

Emily Lazarus

Mechanical and Industrial Engineering Doctoral Student

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RESEARCH INTERESTS

Biomaterials, Bio-Additive Manufacturing, Wound Healing, Biofilm Fabrication

EDUCATIONAL BACKGROUND

Ph.D., Mechanical and Industrial Engineering, *Expected May 2024*

Rochester Institute of Technology, Rochester, NY

B.S., Biomedical Engineering, Magna Cum Laude, May 2020

Rochester Institute of Technology, Rochester, NY

TECHNICAL APPOINTMENTS

Doctoral Intern, *May 2022 – August 2022*

Sartorius – Gaborski NanoBio Materials Lab, Boston, MA/Rochester, NY

Advisor: Dr. Thomas Gaborski and Dr. Aslan Dehghani

- Worked at the interface of an academic and industrial collaboration
- Reported results directly to the industrial sponsor
- Purification and isolation of bionanomaterials through Sartorius laboratory filtration devices including normal flow and tangential flow filtration
- Bio-nanoparticle analysis through Nanoparticle Tracking Analysis
- Protein analysis through BCA

Solutions Process Development Co-op, *January 2019 - August 2019*

Bausch + Lomb, Rochester, NY

- Prepared laboratory and pilot scale batches of lens care solutions in a Good Manufacturing Practice (GMP) facility
- Wrote and revised protocols and technical reports for the pilot scale development of lens care solutions
- Performed data analysis on pilot and manufacturing scale lens care solution batches
- Supported manufacturing process technology scale-up and transfer to manufacturing sites

Research and Development Engineering Co-op, *August 2017 - January 2018*

Welch Allyn (now Hillrom), Skaneateles, NY

- Wrote and executed design validation protocols on the hardware and software of medical devices
- Debugged hardware malfunctions on core boards of an in development vital signs monitor

Design Engineering Co-op, *June 2017 - August 2017*

LimbForge, Rochester, NY

- Refined the design and mechanics of a 3D printed active transradial prosthetic device
- Focused on the improvement of grip strength and biomimicry of device
- Executed design and slicing on 3D modeling software including Fusion360, Cura, and Meshmixer

ACADEMIC APPOINTMENTS

Graduate Teaching Assistant, *August 2022 – Present*

History of World War II, Biomedical Engineering, Industrial and Systems Engineering

Graduate Teaching Assistant, *January 2022 – April 2022*

Biomaterials and Biomechanics Lab, Biomedical Engineering

- Course instructor
- Prepared and delivered laboratory lectures and oversaw laboratory sessions on biomechanics and biomaterials

- Designed biomaterial module and laboratory experiments including stress relaxation and creep

Graduate Teaching Assistant, August 2021 – December 2021

Systems and Project Management, Industrial and Systems Engineering

- Prepared grading rubrics and graded lab reports, homework assignments, and discussion posts
- Assembled lecture feedback and delivered improvements to future instruction and discussion

Graduate Teaching Assistant, August 2021 – December 2021

Production Planning and Scheduling, Industrial and Systems Engineering

- Assisted faculty member with classroom instruction
- Oversaw laboratory sessions and provided student feedback on designing production systems

Graduate Research Assistant, August 2020 – Present

Interdisciplinary Manufacturing Engineering and Design (iMED) Lab

Advisor: Dr. Iris V. Rivero

- Fabrication of antibacterial foam for Negative Pressure Wound Therapy (NPWT)
- Development and characterization of shape memory polymers with a biorelevant activation temperature
- Biomaterial characterization for the application of bone tissue engineering and wound healing
- Developed methodology to determine parametric combinations of biomaterial 3D printing parameters

Undergraduate Research Assistant, August 2019 - August 2020

iMED Lab

- Designed and fabricated 3D printed cryomilled composites for bone regeneration
- Performed printing parameter optimization
- Performed material characterization including scanning electron microscopy, differential scanning calorimetry, rheology, and mechanical testing
- Presented work at technical conference

MENTORSHIP

Undergraduate Research Assistant, May 2022 - August 2022

Gabriella Wagner

- **Discipline:** Biomedical Engineering
- **Project:** Reinforced Sulfated Alginate for 3D Bioprinting of Intervertebral Disks
- **Outcome:** Conference posters (2)
- Taught and oversaw 3D bioprinting of sulfated alginate scaffold and scaffold material characterization

PEER-REVIEWED JOURNAL PUBLICATIONS

Lazarus, E., Bermudez-Lekerika, P., Farchione, D., Schofield, T., Howard, S., Mambetkadyrov, I., Lamoca, M., Rivero, I. v., Gantenbein, B., Lewis, C. L., & Wuertz-Kozak, K. *Sulfated Hydrogels in Intervertebral Disc and Cartilage Research*, Cells. **2021**. <https://doi.org/10.3390/CELLS10123568>

PEER-REVIEWED CONFERENCE PROCEEDINGS

Sarles SE, **Lazarus E**, Widom L, Wuertz-Kozak K, Rivero IV. *Hydrogel Composite Layering Process for Full Thickness Skin Models*, IISE Annual Conference, **2022**.

POSTER AND CONFERENCE PRESENTATIONS

Wagner G, **Lazarus E**, De Pieri A, Rivero IV, Lewis C, Weurtz-Kozak K, Nanofiber Reinforced Sulfated Alginate for 3D Bioprinting of IVDs, Rochester Institute of Technology Research Symposium, Rochester, NY, **2022**.

Lazarus E, Rivero IV, Biofabricated synthetic-natural full thickness skin model with enhanced mechanical properties for studying drug delivery and disease modeling, IISE Annual Conference, Seattle, WA, **2022**.

Lazarus E, Osgood R, Rivero IV, Chitosan Core Polyurethane Shape Memory Foam Composite with Antimicrobial Properties for Negative Pressure Wound Therapy, Material Science and Technology, Virtual, **2021**.

Lazarus E, Ramesh S, Rivero IV, Three-Dimensional Printing of Absorbable Orthopedic Pins with Shape Memory Polymers, IISE Annual Conference, Virtual, **2021**.

Lazarus E, Influence of 3D Printed Scaffold Geometry for Trabecular Bone Regeneration, Rochester Institute of Technology Undergraduate Research Symposium, Rochester, NY, **2020**.

HONORS, GRANTS, AND AWARDS

Manufacturing and Design Student Scholarship, Institute of Industrial and Systems Engineers
2021

Summer Undergraduate Research Fellowship, Rochester Institute of Technology
2020

SERVICE AND OUTREACH

Graduate Student Advisory Committee College Representative, Rochester Institute of Technology, *2021-2022*

Graduate Showcase Committee Member, Rochester Institute of Technology, *2021*

Student Athlete Advisory Committee, Rochester Institute of Technology, *2015-2017*

PROFESSIONAL SOCIETIES

Out in STEM
2022 – Present

Institute of Industrial and Systems Engineers
2020 – Present