SAUL SCHAFFER

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EDUCATION

Ph.D., Mechanical Engineering, Carnegie Mellon University — Aug 2019 - Aug 2024

M.S., Mechanical Engineering, Carnegie Mellon University — Aug 2019 - May 2022

B.S., Mechanical Engineering, University of Maryland, College Park — Aug 2015 - May 2019

LEADERSHIP, SERVICE & OUTREACH

STEM Outreach Coordinator & Volunteer — Aug 2019 - Present
Carnegie Mellon University Gelfand Center for Service Learning and Outreach

- Coordinated 10-week program pairing talks from researchers and hands-on STEM activities for 6th-8th graders (Link)
- Led session about 3D printing including a hands-on activity with a 3D printed catapult (Video)
- Designed biohybrid robot workshop for middle schoolers resulting in a STEM Outreach Award

Vice President & Social Committee Chair — Sept 2020 - May 2023
CMU Mechanical Engineering Graduate Student Organization (MEGSO)

- Managed yearly budget of $25,000+, planned and coordinated 20+ social events for 430+ graduate students
- Enhanced the reputation and quality of MEGSO events, setting a new standard for graduate student activities at CMU
- Initiated and oversaw MEGSO structural overhaul, creating needed roles and eliminating superfluous positions

Undergraduate Course Creator, University of Maryland, College Park — Aug 2017 - Aug 2019
ENME289P: Additive Manufacturing for Prosthetic Design (Syllabus)

- Proposed and taught a new student-run course on leveraging 3D printing to improve prosthetic design
- Hosted speakers from FDA, non-profits, industry, and academia; facilitated quantitative destructive testing
- Successfully led two semesters before transitioning leadership to ensure the course's sustainability

Digital Fabrication Specialist & Educator (Phnom Penh, Cambodia) — Summer 2019
Cambodian School of Prosthetics and Orthotics + Nia Technologies Inc.

- Created free scan-to-prosthetic tutorial using the Meshmixer software, garnering 44,000+ views on YouTube (Playlist)
- Coordinated and led two-day workshop on 3D printing, scanning, & digital prosthetic design to 23 prosthetist students
- Leveraged low-cost 3D scanning hardware to capture anatomy of residual limbs of amputees

RESEARCH AND ENGINEERING EXPERIENCE

Carnegie Mellon University — Aug 2019 - Present
Advisor: Prof. Victoria A. Webster-Wood | (Biohybrid and Organic Robotics Group (BORG))
National Science Foundation Graduate Research Fellow

- Created living machines powered by biological muscle tissue towards sustainable, biodegradable soft robots
- Bioprinted living muscle actuators from bioink harvested from primary chicken skeletal muscle
- Deployed reinforcement learning models (PPO) to leverage muscle adaptability in biohybrid robot systems

National Science Foundation Innovation (NSF I-Corps) Fellow, Technical Lead — Aug 2023 - Present

- Conducted 100+ customer discovery interviews as part of National Cohort hosted by MIT
- Identified customer requirements for a 3D printable resin for low-cost, high-fidelity surgical simulation
- Engaged in product-market fit validation through data-driven hypothesis testing

University of Maryland, College Park — Summer 2018 - Spring 2019
Advisor: Prof. Axel Krieger | (Intelligent Medical Robotic Systems and Equipment (IMERSE) Lab)

- Supported development of a semi-autonomous robotic system for pre-hospital assessment (publication)(patent)
- Developed inexpensive, 3D printed ultrasound phantom for robotic trauma hemorrhage diagnosis (publication)

National Science Foundation International Research Experience Fellowship Summer 2019
Explosive Ordinance Disposal Robotics | (NSF IRES Cambodia)

- Led interdisciplinary research team in Cambodia for 3 months developing low-cost robots for landmine removal
- Interfaced with local humanitarian organizations to understand system needs and requirements
- Prototyped ordnance situational awareness sensor stack (LIDAR + RGB-D) for explosive ordnance disposal operators

University of Maryland, College Park Aug 2018 - May 2019
Advisor: Prof. Ryan D. Sochol | (Biohybrid and Advanced Manufacturing (BAM) Lab)

- Designed and characterized novel 3D-printed soft-rigid interface for fluidic capacitors and transistors (publication)

HONORS & AWARDS

Carnegie Mellon University

- National Science Foundation Graduate Research Fellowship Program (GRFP) 2021-2024
  Competitive fellowship for top STEM graduate students including full tuition and stipend
- Mechanical Engineering Outreach Stars (MEOS) Award – Silver Level 2022
  Awarded by the DEI Taskforce's Outreach Subcommittee of the CMU Mechanical Engineering Dept.
- Nam Pyo and Young Suh Fellowship 2021-2022
  Supports graduate students identified as future technology leaders at Carnegie Mellon University
- Gelfand Student Educational Outreach Award 2020-2021
  Recognizes excellence in STEM outreach at Carnegie Mellon University

University of Maryland, College Park

- Mechanical Engineering Chairman's Award 2019
  Recognizing excellence in scholarship, service, and outstanding leadership for graduating seniors
- President's Scholarship 2015-2019
  $50,000 scholarship based on academic achievement
- Research Honors Program "Freshman of the Year" 2015
  Awarded to "the most outstanding first-year student who demonstrates enthusiasm for interdisciplinary research"

PUBLICATIONS

Selected Journal Publications (Google Scholar for complete list)

- W. Sun, **S. Schaffer**, K. Dai, L. Yao, A. Feinberg, V. A. Webster-Wood, "3D Printing Hydrogel-Based Soft and Biohybrid Actuators: A Mini Review on Fabrication Techniques, Applications and Challenges", *Frontiers in Robotics and AI*, 2021, doi:10.3389/frobt.2021.673533

Selected Conference Proceedings

- **S. Schaffer** *et al.*, "The Tall, the Squat, & the Bendy: Parametric Modeling and Simulation Towards Multi-functional Biohybrid Robots", 12th International Conference on Biomimetic and Biohybrid Systems (Living Machines 2023), Presented, doi:10.1007/978-3-031-39504-8_15

Patents

- **S. Schaffer**, R, Kubicek, V.A. Webster-Wood, "LIFE Vessel: Lateral Imaging and Fabrication with Electrical Stimulation", USPTO Provisional Patent Application No. 63/627,597, January 2024, *Pending*
- A. Krieger, T. Fleiter, H. Saeidi, B. Mathur, **S. Schaffer** *et al.*, "Systems, methods, and media for remote trauma assessment," US 2020/0194117A1, 18 June 2020

ADDITIONAL SKILLS

Computation	Python, MATLAB, Linux, SolidWorks, ImageJ, ANSYS, Meshmixer, C++, LaTeX
3D Printing	FRESH Bioprinting, PolyJet, Extrusion (FDM), UV-based (SLA & DLP)
Embedded Systems	Raspberry Pi 3/4, NVIDIA Jetson TX1, Arduino, Duet3D 3D/CNC printing boards
Cell & Molecular Biology	3D mammalian & chick muscle culture, IHC staining, immunofluorescence, microscopy

PERSONAL

I enjoy mountaineering/rock climbing, glass blowing, and 3D printed sculpture. I am a citizen of the USA, UK, and Canada.