MOHAMMAD NOORANIDOOST

mnooranidoost@fsu.edu (321) 315-4232 http://www.nooranidoost.com

PROFESSIONAL APPOINTMENTS

Dean's Postdoctoral Scholar *August 2022 - present*
Department of Mathematics
Florida State University, Tallahassee, FL
Mentor: Dr. Nick Cogan
Research focus: *Mathematical Modeling of Spatiotemporal Organization of Biofilm Structure and the Flow Interaction*

Postdoctoral Scholar *March 2021 - July 2022*
Department of Mathematics
Florida State University, Tallahassee, FL
Mentors: Dr. M. Yousuff Hussaini & Dr. Nick Cogan
Research focus: *Bayesian Estimation of Biofilm Viscoelasticity Based on Observational Data*

EDUCATION

Ph.D. in Mechanical Engineering *January 2017 - December 2020*
University of Central Florida, Orlando, FL
Advisor: Dr. Ranganathan Kumar
Dissertation title: *Cell Encapsulation in Microfluidic Channels*

M.Sc. in Mechanical Engineering *September 2013 - August 2016*
Koç University, Istanbul, Turkey
Advisor: Dr. Metin Muradoglu
Dissertation title: *Effects of Viscoelasticity on Droplet Dynamics in Microfluidic Systems*

B.Sc. in Aerospace Engineering *September 2008 - August 2013*
Sharif University of Technology, Tehran, Iran

PEER-REVIEWED JOURNAL ARTICLES

1. **M. Nooranidoost**, N. G. Cogan, P. Stoodley, E. S. Gloag, & M. Y. Hussaini. Bayesian estimation of *Pseudomonas aeruginosa* viscoelastic properties based on creep responses of wild type, rugose, and mucoid variant biofilms. *Biofilm* (2023): 100133.
2. B. Palogan, **M. Nooranidoost**, R. Kumar & S. Bhattacharya. Single T-junction formation in a flow-focusing microchannel. *Microfluidics and Nanofluidics* 26.10 (2022): 81.
3. **M. Nooranidoost** & R. Kumar. Deformation of an encapsulated leukemia HL60 cell through sudden contractions of a microfluidic channel. *Micromachines* 12.4 (2021): 355.
4. **M. Nooranidoost** & R. Kumar. Improving viability of leukemia cells by tailoring shell fluid rheology in constricted microcapillary. *Scientific Reports* 10.1 (2020): 1-11.
5. **M. Nooranidoost**, D. Izbassarov, S. Tasoglu & M. Muradoglu. A computational study of droplet-based bioprinting: effects of viscoelasticity. *Physics of Fluids* 31.8 (2019): 081901.
6. **M. Nooranidoost**, M. Haghshenas, M. Muradoglu & R. Kumar. Cell encapsulation modes in a flow focusing microchannel: effects of shell fluid viscosity. *Microfluidics and Nanofluidics* 23.3 (2019): 31.
7. **M. Nooranidoost** & R. Kumar. Geometry effects of axisymmetric flow focusing microchannels for single cell encapsulation. *Materials* 12.17 (2019): 2811.
8. **M. Nooranidoost**, D. Izbassarov & M. Muradoglu. Droplet formation in a flow focusing configuration: effects of viscoelasticity. *Physics of Fluids* 28.12 (2016): 123102.

CONFERENCE PRESENTATIONS AND PROCEEDINGS

Contributed Talks

1. **M. Nooranidoost** & N. G. Cogan. Mathematical Modeling of Spatio-temporal Organization of Biofilm Structure. *Bulletin of the American Physical Society*, Las Vegas, March 5–10 (2023).
2. **M. Nooranidoost**, N. G. Cogan, & M. Y. Hussaini. Bayesian estimation of Pseudomonas aeruginosa viscoelastic properties. *Bulletin of the American Physical Society*, Chicago, March 14-18 (2022).

3. **M. Nooranidoost** & R. Kumar. Deformation and viability of an encapsulated cell through a microfluidic contraction. *Bulletin of the American Physical Society*, Seattle, November 23-26 (2019).
4. **M. Nooranidoost**, D. Izbassarov, & R. Kumar. Cell encapsulation in a flow focusing microchannel: effects of viscoelasticity. *Bulletin of the American Physical Society*, Atlanta, November 18-20 (2018).
5. D. Izbassarov, **M. Nooranidoost** & M. Muradoglu. Effects of viscoelasticity on droplet-based bioprinting. *Bulletin of the American Physical Society*, Atlanta, November 18-20 (2018).
6. **M. Nooranidoost**, M. Haghshenas, M. Muradoglu, & R. Kumar. Cell-encapsulating droplet formation in a flow focusing configuration. *Bulletin of the American Physical Society*, Denver, November 19-21 (2017).
7. **M. Nooranidoost**, D. Izbassarov, & M. Muradoglu. The effects of viscoelasticity in a microfluidic flow focusing configuration. *6^{th} International Workshop on Bubble and Droplet*, Potsdam/Golm, Germany, July 06-10 (2015).
8. **M. Nooranidoost**, D. Izbassarov, & M. Muradoglu. Direct numerical simulations of viscoelastic effects on drop formation in a flow focusing configuration. *International Conference on Advances in Applied and Computational Mechanics*, Izmir, Turkey, August 05-07 (2015).
9. **M. Nooranidoost**, D. Izbassarov, & M. Muradoglu. A computational modeling of viscoelastic effects on droplet formation in a flow focusing configuration. *8^{th} Ankara International Aerospace Conference*, Ankara, Turkey, September 10-12 (2015).
10. M. Muradoglu, D. Izbassarov & **M. Nooranidoost**. Computational modeling of soluble surfactant and viscoelasticity in multiphase flows. *Smart and Green Interfaces Conference*, Belgrade, Serbia, March 30 - April 01 (2015).
11. H. Jahandideh, **M. Nooranidoost**, B. Enghiad & A. Hajimirzakhani. Ball striking algorithm for a 3 DOF ping-pong playing robot based on particle swarm optimization. *16^{th} International Conference on System Theory, Control and Computing (ICSTCC)*, Sinaia, Romania, October 12-14 (2012).

Invited Talks

12. **M. Nooranidoost**, A mathematical model for biofilm viscoelasticty and its spatiotemporal organization *Applied Mathematics Group Seminar*, Georgia State University, May 19 (2023).
13. **M. Nooranidoost**, Bayesian estimation of *Pseudomonas aeruginosa* viscoelastic properties. *Biomathematics Graduate Seminar*, Florida State University , October 20 (2021).

Poster Presentations

14. **M. Nooranidoost**, , N. G. Cogan. Modeling biofilm spatiotemporal organization as a gel-mix. *SMB 2023*, July 16-21 (2023)
15. **M. Nooranidoost**, , N. G. Cogan, & M. Y. Hussaini. A Bayesian Approach to study Pseudomonas aeruginosa viscoelasticity. *The Mathematics of Soft Matter*, IMSI institute (virtual), February 28 - March 4 (2022)

OTHER CONFERENCES AND WORKSHOPS ATTENDED

These exclude those online and in-person conferences/workshops for which a talk/poster was listed above.

2023 National Postdoc Association Annual Conference, Philadelphia, PA	*April 2023*
NSF URoL Post-Doc Incubator, Online	*April 2022*
A Short Course in Systems Biology, UCI Center for Complex Biological Systems, Online	*August 2021*
Montana Biofilm Meeting, Center for Biofilm Engineering, Online	*July 2021*
SIAM Annual Meeting 2021, Society for Industrial and Applied Mathematics, Online	*July 2021*
SMB2021 Annual Meeting, Society for Mathematical Biology, Online	*June 2021*

RESEARCH EXPERIENCE

– **Postdoctoral Scholar** *March 2021 - present*

Department of Mathematics, Florida State University

- Developing an in-house code to model the rheology and spatio-temporal organization of biofilm structure as a multi-phase system, and their interaction with the fluid flow interaction.
- Developed a Bayesian framework to estimate the rheological parameters and quantified the uncertainty in estimation of these parameters for different mutants of *Pseudomonas aeruginosa* biofilms based on creep-recovery experimental data.

Graduate Research Assistant *January 2017 - December 2020*

Department of Mechanical Engineering, University of Central Florida

- Developed an in-house code to simulate the encapsulation of single cells and migration of the encapsulated cells as a three-phase system.
- Characterized different single cell encapsulation modes and studied statistics of number of cells per droplet under different physical conditions.

– Incorporated a theoretical cell survival model into numerical simulations to quantify the deformation and viability of leukemia cells encapsulated with Newtonian and viscoelastic shell fluids in constricted microchannels.
– Performed PIV experiments and COMSOL multiphysics simulations to explain the droplet formation process and fluid blockage in hydrophobic/ hydrophilic microfluidic channels.

Graduate Research Assistant *September 2013 - August 2016*
Department of Mechanical Engineering, Koç University
– Developed a front-tracking based in-house code to simulate the generation of droplets n flow focusing geometries for viscoelastic systems.
– Developed an in-house code to simulate droplet-based bio-printing systems with viscoelastic bioinks in a cell epitaxy model and quantified cell viability during the printing process.

TEACHING EXPERIENCE

Instructor of Record
Department of Mathematics, Florida State University
– MAC 2312 - Calculus with Analytic Geometry II Fall 2022 & Spring 2023.
Taught using a (partially) flipped-classroom structure. Designed lecture notes that complemented the textbook. Designed assessments and exams and graded the students' work.

Graduate Teaching Assistant
Department of Mechanical Engineering, University of Central Florida
– EGN 3343 - Thermodynamics Fall 2017 & Spring 2018.
Conducted one-to-one, score-clarification sessions for a class size of ≈ 400 students. Developed a question banks for class demonstrations and formative/summative assessments in Canvas. Graded quizzes and tests on a weekly basis.

Graduate Teaching Assistant
Department of Mechanical Engineering, Koç University
– MECH 301 - Fluid Mechanics Fall 2013 & Fall 2016
Conducted review sessions on a weekly basis. Graded midterm exams and quizzes.
– PHYS 102 - General Physics Lab 2 Fall 2014 & Fall 2015
Performed demonstrations and helped students with their lab experiments. Graded lab reports.
– PHYS 101 - General Physics Lab 1 Spring 2014 & Spring 2015
Performed demonstrations and helped students with their lab experiments. Graded lab reports.

Teaching Assistant
Department of Aerospace Engineering, Sharif University of Technology
– Aerodynamics I Fall 2012
Taught students how to use Ansys Fluent software and assisted them with their projects. Designed a course project and graded project reports.
– Mechanics of Materials Fall 2011
Developed a question bank and graded midterm exams and quizzes.
– Engineering Analysis-Dynamics Fall 2011
Conducted review sessions and graded midterm exams and quizzes.
– Engineering Analysis-Statics Spring 2011
Graded midterm exams and quizzes.

MENTORING EXPERIENCE

Florida State University, Undergraduate Research Opportunity Program

– Elona Berisha, Undergraduate student in biomathematics and pre-med program *Fall 2023*
Project title: Statistical Modeling of Cell Encapsulation
Outcome: One poster presentation in *the FSU 2023 Undergraduate Research Symposium*
– Lorenzo Lindquist, Undergraduate student in statistics *Fall 2023*
Project title: Simulating Soccer Seasons Using Bi-variate Poisson Distributions
Outcome: One poster presentation in *the FSU 2023 Undergraduate Research Symposium*

Department of Mechanical Engineering, University of Central Florida

– Bryan Palogan, Ph.D. student in mechanical engineering *Spring 2019 - Fall 2020*
Project title: Droplet generation process in hydrophobic/hydrophilic microchannels.
Outcome: One peer-reviewed article in *Microfluidics and Nanofluidics*

PROFESSIONAL SERVICE

Postdoctoral Association (PDA)
Florida State University
Senior advisor (*Dec. 2022-May 2023)* – President (*June 2022-Nov. 2022)* – Vice-president (*August 2021-May 2022)*

- Worked closely with the FSU Office of Postdoctoral Affairs and the Postdoc Advisory board to advocate for postdoc-related policies and address unmet needs in the postdoc community.
- Worked on initiatives such as paid parental leave, newsletter, and buddy program for FSU postdoc community.
- Co-chaired the 2023 Spring Event *"Academic and Industry CV Workshop + Mental Health Talk"*
- Co-chaired the 2022 Spring Event *"Planning Your Career After a Postdoc"*

Senior Design Showcase Judge
College of Engineering and Computer Science, University of Central Florida
- Judged the UCF-CECS Senior design virtual showcase. *Spring 2021 & Fall 2021*

Reviewer
- Peer-reviewed ten journal articles for Physics of Fluids *August 2017 - present*
- Evaluated the applicants' documents for the FSU postdoctoral travel awards *Fall 2022 & Spring 2023*

American Physcial Society - Division of Biological Physics
- Co-organizing the focus session "Collective Behavior in Cell Biology" in 2024 March Meeting
- Chaired the session "Intrinsically Disordered Proteins and Non-equilibrium Processes" in 2023 March Meeting
- Co-organized the postdoc networking event "Making the most of your postdoc training" *December 2022*

PROFESSIONAL CERTIFICATIONS

Preparing Tomorrow's Faculty
University of Central Florida
- Completed a twelve-week, face-to-face certificate program, offered by *The Faculty Center for Teaching & Learning*, that aims to prepare future and academic leaders to teach at collegiate level.
- Designed syllabus and course materials for an undergrad level course (EML 3701 - Fluid Mechanics).

Diversity & Inclusion Certificate
Florida State University
- Six training sessions and a project, offered by *Diversity & Inclusion Council*, that aims to teach individuals strategic areas around diversity and to learn how they can assist in creating a welcoming and inclusive campus for all.

AREAS OF EXPERTISE

Technical Expertise
- Mathematical modeling, Inverse problems, Bayesian Inference, Physical/theoretical model development, Computational Fluid Dynamics, Discretization and implementation of numerical schemes, Multiphase Flows, Interfacial flows, Front-tracking method, Rheological flows, Microfluidics, Level-set method, Technical writing.

Computer Expertise
- FORTRAN, MATLAB, Python, OpenFOAM, COMSOL Multiphysics, Ansys Fluent, Linux, LaTeX, Microsoft Office

HONORS AND AWARDS

- Landahl Travel Awards for SMB 2023
- FSU Postdoctoral Scholars Career Development Travel Awards in 2022
- UCF College of Science and Engineering scholarship during doctoral program
- UCF Student Government Association travel funding in 2018 & 2019
- UCF Presentation Fellowship to attend APS-DFD meetings in 2017, 2018 & 2019
- UCF Open Access Publishing Fund in 2020
- TUBITAK scholarship during master's program for computational modeling of non-Newtonian drops in
- Koç University research award in Spring 2015
- COST action MP1106 travel grant in Spring 2015

PROFESSIONAL MEMBERSHIPS

American Physical Society (APS) – Society of Mathematical Biology (SMB) – Society of Industrial and Mathematics (SIAM) – National Postdoctoral Association (NPA)