STEVEN DEFREITAS (He/They)

Providence, RI | (401) 419-6385
www.sdefreitas.biz | stevenadefreitas@gmail.com | linkedin.com/in/steven-a-defreitas/

Professional Summary

I am a Biomaterials and Tissue Engineer with a diverse background in the arts and design. I have a passion for using my skills in creative ways to help others and solve unique problems. I aim to develop and use my skills to push the boundaries of biomedical innovation for the benefit of the world while exploring ways to remedy healthcare disparities from within the industry.

Education

Worcester Polytechnic Institute (WPI), Worcester, MA — Aug 2019 - May 2023
B.S. Biomedical Engineering with High Distinction, GPA 3.82

Minor in Interactive Media and Game Development
Dean's List – Fall 2019, Spring 2020, Fall 2020, Fall 2021

Related Courses: Cellular Engineering, Biotransport Lab, Biomaterials Lab, Biomechanics Lab, Biomaterial Tissue Interactions, Drug Delivery, Physiology & Engineering, Biomedical Engineering Design, Cell Biology, Bioinstrumentation, CAD I

Skills

Technical/Laboratory: 2D and 3D cell culture of human and animal models for healthy and cancerous tissues • CRISPR Cas9 gene editing • Controlled Cell Differentiation (C2C12) • Treatment and seeding on PDMS • Cell freezing and thawing • Genotyping by immunoblotting and PCR Gel electrophoresis • Protein expression analysis by ELISA • Stable cell line development by cloning • Plasmid isolation from glycerol stock • Fluorescent microscopy

Software: Microsoft Office • Adobe Suite • MATLAB • R • ImageLab • ZEISS ZEN • Maple • LoggerPro • Java • SOLIDWORKS (certified) • ZBrush • Autodesk Maya • EPANET • Bluehill

Communication: Intermediate Spanish • Figure design and editing for publication • Research poster design and presentation

Experience

Research Assistant, Brown University, Providence RI — Aug 2023 - Present

- Established and optimized lab-wide protocols for use in various projects surrounding the DNA damage response and base excision repair.
- Generated stable, population representative cell line models for use in research of toxicological effects of common environmental genotoxins.
- Designed and edited graphical abstracts and figures for developing manuscripts authored by various lab members.
- Analyzed and reported findings while offering recommendations and making decisions for future project directions.
- Taught and mentored undergraduate students on basic and advanced laboratory skills and protocols.
- Responsibilities:
    - Experimental design and execution – 75%
    - Undergraduate mentoring – 15%
    - Publication writing & Figure design – 5%
    - Lab maintenance & Inventory management – 5%

Summer PLM Validation Intern, AMGEN Rhode Island Inc., East Greenwich RI, — Jun 2018 – Aug 2018

- Worked in the validation department to execute and archive various documents regarding equipment welfare and maintenance.
- Assisted in autoclave operation and equipment cleaning according to standard operating procedures.
- Assisted in data collection to determine effectiveness and operational status of autoclaves.

Projects

Barcoded Human Cells Engineered with Heterozygous Genetic Diversity to Uncover Toxicodynamic Variability Aug 2023 - Present

- Developed a library of cell lines with heterozygous and homozygous knockouts of various key genes involved in the base excision repair pathway of the DNA damage response.
- Developed and optimized an internal method of knockout confirmation while avoiding the dependence on antibodies for traditional immunoblotting.
- Established and optimized protocols used lab-wide for developing new cell lines with targeted gene modifications.

A Microfluidic Transfection Device to Modify Mammalian Cells, Worcester, MA Aug 2022 - May 2023

- Developed a device for gene editing of mammalian cells with direct applications in cancer research and personalized medicine.
- Achieved high modification efficiency with repeatability, scalability, and a turnaround time of 48 hours.
- Provisional Patent pending and publication embargoed until 2026.

Hydraulic Modeling and Water Distribution Optimization, Panama City, Panama Aug 2022 – Oct 2022

- Gathered comprehensive data regarding the specifications and functional state of the water distribution network in the greater metropolitan area of Panama City in the Kuna Nega District.
- Modeled the distribution system in an EPANET simulation to identify key problem nodes.
- Generated optimized distribution system to maximize water availability while maintaining equity.
- Audited ongoing design project for constructing a supplemental pipeline to the region to alleviate water scarcity and presented recommendations to the National Water Authority of Panama.

Cell Eng., Biomaterials, Biomechanics, and Biotransport Labs, Worcester, MA Aug 2019 – Dec 2022

- Differentiated myoblast cells into myofiber cells using differentiation media.
- Manufactured lipid microtubules, fibrin microthreads, and PDMS sheets for material analysis.
- Uniaxial stress, Screw Pull-out, 3-Point, and 4-Point flexure analyses.
- Analyzed fluid flow kinetics through self-made aneurysm models.
- Analyzed diffusion rates of glucose as free diffusion and through agarose membranes.
- Developed a research paper and PowerPoint presentation regarding the results found from the studies and scientific evidence behind the findings.

Patents

A Microfluidic Transfection Device to Modify Mammalian Cells, #63/521,918 filed June 20, 2023

Publications

Nguyen, B., **Defreitas, S.**, Frick, E., & Panza, G. (2023). *A Microfluidic Transfection Device to Modify Mammalian Cells.* : Worcester Polytechnic Institute. (Embargo release date 2026-04-27)

Gillis, B., Thornton, N., & **Defreitas, S.** (2022). *Hydraulic Modeling and Water Distribution Optimization in Corregimiento Kuna Nega, Panama City, Panama.* : Worcester Polytechnic Institute.

Emran, T. B., Koczor, C. A., Bertone, P., De Padova, J., **Defreitas, S. A.**, Siddiqui, A. H., Schorl, C., & Sobol, R. W,. *Barcoded Human Cells Engineered with Heterozygous Genetic Diversity to Uncover Toxicodynamic Variability* (Manuscript in progress).

Abstracts & Poster Presentations

Gillis, Bridget, Nicholas Thornton, and **Steven Defreitas**. *Hydraulic Modeling and Water Distribution Optimization in Corregimiento Kuna Nega, Panama City, Panama*. November 2023. New England Council on Latin American Studies, Worcester Polytechnic Institute, Worcester, MA.

Steven A. DeFreitas, Aisha H. Siddiqui, and Robert W. Sobol, PhD. *Development and validation of a rapid human gene CRISPR/cas9 knockout approach: Targeted Exon Modification Analysis by PCR and Nanopore Sequencing (TEMAPS).* February 2024. 2024 Legorreta Cancer Center Cancer Biology Retreat, Brown University, Providence RI.

Outreach

Volunteer, *Women and Infants Hospital, NICU* 2018 – 2019

Membership	Member, *National Academy of Inventors*	2024 – Present
	Member, *Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)*	2019 – Present
	Member, *Society of Hispanic Professional Engineers* (SHPE)	2019 – Present
	Member, *Biomedical Engineering Society (BMES)*	2019 – Present
	Member, *National Society of Black Engineers (NSBE)*	2019 – Present
Conference Attendance	**Legorreta Cancer Center Symposium on Tumor Plasticity in Diagnosis & Treatment**, Brown University, Providence RI	September 2023
	New England Council on Latin American Studies Annual Conference, Worcester Polytechnic Institute, Worcester MA	November 2023
	Legorreta Cancer Center Cancer Biology Retreat, Brown University, Providence RI	February 2024
	Research, Discovery, and Innovation (ReDI) Fourth Annual Symposium, Worcester Polytechnic Institute, Worcester MA	April 2024