christov*

**Dissertation:** Modeling and Stability of Flows in Compliant Microchannels

**Shanghai Jiao Tong University, China**

*M.S. in Naval Architecture and Ocean Engineering*

*GPA: 3.64/4.0*

**Sept. 2015 – Mar. 2018**

*Advisor: Renchuan Zhu*

**Tianjin University, China**

*B.S. in Ocean and Naval Engineering*

*GPA: 3.86/4.0*

**Sept. 2011 – Jun. 2015**

*Minor in English Literature*

## RESEARCH INTERESTS

Fluid mechanics

Microfluidics

Fluid–structure interactions

Hydrodynamic stability

Scientific computing

Mathematical modeling

## AWARDS AND HONORS


- **Conference Travel Grant** from the College of Engineering, Purdue University, 2021.
- **Rising Stars in Mechanical Engineering**, 2021. Selected as one of the (around) 30 participants in the United States attending the Academic Career Workshop for Women in Mechanical Engineering at Massachusetts Institute of Technology, Cambridge, MA.
- **Ross Fellowship** from The Graduate School at Purdue University, 2018
- **Second Prize** in China Post-Graduate Mathematical Contest in Modeling, 2017
- **First-class Academic Scholarship** from Shanghai Jiao Tong University, 2015
- **Puxin Environmental Protection Scholarship** from Puxin Co. Ltd, 2015
- **CCS scholarship** at Tianjin University, 2012, 2013
- **Three A's Student** at Tianjin University, 2012 – 2015

## PUBLICATIONS

 [GOOGLE SCHOLAR](#)

### In Refereed Journals:

1. **X Wang**, S Pande, IC Christov, Flow rate–pressure drop relations for new configurations of slender compliant tubes arising in microfluidics experiments, *Mechanics Research Communications*, 126: 104016, 2022.

2. **X Wang**, IC Christov, Reduced modeling and global instability of finite-Reynolds-number flow in compliant rectangular channels, *Journal of Fluid Mechanics*, 950 A22, 2022.
3. **X Wang**, IC Christov, Reduced models of unidirectional flows in compliant rectangular ducts at finite Reynolds number, *Physics of Fluids*, 33(10):102004, 2021.  
 **Featured Article.** Contribution to the special issue [Tribute to Frank M. White on his 88th Anniversary](#).
4. TC Inamdar, **X Wang**, IC Christov, Unsteady fluid-structure interactions in a soft-walled microchannel: A one-dimensional lubrication model for finite Reynolds number, *Physical Review Fluids*, 5(06): 064101, 2020.
5. Q Xiao, R Zhu, S Huang, **X Wang**, Responses of ship motion to nonlinear focusing waves based on high-order spectral method, *Shipbuilding of China*, 61(01): 50-59, 2020. (In Chinese)
6. **X Wang**, IC Christov, Theory of the flow-induced deformation of shallow compliant microchannels with thick walls, *Proceedings of the Royal Society A*, 475(2231): 20190513, 2019.
7. H Cai, R Zhu, **X Wang**, J Fan, Dynamic response analysis of floating offshore wind turbine in combined wind and wave, *Journal of Harbin Engineering University*, 40(01): 118-125, 2019. (In Chinese)
8. **X Wang**, R Zhu, L Hong, Kramers–Kronig relations and frequency to time-domain transformation method for time domain calculation of floating body with forward speed, *Shipbuilding of China*, 59(2): 9-15, 2018. (In Chinese)

#### In Conference Proceedings:

- **X Wang**, IC Christov, Soft hydraulics in channels with thick walls: The finite-Reynolds-number base state and its stability, *AIP Conference Proceedings*, 2302: 020002, 2020.
- **X Wang**, R Zhu, L Hong, ‘Time domain calculation of floating body with forward speed in waves and derivation and validation for unified expressions of Kramers–Kronig relations, *Proceedings of the 14th National Congress on Hydrodynamics and the 28th National Conference on Hydrodynamics*, 2017. (In Chinese)

#### SELECTED CONFERENCE PRESENTATIONS

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- **X Wang**, SD Pande, IC Christov, Nonlinear flow rate–pressure drop relations in slender compliant microtubes, The 75th Annual Meeting of the APS DFD, Indianapolis, USA, 2022.
- **X Wang**, Reduced modeling and global instability of low-Reynolds-number flows through compliant microchannels, Engineering and Applied Science Forum Webinar, virtual, 2022.
- **X Wang**, IC Christov, Reduced models for analyzing flow instability in compliant rectangular microchannels, The 74th Annual Meeting of the APS DFD, Phoenix, USA, 2021.
- **X Wang**, IC Christov, Modeling and stability in compliant microchannels, SPARC Workshop on Fluidics involving deformable interfaces, virtual, 2021.
- **X Wang**, IC Christov, Theory of the bulging effect of soft microchannels with thick walls, The 72nd Annual Meeting of the APS DFD, Seattle, USA, 2019.
- **X Wang**, R Zhu, L Hong, Time domain calculation of floating body with forward speed in waves and derivation and validation for unified expressions of Kramers–Kronig relations, The 28th National Conference on Hydrodynamics, Changchun, China, 2017.

## SELECTED COURSEWORK

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- ME509: Intermediate Fluid Mechanics, A
- ME610: Boundary Layer Theory, A+
- ME612: Continuum Mechanics, A
- ME614: Computational Fluid Dynamics, A+
- MA/CS615: Numerical Methods for Partial Differential Equations, A+
- MA598: Spectral Method for Computational Fluid Dynamics, A
- ME697: Computational Methods for Interface Dynamics, A+

## EXPERTISE AND SKILLS

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- Programming: Python, Matlab, FORTRAN, L<sup>A</sup>T<sub>E</sub>X, Mathematica
- High Performance Computing: MPI, Slurm, Bash
- Finite element analysis: svFSI of SimVascular, FEniCS, FreeFEM

## LEADERSHIP AND SERVICE

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### Research Mentor, Purdue University

Spring 2021 – Present

- Advised a Purdue Mechanical Engineering master student, Shrihari Pande, performing an independent study on **modeling and numerical simulations of oscillatory flows in a compliant tube**.
- Advised a Purdue Mechanical Engineering undergraduate student, Shrihari Pande, performing an independent study on **modeling and stability in compliant rectangular microchannels**.
- Prepared educational learning materials (references, codes, etc.). Supervised progress on research.

### Teaching Assistant, Shanghai Jiao Tong University

Sept. 2016 – Jun. 2017

- Affiliated in School of SJTU-Paris Tech Elite Institute of Technology.
- Responsible for lab preparation and cleaning.

### Student Volunteer

Jul. 2016

- In 2016 International Summer School on Naval Architecture, Ocean Engineering and Mechanics at Shanghai Jiao Tong University.
- Assisted in organizing seminars.
- Provided guidance for international speakers.

### Teaching assistant, Shanghai Jiao Tong University

Mar. 2016 – Jun. 2016

- Course: *Potential theory of ship motion in waves*.
- Translated learning materials into English and disseminated with international students.

### Member of Summer Practice Team, Tianjin University

Jul. 2013

- Investigated the state of education in the northwestern part of China.
- Taught English for students from the first to the third grade in Lan Lian Primary School, Gansu Province, China.

## PROFESSIONAL DEVELOPMENT

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- The 2021 SES (Virtual) Month: Mechanics Matters, virtual, Oct. 15, 2021. Participated in the online poster session, presenting **Dancing microchannels: Reduced models for unsteady fluid–structure interactions at the microscale**.
- XSEDE HPC Workshop Summer Boot Camp, virtual, Jun. 8–11, 2021.
- Six-week short course on *Intermediate Pronunciation and Prosody*, Purdue Language and Cultural Exchange, Aug. 31– Oct. 07, 2020.
- Mathematical Fluids, Materials and Biology Workshop, Ann Arbor, USA, Jun. 13–15, 2019. Participated in poster session, presenting **Towards a theory of fluid–structure interaction due to internal flow in deformable microchannels**.
- The 45th Midwest Universities Fluid Mechanics Retreat (MUFMECH 2019), Rochester, Indiana, USA, Apr. 11–13, 2019.
- Software Carpentry Workshop, Purdue University, Oct. 8–10, 2018.
- Summer internship at Hudong-Zhonghua Shanghai Shipyard, Shanghai, China, Jul. 2014.

## ACADEMIC REFERENCES

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Dr. Ivan C. Christov (Ph.D. advisor)

Assistant Professor of School of Mechanical Engineering, Purdue University

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Dr. Jie Shen

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