

Mitch Igan

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SUMMARY

Experienced biomedical engineering researcher with expertise in biomaterials, mechanobiology, and cell biology. Biotechnology and pharmaceutical industry experience focused on early-stage discovery and development of therapeutics for fibrotic diseases. Motivated and collaborative worker with a strong publication record and excellent communication skills, pursuing an industry postdoctoral research position in discovery oncology.

EDUCATION

University of Michigan **Ann Arbor, MI**
Ph.D. in Biomedical Engineering, Concentration in Biomaterials and Regenerative Medicine *December 2024*
Graduate Certificate in Innovation & Entrepreneurship *GPA: 3.93/4.00*
Thesis: Biomaterial Control of Cell Forces to Enable Intercellular Communication during Vasculogenic Assembly
Relevant Coursework: Artificial Intelligence in Biomedical Engineering, Cellular Biotechnology, Commercialization of Biomedicine, Technology-Inspired Business Models

University of Nebraska - Lincoln **Lincoln, NE**
Bachelor of Science in Biological Systems Engineering, Minor in Biomedical Engineering *May 2019*
Honors Program Scholar *GPA: 4.00/4.00*

RESEARCH EXPERIENCE

University of Michigan - Engineered Microenvironments and Mechanobiology Lab **Ann Arbor, MI**
Graduate Research Assistant *November 2019 - Present*
Advisor: Dr. Nigel Thomson

- Combine approaches from cell biology, materials science, and microfabrication to investigate how structure and mechanics of the cellular microenvironment regulate fundamental cell processes
- Investigate cellular interactions with their microenvironment in order to design biomaterials that direct the self-assembly of functional microvascular networks, and understand how the physical properties of the extracellular matrix regulate myofibroblast activation during fibrotic diseases
- Design and characterize natural and synthetic hydrogel platforms with tunable physical properties through polymer chemistry, electrospinning, and atomic force microscopy
- Perform 2D and 3D culture of various cell types including endothelial cells, fibroblasts, and induced pluripotent stem cells (iPSCs)
- Visualize data with confocal microscopy and write custom Matlab scripts for high throughput data analysis
- Utilize photolithography and soft lithography approaches to develop high throughput substrates that isolate single cells for analysis of cell behavior in user-defined microtissues
- Mentor three undergraduate researchers through one-on-one instruction in data collection and analysis

AbbVie Inc. **North Chicago, IL**
Experiential Intern – Discovery Dermatology and Fibrosis (Remote) *June 2023 – August 2023*

- Surveyed, evaluated, and proposed novel 3D cell culture platforms and techniques for *in vitro* modeling of idiopathic pulmonary fibrosis
- Organized and led biweekly internship group meetings to foster intern networking and cross-functional exposure

TEACHING EXPERIENCE

University of Michigan - Biomedical Instrumentation and Design **Ann Arbor, MI**
Graduate Student Instructor *August 2020 – December 2020*

- Instructed students on how to design and configure various biosensors to acquire physiological information from a living system, interface sensing devices to a digital acquisition system, and process experimental data for analysis
- Assessed student capabilities and needs to deliver customized tutoring and support student learning during weekly office hours

PROJECT EXPERIENCE

miLEAD Consulting

Project Manager

Consultant

Ann Arbor, MI

June 2024 - Present

August 2022 – June 2024

- Managed a team of four consultants to provide early-stage and established organizations with rigorous analysis to inform and guide decisions towards advancing their products and services
- Developed a project plan, communicated directly with client, and maintained focus on final deliverables to ensure that project goals were met
- Conducted comprehensive primary and secondary market research to identify viable customer segments for a client's novel product or technology

University of Michigan – Biomedical Engineering Department

Artificial Intelligence in Biomedical Engineering: Research Report

Ann Arbor, MI

January 2023 – April 2023

- Analyzed a preexisting single cell RNA-sequencing dataset consisting of transcriptomes from 21,252 endothelial cells (each consisting of 14,917 genes) that were isolated from healthy and cancerous lung tissue
- Utilized Matlab to analyze properties of the dataset, conduct unsupervised learning approaches, and develop machine learning algorithms to identify unique genes that were differentially regulated as well as predict disease state based solely on endothelial cell expression levels

SKILLS

Lab Skills: 2D & 3D cell culture, Hydrogel Formulation, Mechanical Characterization, Confocal Microscopy
Immunostaining, Live Cell Imaging, Lentiviral Transduction, Western Blotting, Microfabrication

Computer Skills: MATLAB, ImageJ, GraphPad Prism, Adobe Illustrator, AutoCAD, Microsoft Office

PUBLICATIONS

1. **Igan MJ**, Rossi LF, Li MR, Ivanov MI, Garcia JG, Arbor AA. Mechanical intercellular communication via matrix-borne cell force transmission during vascular network formation. *BioRxiv* 2024.
2. Li MR, **Igan MJ**, Zhang WC, Arbor AA. Actomyosin contractility-dependent matrix stretch and recoil induces rapid cell migration. *Nature Communications* 2022; 10:1186.
3. Li MR, Taylor AP, Zhao S, Weber EL, Kornakova M, **Igan MJ**, Soto H, Zhang WC, Murphy SK, Leung Z, Nowak AK, Kalchik IN, Thomson, NA. Direct comparison of angiogenesis in natural and synthetic biomaterials reveals matrix porosity regulates endothelial cell invasion speed and sprout diameter. *Acta Biomaterialia*, in press.

FELLOWSHIPS AND SCHOLARSHIPS

National Institutes of Health Ruth L. Kirschstein National Research Service Award (Parent F31)

2023 - Present

National Science Foundation Graduate Research Fellowship

2023 - Present

HONORS AND AWARDS

Acta Student Award Finalist, *Acta Journals*

May 2024

ASME-BED PhD Student Paper Competition 2nd place, *Summer Biomechanics Conference*

June 2022

ABSTRACTS AND PRESENTATIONS

1. **Igan MJ**, Ivanov MI, Bianchi SA, Wilson DN, Tremblay SA, Thomson NA. Synthetic matrix fibers supports 3D endothelial cell network assembly in fibrin hydrogels. *BMES 2024 Annual Meeting*, Orlando, FL. October 6-9, 2024, poster.
2. Rossi LF, Martin MP, Esposito MA, **Igan MJ**, Jensen OW, Thomson NA. Mechanical cues drive the robust assembly of microfabricated stem cell-derived cardiac tissues. *2024 Summer Biomechanics, Bioengineering, and Biotransport Conference*, June 14-18, 2024, virtual presentation.
3. **Igan, MJ**, Thomson NA. Cellular communication via force propagation in fibrous microenvironments. *Engineering Graduate Symposium*, Ann Arbor, MI, October 26, 2022, poster.