

# WILLIAM DRENNAN

CURRICULUM VITAE

☎ 1 (630) 457-8239

✉ wcd2@illinois.edu

📍 Champaign, IL

## Education

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**University of Illinois, Urbana-Champaign, IL**

*Ph.D. Candidate, Mechanical Science and Engineering*

Expected Graduation May 2025

GPA: 3.91/4.00

**University of Illinois, Urbana-Champaign, IL**

*Bachelor of Science, Mechanical Science and Engineering*

December 2019

GPA: 3.98/4.00

**Illinois Mathematics and Science Academy, Aurora, IL**

*High School Diploma*

June 2016

GPA: 4.00/4.00

## Experience

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**Graduate Researcher**

January 2020 – Present

*Saif Lab: Mechanics of living cells and nanoscale materials*

*Urbana, IL*

- Manufactured swimming biohybrid robots using engineering skeletal and neural tissues on a micromolded silicone scaffold
- Designed high throughput arrays for studying the mechanosensitivity of neonatal cardiac muscle cells and neuromuscular units
- Performed high speed calcium imaging and immunofluorescent confocal imaging of cardiac tissue cultures

**Undergraduate Researcher**

May 2018 – December 2019

*Advanced Controls Research Group*

*Urbana, IL*

- Conducted an experimental and numerical study of Maxwell–Cattaneo heat flux through tissue during electrosurgery
- Conducted numerical study of mini-ingotism and bridging during sudden slab casting slowdowns

**Research Assistant**

August 2014 – May 2015

*Adler Planetarium Astronomy Department*

*Chicago, IL*

- Developed a program to model the fragmentation and impact pattern of meteors passing through the atmosphere

## Publications

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**A fast, muscle-actuated biohybrid swimming robot. *BioRxiv Preprint.***

Drennan, W., Aydin, O., Emon, B., Li, Z., Joy, M.S.H., Barishman, A., Kim, Y., Wei, M., Denham, D., Carrillo, A., & Saif, M.T.A.

**A multi-functional sensor for cell traction force, matrix remodeling and biomechanical assays in self-assembled 3D tissues in vitro. *Nature Protocols, Manuscript accepted for publication.***

Emon, B., Joy, M.S.H., Drennan, W., & Saif, M.T.A.

**Disorder to order transition in cell-ECM systems mediated by cell-cell collective interactions. *Acta Biomaterialia, 2022, 290-301.*** <https://doi.org/10.1016/j.actbio.2022.10.012>.

Doha, U., Aydin, O., Joy, M.S., Emon, B., Drennan, W., & Saif, M.T.A.

**Investigating centerline bridging in continuous casting during speed drops with conoffline. *AISTech - Iron and Steel Technology Conference Proceedings, 2019-May, 2075-2083.*** <https://doi.org/10.33313/377/213>.

Chen, Z., Drennan, W., Thomas, B., & Bentsman, J.

## Presentations

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**Biomedical Engineering Society 2024 Annual Meeting, Baltimore, MD. *Design and microfabrication of a fast, muscle-powered biohybrid swimming robot through application of low Reynolds number elasto-hydrodynamic theory and supportive mechanical and chemical cues.***

**An NSF Expedition in Computing Mind in Vitro Annual Review *Embodiment of neuromuscular junctions.***

**Biomedical Engineering Society 2022 Annual Meeting, San Antonio, TX. *Frequency Distributions of Mechanically Coupled Cardiac Tissues.***

**Continuous Casting Consortium Conference 2018, Golden, CO. *Centerline Bridging and Mini-Ingotism during Continuous Casting Slowdown.***

## Outreach

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### **Institute of Genomic Biology World of Genomics**

July 2024 – October 2024

- Made interactive exhibits showcasing soft robots for our outreach event at the Museum of Science and Industry
- Fabricated portable enclosures for micro-grippers actuated by electrically stimulated living muscle

### **Saif Lab Mentoring**

May 2022 – August 2023

- Trained two local high school students and six undergraduate students to work in a biosafety level 2 lab
- Designed writing assignments and lessons for teaching mentored students the fundamentals of solid mechanics and developmental biological applicable to their experiments with neuromuscular junctions

### **Saif Lab Summer High School Outreach Program**

May 2022 – August 2022

- Conducted a summer program for seven local high school students aimed at teaching students the fundamentals of 3D modeling, image tracking, and signal processing

## Teaching Activities

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### **Design for Maneuverability, ME 270 - Fall 2024**

Teaching manufacturing techniques and design labs, grading labs and project assignment, office hours

### **Thermodynamics, ME 200 - Fall 2020**

Grading assignments on the United Nations Sustainable Development Goals, holding remote office hours

## Honors

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NSF Graduate Research Fellow - 2021

## References

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### **Dr. M Taher A Saif**

Edward William and Jane Marr Gutgsell Professor  
University of Illinois, Urbana-Champaign  
2101D Mechanical Engineering Lab, Urbana, IL 61801  
Email: saif@illinois.edu  
Phone: (217) 333-8552

### **Dr. Mattia Gazzola**

Associate Professor; Charles Conrad Kritzer Faculty Scholar  
University of Illinois, Urbana-Champaign  
3032B Signey Lu Mech Engr Bldg, Urbana, IL 61801  
Email: mgazzola@illinois.edu  
Phone: (217) 300-4773