

# XIAOJIA WANG

Postdoctoral Assistant Professor

Department of Mathematics, 530 Church St, Ann Arbor, MI 48109

☎ (+1)765-409-4627 ✉ [xiaojia@umich.edu](mailto:xiaojia@umich.edu) 🌐 <https://xiaojia-wang.github.io>

## 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*

**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*

**Sept. 2015 – Mar. 2018**

*Advisor: Renchuan Zhu*

**Tianjin University, China**

*B.S. in Ocean and Naval Engineering*

*Minor in English Literature*

**Sept. 2011 – Jun. 2015**

## 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)

## TEACHING EXPERIENCES

### University of Michigan

### Instructor

- Math 115 Calculus I (section 064 & 084)

Fall 2022

Comments from students (obtained from Mid-Semester Feedbacks):

“The continuing of group work should be encouraged. I very much appreciate that Xiaojia is supportive of this group culture, not only in team homework, but also within class and on problems. She cares a lot about the class and treats everyone with great respect.”

“While concepts are at times confusing, the instructor does her best to clear up any misunderstandings and is always happy to answer any questions that we may have. The classroom environment is very good; everyone gets along really well and collaboration is both encouraged and generally helpful for learning. ”

“Dr. Wang is very passionate about the subject and at times can make learning the content fun. Sometimes it can be hard to understand the topic but in the end, after several examples I can piece together and have enough of an idea to know the rest.”

“The instructor is very thorough when she teaches and wants to make sure we understand everything.”

## Purdue University

## Research Mentor

Spring 2021 – Summer 2022

- 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.

## Shanghai Jiao Tong University

## Teaching Assistant

- For Lab in School of SJTU-Paris Tech Elite Institute of Technology.
- For Course: *Potential theory of ship motion in waves*.

Sept. 2016 – Jun. 2017

Mar. 2016 – Jun. 2016

## SELECTED CONFERENCE PRESENTATIONS

---

- **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.

## PROFESSIONAL DEVELOPMENT

---

- 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.

## LEADERSHIP AND SERVICE

---

### 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.

### 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.

## SELECTED COURSEWORK

---

- 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

---

- Programming: Python, Matlab, FORTRAN,  $\text{\LaTeX}$ , Mathematica
- High Performance Computing: MPI, Slurm, Bash
- Finite element analysis: svFSI of SimVascular, FEniCS, FreeFEM

## ACADEMIC REFERENCES

---

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

Associate Professor of School of Mechanical Engineering, Purdue University

585 Purdue Mall, West Lafayette, IN 47907, USA

Email: christov@purdue.edu Phone: +1 765 496-3733 FAX: +1 765 494-0539

Dr. Jie Shen

Professor of Mathematics, Director of Center for Computational and Applied Mathematics  
Purdue University

585 Purdue Mall, West Lafayette, IN 47907, USA

Email: shen7@purdue.edu

Dr. Hector Gomez

Professor of School of Mechanical Engineering, Purdue University

585 Purdue Mall, West Lafayette, IN 47907, USA

Email: hectorgomez@purdue.edu