

# Ali Asghari Adib, Ph.D.

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## SUMMARY

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A mechanical engineer with interdisciplinary expertise in additive manufacturing, mechatronics hardware and software development, dynamics and control, material science, process optimization, and robotics. I am looking for Senior Mechanical Engineer and Print Optimization Engineer roles. I am authorized to work in the US (green card holder) and do not require sponsorship.

## SKILLS

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**Additive Manufacturing (AM):** 3D printing (FDM and SLA), Direct-write extrusion-based AM, 3D bioprinter development, 3D printing parameter optimization, 3D printing material development and rheological optimization, Multi-head extrusion-based 3D printer hardware and software integration, Root cause analysis of 3D printing defects

**Software Development:** Matlab & Simulink, LabVIEW, ROS, C++, Python

**Mechanical Engineering:** CAD via SolidWorks, System dynamics, Mathematical modeling of electromechanical and fluidic systems, Simulation via ANSYS Fluent and FEA, Feedback controls design and implementation, Robotics

**Hardware Integration:** Sensor (pressure, temperature) and actuator (stepper, servo, DC, BLDC, linear motor) implementation, Machine vision, Analog/Digital data acquisition (DAQ), Serial communication, Motion control

**Material Science:** Polymer chemistry, Biomaterials, Rheological characterization and Optimization for 3D Printability, Photocrosslinkable hydrogels, Mechanical testing on polymeric materials

**General:** Design of Experiments (DoE), Statistical analysis, Data analysis and visualization, Biomaterials, Confocal Microscopy, Scanning Electron Microscopy, Imaging, Image processing

## WORK EXPERIENCE

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### Carnegie Mellon University - Post Doctoral Scholar

2022 - present

*Dr. Adam Feinberg's Lab, Biomedical Engineering Dept.*

- Developed a robotic-assisted additive manufacturing platform for non-planar 3D bioprinting to recapitulate fiber orientation in the native tissue with less than 100  $\mu\text{m}$  accuracy
- Optimized print parameters for different concentrations of a collagen-based biomaterial enhancing fidelity by 35%

### The Ohio State University - Graduate Research Associate

2017 - 2022

*Dr. David Hoelzle's Research Lab, Mechanical and Aerospace Engineering Dept.*

- Worked with a cross-functional team of robotic surgeons, polymer chemists, bioengineers, and mechanical engineers to develop the new paradigm of intracorporeal robotic-assisted endoscopic additive manufacturing
- Contributed to the design of a 9-DOF robotic manipulator for minimally invasive 3D printing
- Developed and tuned the rheological properties of a polymeric material formulation for intracorporeal 3D printing at physiological conditions
- Designed a stable hybrid feedback control scheme using Matlab and Simulink for material flowrate control in direct write 3D printing, integrated and validated it experimentally, demonstrating a significant 48% increase in material deposition accuracy.

### Viscient Biosciences - NSF Intern

Jan - Apr 2021

*Research and Development Department*

- Optimized the printability of a biomaterial to fabricate diseased liver scaffolds for non-alcoholic steatohepatitis (NASH) drug discovery

### Ohio University - Graduate Research Assistant

2015 - 2017

*Chemical and Biomolecular Engineering Department*

- Investigated the effects of engineered silica nanoparticles on properties of lipid cell membrane models

## EDUCATION

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### Doctor of Philosophy in Mechanical Engineering

2017 - 2022

The Ohio State University, Columbus, OH, 43210

Overall GPA: 3.96/4

Thesis: Towards intracorporeal additive manufacturing of tissue engineering scaffolds

### 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

### Bachelor of Science in Mechanical Engineering

2010 - 2015

Iran University of Science and Technology (IUST), Tehran, Iran

## HONORS AND AWARDS

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### The Presidential Fellowship

2021-2022

*Mechanical and Aerospace Engineering Dept., The Ohio State University*

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 Award

2020

*National Science Foundation*

### NSF Partnerships for Innovation Award (Partnership with INTUITIVE)

2019

*National Science Foundation (on behalf of Hoelzle Research Lab)*

## PUBLICATIONS AND PATENTS

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### 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.; Mohammadipour, 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.

### 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

## LEADERSHIP & INVOLVEMENT

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### Open Source Bioprinting Workshop

2022 - 2023

*Department of Biomedical Engineering, CMU*

Head of the executive team holding the annual workshop. The workshop hosts attendees from acclaimed universities including Stanford, Georgia Tech, MIT, and the University of Toronto.