

## Jeffrey Ock

Curriculum Vitae

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### EDUCATION

#### **Texas A&M University, College of Engineering**

*Bachelor of Science in Biomedical Engineering*

**May 2026**

**GPA:** 3.51/4.00

### RESEARCH EXPERIENCE

#### **Stem Cell & Tissue Engineering Lab, Texas A&M University, College Station, TX**

*Undergraduate Researcher, PAID*

*May, 2024 - Present*

❖ Advisor: Feng Zhao, PhD

Expandable Acellular Dermal Matrix

❖ Launched and lead project on expandable skin graft grown from hDFs

❖ Achieved 67% greater area increase and thus expandability from control.

Impact of Microtopography on Human Dermal Fibroblasts

❖ Leading project on highly aligned (anisotropic) interwoven skin graft grown from hDFs.

❖ Discovered higher rates of senescence and proto-myofibroblast differentiation were observed, along with a more than 200% increase in mechanical strength under tension.

Dermal Matrix Bioreactor

❖ Developed bioreactor for mass cell culture of multiple extracellular matrix (ECM) samples.

❖ Achieved 10 consecutive 5x5 cm cell sheets were cultured with no significant difference.

Contributions to:

❖ Characterization of different cardiac fibroblasts (Pri-CF, hiPSC-CF) on anisotropic scaffolds.

❖ Studying cell migration depending on porosity of the scaffold.

#### **Forster Lab, UPMC Children's Hospital of Pittsburgh, Pittsburgh, PA**

*Student Research Internship Program (SRIP), UPitt School of Medicine*

*May - Aug, 2023*

❖ Advisor: Catherine Forster, MD

Urothelium Characterization of Chrm3 Knockout Mice

❖ Did small animal (mice) (IACUC) work including maintenance, gowning, sample collection, and asphyxiation.

❖ Paraffinized samples, microtomes, and performed IHC stains co-stains along with morphological stains (H&E).

❖ Observed morphological and proteomic congruency between Chrm3 <sup>-/-</sup> mice and SCI mice as hypothesized.

### PUBLICATIONS AND POSTERS

#### **Publications**

1. Sharma, A., Sharma, D., Horn, S. J., Wen, Z., **Ock, J.**, Bova, J., Clubb, F., George, J. T., Zhou, Y., Zhao, F. (2026). Human cell-derived dermal-specific interwoven extracellular matrix for diabetic wound healing. *Acta Biomaterialia*
2. **Ock, J.**, Proca, A., Stout, T., Wang, E., Liu, S., Zhao, F. Surface Treatment of PDMS Substrates for the Development of an Expandable Dermal Extracellular Matrix. *In Preparation*
3. **Ock, J.**, Stout, T., Wang, E., Kaluarachchi, S., Wen, Z., Liu, S., Yang, Y., Zhao, F. Enhancing the Mechanical Strength and Altering Properties of Dermal Extracellular Matrix through Micropattern Design Micromanipulation. *In Preparation*

## Poster

1. **Ock, J.**, Wang, E., Stout, T., Zhao F. “Extracellular Matrix Morphology and Cellular Mechanobiology on Interwoven v. Interwoven-Aligned PDMS Scaffolds,” LAUNCH Undergraduate Research, Texas A&M University, July 2025
2. **Ock, J.**, Sharma, B., Holden, J., Bushnell, D., Narla, S., Forster, C. “Knockout muscarinic acetylcholine receptor subtype M3 in mice as a model for urothelial injury due to neurogenic bladder,” SRIP Poster Symposium, Pittsburgh, July 2023

## PROJECTS

### **Versatile Innovative Peristalsis Environment bioReactor (VIPER), Texas A&M University, College Station, TX**

*Electrical Lead, Software Lead*

*Aug, 2024 - Present*

- ❖ Objective: Cell bioreactor that simulates the flow strain and axial stress of a peristaltic organ.
- ❖ Under the Raghavan Lab’s advising a operational peristaltic bioreactor was developed.
- ❖ Electrical safety and circuit optimization was applied and prototyped on a soldered perfboard.
- ❖ A usable CLI tool was developed for simple flow and peristalsis control.

### **CytoCaricature, Texas A&M University, College Station, TX**

*Software Lead*

*Aug, 2024 - Present*

- ❖ Objective: Custom cell analysis app made to streamline my personal profiling workflows..
- ❖ Post-processing: Channel isolation, RGB to grayscale, Gaussian blur filtering, Pixel intensity thresholding
- ❖ Cell Profiling/Analysis: Watershed-based cell counting, NSI analysis and heatmap

### **Personal Website - <https://jeffock.net>**

*Personal*

*Aug, 2024 - Present*

- ❖ Objective: Build a personal website from scratch (no holistic frameworks like React or Bootstrapping).
- ❖ Frontend: HTML5, CSS, vanilla JS
- ❖ Backend: batch script → local web-scraping server (Node.js) → PostgreSQL DB (via Supabase) server-side request → CORS proxy (Heroku) → TS function (via Supabase) → PostgreSQL DB

### **Crowd counting CNN model for counting cytoplasmic fluorescent stains, UPMC Children’s Hospital of Pittsburgh, Pittsburgh, PA**

*Software Lead*

*Jul, 2023*

- ❖ Objective: Utilize CNN (Convolutional Neural Network) to count cytoplasmic IHC stains that current neural network cell counters struggle to process.
- ❖ For the general (cytoplasmic & nucleic) model MAE = 79.8 (n = 58) for cell counts of ~400 per image.
- ❖ Lower cell count images fared better: i.e. an image with 62 cells had a prediction of 60 cells.

## LEADERSHIP EXPERIENCE

### **Medical Journaling at A&M (MJAM), Texas A&M University, College Station, TX**

*Vice President & Co-Founder*

*Aug, 2023 - May, 2025*

- ❖ Co-founded an organization that seeks to expose and guide undergraduates through digesting medical and scientific journals.
- ❖ Hosted weekly meetings in a journal club fashion and provided relevant resources to students (reading techniques, figure understanding/analysis, etc.)

### **Zhao Lab, Texas A&M University, College Station, TX**

*Mentor*

*Aug, 2024 - Present*

- ❖ Mentored 2 undergraduates and a new masters student in basic laboratory techniques and cell culture.
- ❖ Trained mentees in various instruments such as confocal, tensiometer, plasma clearing, and ethylene oxide sterilization.

**Aggie Outdoors, Texas A&M University, College Station, TX**

*Merchandise Chair*

*May, 2025 - Present*

- ❖ Designed merchandise and miscellaneous paraphernalia for Aggie Outdoors, a camping organization committed to preservation and service to our natural world.
- ❖ Lead volunteering objectives (i.e. Big Event) and contributed to organization decision-making for 70+ members.

**PROFESSIONAL EXPERIENCE**

**Department of Biomedical Engineering, Texas A&M University, College Station, TX**

*BMEN 351 Student Assistant*

*Aug - Dec, 2025*

- ❖ Machine Learning and Data Science: Machine learning and data analysis/presentation in BME.
- ❖ Graded and held office hours for 100+ students.

*BMEN 344 Student Assistant*

*Jan - May, 2026*

- ❖ Biological Interactions: Interactions between medical devices and the host.
- ❖ Graded and proctored for 100+ students.

**CVS Pharmacy, Wexford, PA**

*Store Associate*

*Aug, 2021 - Jun, 2022*

- ❖ Performed all general customer related and store upkeep duties.

**VOLUNTEERING**

**Local Parks and Streets, College Station, TX**

*Volunteer*

*Mar, 2025 - Present*

- ❖ Clean local parks and streets 3-4 times a semester with Aggie Outdoors. Over 60 bags of trash are filled from various parks and streets every semester.

**Rock Steady Boxing, College Station, TX**

*Volunteer*

*Mar - May, 2025*

- ❖ Paint and help upkeep the local dementia care center.

**CHI St. Joseph Health, College Station, TX**

*ER Volunteer*

*Jan - Dec, 2023*

- ❖ Took vital signs and turned over rooms in a timely manner at the ER. Helped care for over 2000 patients.
- ❖ Took additional duties if needed due to understaffing of the College Station ER location.

**AWARDS AND HONORS**

**Awards:**

**Kidney STARS Award**

*Aug, 2023*

- ❖ Travel stipend along with American Society of Nephrology membership and Kidney Week 2023 Conference entry, awarded through my urinary tract research at UPMC.
- ❖ Guidance via the Kidney STARS program, a week long program during ASN Kidney Week with guidance for aspiring MD and PhD students.

**Scholarships:**

President's Endowed Scholarship	<i>Aug, 2022</i>
NM Recognition Scholarship	<i>Aug, 2022</i>
Non-Res Competitive Scholarship	<i>Aug, 2022</i>
National Merit Finalist	<i>May, 2022</i>

**SKILLS AND CERTIFICATES**

**Lab Procedures/Instruments:** H&E Staining, IHC Staining, Sectioning (Microtome), IF Staining, Cell Culture (BSL 2), Tissue Culture, Decellularization, Confocal (Olympus FV 1000), Microscopy (Zeiss & Leica scopes), DNA Assay, MTT Assay, Live/Dead Assay, Water Contact Angle (Optical Tensiometer), Plasma Cleaning (Harrick), Ethylene Oxide Sterilization, Morphometric Cell Analysis, PDMS Fabrication, Silicon Wafer Nanofabrication (RIE Lithography)

**Coding Languages/Frameworks:** C++, C, C#, Java, JS, TS, Lua, Python, Rust, HTML5/CSS3, R, MATLAB, Batch, PostgreSQL, Node.js, CMake, Pytorch

**Systems/Protocols/Services:** CORS, CSP, TCP-IP, HTTP, Proxy Servers, Heroku, Web Scraping, Supabase, Github Pages, DNS

**Engineering Skills:** CAD (Autodesk, Solidworks), PCB Design (EasyEDA), Soldering, Circuit Design/Assembly/Testing, 3D Printing, Labview

**Soft Skills:** effective oral/written communication, project planning/management, team building, technical communication, problem solving, critical thinking

**Languages:** Native English Proficiency, Native Korean Proficiency

**Other Proficiencies:** Microsoft Suite, Google Suite, GraphPad Prism, Minitab

**Certificates:**

Working with Small Animals (CITI Program, 55478167)	<i>expires May, 2027</i>
Working with Mice in Research (CITI Program, 55478160)	<i>expires May, 2027</i>
Use of Controlled Substances in Basic and Animal Research (CITI Program, 55970394)	<i>expires May, 2027</i>
COI PHS Regulated Course (CITI Program, 55478159)	<i>expires May, 2027</i>
Responsible Conduct of Research (CITI Program, 55478161)	<i>expires May, 2027</i>

**Related Coursework:** Tissue Engineering, Drug Delivery, Nanotechnology, Molecular & Cell Biomechanics, Biomolecular Engineering, BME Materials, Biological Interactions & Testing (Med. Implants), Imaging Living Systems, Biomechanics, BM & Health Data Science, Circuits/Signals/Systems, Fluid Mechanics, Computing for BME, Biostatistics, Organic Chemistry I/II, Differential Equations, Physics E&M, Human Physiology I/II, Calculus I/II/III, Computation (Python), Programming I (Java), Biology I/II, Chemistry I/II