

Ali Asghari Adib

Mechanical and Aerospace Engineering Department, The Ohio State University, Columbus, Ohio, 43210

Email: asghariadib.1@osu.edu

Phone: +17408184748

EDUCATION

Doctor of Philosophy in Mechanical Engineering 2017 - Present
The Ohio State University, Columbus, OH, 43210 Overall GPA: 3.96/4
Thesis: Intracorporeal robotic additive manufacturing and characterization of GelMA-based tissue engineering scaffolds
Adviser: Dr. David Hoelzle

Master of Science in Biomedical Engineering 2015 - 2017
Ohio University, Athens, OH, 45701 Overall GPA: 4/4
Thesis: Interactions of Engineered Silica Nanoparticles with Cell Membrane Models
Adviser: Dr. Amir Farnoud

Bachelor of Science in Mechanical Engineering 2010 - 2015
Iran University of Science and Technology (IUST), Tehran, Iran

WORK EXPERIENCE

The Ohio State University - Graduate Research Associate 2017 - present
Mechanical and Aerospace Engineering Dept.

- Developed a GelMA-based printable biomaterial formulation for intracorporeal tissue engineering
- Characterized mechanical, biological (*in vitro*) and shape fidelity properties of the bioprinted scaffolds
- Conducted intracorporeal delivery and 3D printing of soft tissue engineering scaffolds using a robotic assisted endoscopic additive manufacturing tool in an emulated surgical environment
- Investigated the adhesive and wound closure properties of the biomaterial on soft tissue mimicking substrates
- Designed and implemented a hybrid control scheme for flowrate control in direct write additive manufacturing utilizing material pressure feedback
- Demonstrated the on-demand material-independent fabrication of parts using a direct-write additive manufacturing system equipped with the developed material pressure-based controller

Viscient Biosciences - NSF Intern Jan - Apr 2021
Research and Development Department

- Bioprinted tissue to recapitulate liver function for non-alcoholic steatohepatitis (NASH) drug discovery
- Performed downstream biological assays including quantitative polymerase chain reaction (qPCR) and enzyme-linked immunosorbent assay (ELISA) assays to understand the drugs effectiveness in preventing fibrosis in the printed tissues
- Developed a lung tissue model to recapitulate idiopathic pulmonary disease (IPF)
- Bioprinted lung tissue models and performed early drug discovery for IPF

Ohio University - Graduate Research Assistant 2015 - 2017
Chemical and Biomolecular Engineering Department

- Investigated the effects of engineered silica nanoparticles on interfacial and structural properties of lipid monolayer and bilayer cell membrane models
- Synthesized lipid monolayer and bilayer cell membrane models mimicking the lipid composition of the cells
- Characterized the effect of silica nanoparticles on lipid monolayers using atomic force microscopy (AFM)
- Assisted with setting up a new laboratory in the Chemical and Biomolecular Engineering department

TEACHING EXPERIENCE

Ohio University - Introduction to Biomedical Engineering (Graduate) 2016
Teaching Assistant, Chemical and Biomolecular Engineering Department

- Planned and prepared the course syllabus and the course content
- Coordinated lectures with Biomedical Engineering faculty and arranged visits to different facilities across campus

PUBLICATIONS AND PATENTS

Published Journal Articles

1. **Asghari Adib, A.**; Hoelzle, D. J. “*Hybrid Control of Flowrate in Microextrusion-Based Direct-Write Additive Manufacturing*”, IEEE Control Systems Letters, pp. 1–1, 2021.
2. **Asghari Adib, A.**; Sheikhi, A.; Shahhosseini, M.; Simeunović, A.; Wu, S.; Castro, C. E.; Zhao, R.; Khademhosseini, A.; Hoelzle, D. J. “*Direct-Write 3D Printing and Characterization of a GelMA-Based Biomaterial for Intracorporeal Tissue Engineering.*” Biofabrication 2020.
3. **Asghari Adib, A.**; Nazemidashtarjandi, S.; Kelly, A.; Kruse, A.; Cimat, K.; David, A. E.; Farnoud, A. M. “*Engineered Silica Nanoparticles Interact Differently with Lipid Monolayers Compared to Lipid Bilayers.*” Environ. Sci. Nano 2018, 5 (2), 289–303 (Featured on the Front Cover).
4. Reynolds, N. M.; Mohammadalipour, A.; Hall, C. R.; **Asghari Adib, A.**; Farnoud, A. M.; Burdick, M. M. “*Galectin-1 Influences Breast Cancer Cell Adhesion to E-Selectin Via Ligand Intermediaries.*” Cell. Mol. Bioeng. 2018, 11 (1), 37–52.

Journal Articles In Preparation

1. **Asghari Adib, A.**; Simeunović, A.; Sheikhi, A.; Shahhosseini, M.; Castro, C. E.; Skardal, A.; Khademhosseini, A.; Hoelzle, D. J. “*Intracorporeal 3D Printing of Functional Biologics Using a Novel Endoscopic Additive Manufacturing Tool.*” To be submitted to Nature Biomedical Engineering 2022.
2. **Asghari Adib, A.**; Hoelzle, D. J. “*Universal Material Pressure Feedback Control Scheme for Material- and Nozzle-independent Extrusion Based 3D Printing.*” To be submitted to Additive Manufacturing Journal, 2022.

Conference Proceedings

1. **Asghari Adib, A.**; Hoelzle, D. J. “*Hybrid Control of Flowrate in Microextrusion-Based Direct-Write Additive Manufacturing*”, American Control Conference, 2021.
2. **Asghari Adib, A.**; Hoelzle, D. “*Hybrid System Model of Microextrusion Based Direct-Write Additive Manufacturing*” American Control Conference, 2019

Patents

1. D. J. Hoelzle, D. M. D’Souza, A. Simeunovic, and A. Asghari Adib, “Additive manufacturing methods utilizing a robotic arm,” WO2020206283A1, Oct. 08, 2020

PRESENTATIONS

Talks

- Solid Freeform Fabrication 2021 — Asghari Adib, A., Hoelzle, D., “Material pressure sensing at the nozzle in direct-write additive manufacturing enables the precise fabrication of complex parts”
- American Control Conference 2021 — Asghari Adib, A., Hoelzle, D., “Hybrid Control of Flowrate in Microextrusion-Based Direct-Write Additive Manufacturing”
- American Control Conference 2019 — Asghari Adib, A., Hoelzle, D., “Hybrid System Model of Microextrusion Based Direct-Write Additive Manufacturing”
- Solid Freeform Fabrication 2018 — Asghari Adib, A., Hoelzle, D., “Developing a 3D printable bioink for soft tissue engineering at physiologically relevant conditions”

Posters

- Biofabrication 2019 — “Direct-Write Additive Manufacturing and Characterization of Visible Light Crosslinkable GelMA-Laponite-Methylcellulose Hydrogel at Physiological Temperature”
- Biomedical Engineering Society 2017 — “Silica nanoparticles interact differently with lipid monolayers vs bilayers”

HONORS AND AWARDS

The Presidential Fellowship

Mechanical and Aerospace Engineering Dept., The Ohio State University

2021-Present

The most prestigious award given by The Ohio State University Graduate School. Recipients of this award embody the highest standards of scholarship in the full range of Ohio State's graduate programs.

NSF INTERN 2020
National Science Foundation

NSF Partnerships for Innovation 2019
National Science Foundation (on behalf of Hoelzle Research Lab)

Paper Featured on the Front Cover of Environmental Science: Nano 2018
Environmental Science: Nano, vol. 5, Issue 2, February 1st 2018.

Research Expo Best Poster Award (1st Place) 2017
Chemical & Biomolecular Engineering Best Poster, Russ College of Engineering and Technology, Ohio University

STUDENT ADVISING

Hailey Baker 2021
Chemical Engineering Undergraduate Student

Project: The stiffness of the bioprinted cartilage tissue engineering scaffolds affects the chondrocytes function
Hoelzle Research Lab, Mechanical and Aerospace Engineering Dept., The Ohio State University

Angelo Gentile 2021
Mechanical and Aerospace Engineering Undergraduate Student

Project: Material pressure sensing at the nozzle in direct-write additive manufacturing enables the precise fabrication of complex parts
Hoelzle Research Lab, Mechanical and Aerospace Engineering Dept., The Ohio State University

Marisa Egan 2020
Chemical Engineering Undergraduate Student

Project: Simulation of non-Newtonian flow in direct-write additive manufacturing using computational fluid dynamics
Hoelzle Research Lab, Mechanical and Aerospace Engineering Dept., The Ohio State University

LEADERSHIP & INVOLVEMENT

Council of Graduate Students (CGS) Delegate 2019 - 2021
Mechanical and Aerospace Engineering Dept., The Ohio State University

Member of *International Students Concerns* internal committee

Research Integrity Committee 2016 - 2017
Russ College of Engineering and Technology, Ohio University

Dealt with allegations of research misconduct, or misconduct in the documentation of research

SKILLS

Core Skills

Biomaterials and Bioinks Development and Characterization
Additive Manufacturing
Dynamics and Control of Flow in Additive Manufacturing
3D Bioprinting of Tissue Engineering (TE) Scaffolds
TE Scaffold Mechanical and Biological Characterization
Scanning Electron Microscopy (SEM) of Hydrogel Scaffolds
Micro Computed Tomography (μ CT)
2D/3D Culture of Primary Cells, Stem Cells and Cell lines.
Downstream Biological Assays: ELISA, qPCR, LDH, IHC
RNA Isolation from Cells Encapsulated in Hydrogels
Bioprinting Tissue Models for Drug Discovery

Modelling and Simulation

Matlab & Simulink
C++, Fortran 95

ANSYS, Fluent
SolidWorks, AutoCAD, CATIA

Web Development and Graphics

Adobe Dreamweaver, illustrator, Photoshop

GRADUATE COURSEWORK

PhD

Linear Systems Theory
Nonlinear Systems
Intermediate Dynamics
Lumped parameter modeling and analysis
Robust Control
Real-time Robotics
Mechanics and Control of Robots
Intermediate Fluid Dynamics

Master's

Advanced Engineering Mathematics
Nano and Bio interfaces
Biochemistry
Toxicology
Advanced Topics in Biomedical Engineering
Biomedical Engineering Professional Development