Mohammadhossein **Firouznia**

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Research Interests

Fluid Dynamics, Complex Fluids, Microfluidics, Rheology, Suspensions, Granular Flows, Colloids, Computational Fluid Dynamics, Optical Diagnostic Techniques

Education

MS. in Mechanical Engineering *2014- Aug 2017*

Ohio University, Russ College of Engineering and Technology, Athens, OH

- Thesis: *"The Hydrodynamic Interaction of Two Small Freely-moving Particles in a Couette Flow of a Yield Stress Fluid"*
- Advisor: Dr. Sarah Hormozi
- GPA: 4.0

BS. in Mechanical Engineering *2008-2012*

Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

- GPA: 3.88

Publications

1. **M. Firouznia**, Bloen Metzger, Guillaume Ovarlez & S. Hormozi, *The interaction of two spherical particles in simple-shear flows of yield stress fluids*, Journal of Non-Newtonian Fluid Mechanics, under review.
2. M. Sarabian, **M. Firouznia**, Bloen Metzger & S. Hormozi, *Dispersion and layering of solid particles in cylindrical Couette flows*, Physical Review Fluids, under review.
3. **M. Firouznia**, M. Sarabian, M. Rosti, S. Hormozi & Luca Brandt, *Interface-resolved simulations of particle interactions in shear flows of elastoviscoplastic fluids*, Journal of Computational Physics, in preparation.
4. M. Gholami, **M. Firouznia**, Nicolas Lenoir, David Hautemayou, Guillaume Ovarlez & S. Hormozi, *Shear Induced Migration of particles in yield stress fluids*, Journal of Non-Newtonian Fluid Mechanics, manuscript in preparation.

Skills and Expertise

- **Rheometry:** Rheological characterization of complex fluids such as polymer solutions, gels, emulsions and suspensions
- **Flow Field Diagnostic Techniques:** Particle Image Velocimetry and Particle Tracking Velocimetry
- **Other Visualization Techniques:** Optical microscopy, X-ray Radiography, X-ray Tomography
- **Image & Signal Processing:** ImageJ, MATLAB
- **Modeling Techniques:** Immersed Boundary Method, Finite Element Method, Finite Volume Method
- **Parallel Processing:** Domain Decomposition Method, Master-Slave Method
- **Technical Softwares:** Fluent, Gambit, ANSYS, Auto CAD, Solid Works, EES, Thermoflow, HAP System Design Load
- **Programing:** MATLAB, Fortran, C/C++, Maple, Excel

Honors & Awards

- **Scholarship**: Department of Mechanical Engineering of Ohio University *2014-2017*
- **Travel Award**: $500 coverage of conference trips awarded by Graduate College of Ohio University *2017*
- **Poster Award**: 2nd place in Ohio University Student Expo *2017*
- **Golden Scholarship**: Deptartment of Mechanical Engineering of Politecnico di Milano, Milan, Italy *2013*
- **Outstanding Student Award**: Awarded merit-based admission to MS. program in mechanical engineering as the top senior, Amirkabir University of Technology, Tehran, Iran *2012*
- **Honor Scholar and Double Major Award**: Recognized by the office of Brilliant Talents and Olympiads and offered choice of two desired bachelor programs as a distinguished sophomore, Amirkabir University of Technology, Tehran, Iran *2010*

Conference Presentations

- *The interaction of two spheres in a simple-shear flow of complex fluids*, The 70^{th} Annual Meeting of American Physical Society Division of Fluid Dynamics, Nov 19, Denver, Colorado, 2017.
- *Dispersion and layering of solid particles in cylindrical Couette flows*, The 70^{th} Annual Meeting of American Physical Society Division of Fluid Dynamics, Nov 20, Denver, Colorado, 2017.
- *Particle interactions in shear flows of yield stress fluids*, Viscoplastic Fluids Workshop: From Theory to Applications, Oct 31, Rotorua, New Zealand, 2017.
- *The hydrodynamic interaction of two small freely-moving particles in a Couette flow of a yield stress fluid*, The 69^{th} Annual Meeting of American Physical Society Division of Fluid Dynamics, Nov 21, Portland, Oregon, 2016.
- *Particle interactions in shear flows of complex fluids*, Ohio University Student Expo, April 6, Athens, Ohio, 2017.

Professional Experience

Research Assistant *2014-present*

Department of Mechanical Engineering, Ohio University, OH, USA

- Developed from scratch in-house Particle Image Velocimetry (PIV) and Particle Tracking Velocimetry (PTV) systems fine-tuned for dense suspensions
- Analyzed flow field around particles in shear flows of Newtonian, yield stress and shear thinning fluids via PIV
- Performed fully resolved 3D simulation of interaction of particles in shear flows of elastoviscoplastic fluids using immersed boundary method on parallel platforms
- Specialized in rheology of complex fluids such as polymer solutions, gels, suspensions and emulsions
- Characterized shear-induced migration of noncolloidal particles in Newtonian and yield stress fluids via X-ray radiography
- Simulated shear-induced migration of noncolloidal particles in Newtonian and yield stress fluids
- Performed precise thermal-assisted refractive index matching methods for high quality visualization of dense suspensions

Lab Manager *2015-present*

Fluid Mechanics Lab, Department of Mechanical Engineering, Ohio University, OH, USA

- Maintained compliance with corresponding environmental, health and safety regulations
- Supervised two undergraduate students for research projects
- Supervised procurement of equipment and supplies
- Assisted with setting up a new laboratory in the Department of Mechanical Engineering

Teaching Assistant *2012-2013*

Course title: Heat Transfer- I

Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

- Designed and graded assignments, quizzes and exams
- Lectured weekly tutorial sessions for solving problems and reviewing important concepts

Intern *Summer 2012*

New Technologies Research Center of Amirkair University of Technology, Tehran, Iran

- Designed and implemented automated hydraulic systems using Programmable Logic Controller (PLC)
- Acquired skills on designing industrial hydraulic and pneumatic systems

Intern *Summer 2010*

SAICO, Tehran, Iran

- Led project team of 4 to design an electric stacker and supervised the manufacturing process
- Obtained skills on designing filters and valves used in water treatment industry

Language Proficiency

- **English** Fluent, **(GRE: Q 166, V 154, W 3.5)**
- **Persian** Native
- **French** Novice

Workshops and Training

- LaVision tomographic PIV & shake-the-box 4D PTV one-day workshop, Denver, Colorado, Nov 18, 2017.
- Global harmonization system, chemical hygiene, and hazard communication training, Environmental Health & Safety Department, Ohio University, Sept 17, 2014.
- Professional leadership & 21st century leadership workshops, Ohio University Career & Leadership Development Center, Athens, Ohio, Sept 23, 2017.

Professional Service and Outreach

- **Journal Service:** Reviewed manuscripts for the European Journal of Mechanics - B/Fluids
- **Science Cafe:** Assisted with arranging a talk on shear thickening at Baker Center, Ohio University (Sept 21, 2016)
- **Tech Savvy:** Participated in hosting a day-long STEM career workshop for girls in grades 6-9
- **Technology Camp for High School Girls:** Contributed to organization of a three-day camp providing female high school students with the opportunity to explore careers in engineering and technology
- **Volunteer teacher:** Educated pre-college students during a one-week program preparing students from low-income areas of the city for the National University Entrance Exam, Tehran, Iran, 2008-2012

Affiliations

- **Reviewer of European Journal of Mechanics - B/Fluids** *2017-Present*
- **American Physical Society** *2016-Present*
- **Society of Rheology** *2017-Present*

References

Sarah Hormozi

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- Website: http://www.lof.cnrs.fr/spip.php?article618

Luca Brandt

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Stockholm, Sweden

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Bloen Metzger

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