Robert W. Gregg

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EDUCATION

April 2020
Anticipated

Doctor of Philosophy in Chemical Engineering
University of Pittsburgh
Advisor: Dr. Jason Shoemaker

May 2015

Bachelor of Science in Chemical Engineering
University of Rochester

RESEARCH EXPERIENCE

Jan. 2016-
Present

Graduate Student Researcher
Department of Chemical and Petroleum Engineering, University of Pittsburgh

Developed multi-scale ODE/Agent-Based models of the cGAS pathway to investigate the impact of stochasticity in cell populations.

Implemented parallel tempering Markov Chain Monte Carlo (PT-MCMC) methods for parameterization on a Linux computing cluster.

Performed read alignment and differential gene expression analysis on time course RNA-seq data in R. Carried out RT-qPCR experiments using ISD transfected BJ-TERT (human fibroblast) cells.

May 2014-
Jul. 2014

NSF: Research Education for Undergraduates (REU)
Department of Immunology, University of Pittsburgh

Modeled the spatial and temporal patterns associated with granuloma formation in tuberculosis. Learned to segment PET/CT lung scans using Osirix and transfer data into Matlab to simulate disease dynamics.

Jan. 2014-
Apr. 2014

Undergraduate Independent Study
Department of Imaging Sciences, University of Rochester

Investigated the quantum chemical phenomena underpinning photodynamic therapy and its role as a curative and palliative treatment for cholangiocarcinoma. Reviewed literature on current photosensitizer drugs used to generate reactive oxygen species in malignant tumors.

WORK EXPERIENCE

Sep. 2016-
Dec. 2018

Teaching Assistant
Introduction to Engineering Analysis

Taught 75 incoming freshman engineering students from a wide range of skill levels and backgrounds essential computer skills including Excel, Unix, and HTML/JavaScript. Participated in every lecture troubleshooting coding assignments and graded homework problem sets.

Process Control Dynamics

Prepared and taught recitation for senior undergraduates twice a week, including new concepts and practice problems. Planned and guided students through simulations in MATLAB and Simulink. Provided extra examples and skill assessments to explain challenging material. Held office hours each week to provide individual support to student learning.

Jun. 2015-
Aug. 2015

Upward Bound: High School Course Instructor (Massachusetts)

Instructed two sections of Calculus and one section of Differential Equations for the federally funded Upward Bound Program (*B.S.* degree required). Prepared low-income, first generation, college bound high school students for success in higher level mathematics in the upcoming school year and college. Developed curricula, homework problem sets, examinations, and projects integrating use of Mathematica.

Jan. 2012-
May 2015

Upward Bound: Tutor and Mentor (New York)

Volunteered and tutored local high school students in the Rochester City School District. Guided students through challenging math and science coursework to help reinforce key learning objectives taught in class. Worked closely with low-income, minority, and ESL students to improve writing skills for college applications.

Peer Reviewed Publications

Journal of Theoretical Biology	**Gregg, Robert W.**, Saumendra N. Sarkar, and Jason E. Shoemaker. "Mathematical Modeling of the cGAS Pathway Reveals Robustness of DNA Sensing to TREX1 Feedback." Journal of theoretical biology (2018). https://doi.org/10.1016/J.JTBI.2018.11.001
IFAC	**Gregg, Robert W.**, Saumendra Sarkar, and Jason E. Shoemaker. "Examining Dynamic Emergent Properties of the DNA Sensing Pathway." IFAC-PapersOnLine 51.19 (2018). https://doi.org/10.1016/J.IFACOL.2018.09.017
Radiology of Infectious Diseases	**Gregg, Robert W.**, et al. "Spatial and temporal evolution of lung granulomas in a cynomolgus macaque model of Mycobacterium tuberculosis infection." Radiology of Infectious Diseases 5.3 (2018). https://doi.org/10.1016/j.jrid.2018.08.001
PLOS Pathogens	Philana Ling Lin , Pauline Maiello, Hannah P. Gideon, M. Teresa Coleman, Anthony M. Cadena, Mark A. Rodgers, **Robert Gregg**, Melanie O'Malley, Jaime Tomko, Daniel Fillmore, L. James Frye, Tara Rutledge, Robert M. DiFazio, Christopher Janssen, Edwin Klein, Peter L. Andersen, Sarah M. Fortune, JoAnne L. Flynn. "PET CT identifies reactivation risk in cynomolgus macaques with latent M. tuberculosis." PLoS Pathog 12, no. 7 (2016). https://doi.org/10.1371/journal.ppat.1005739

Conferences

Presentation *Nov. 2019*	**American Institute of Chemical Engineers** *Quantifying the Impact of Cellular Heterogeneity on cGAS Pathway Regulation using Multiscale Agent-Based Modeling* **Robert W. Gregg**, Jason E. Shoemaker
Presentation *Oct. 2018*	**American Institute of Chemical Engineers** *Using Uncertainty to Assess Feedback Mechanisms in the Innate Immune DNA Sensing Pathway* **Robert W. Gregg**, Sarkar N. Saumendra, Jason E. Shoemaker
Poster *Aug. 2018*	**Foundations of Systems Biology in Engineering** *Examining Dynamic Emergent Properties of the DNA Sensing Pathway* **Robert W. Gregg**, Sarkar N. Saumendra, Jason E. Shoemaker
Presentation *Oct. 2017*	**American Institute of Chemical Engineers** *Dynamic Analysis of the DNA Sensing Pathway Predicts Host Immune Response* **Robert W. Gregg**, Sarkar N. Saumendra, Jason E. Shoemaker
Poster *Jun. 2017*	**American Society for Virology** *Mathematical Modeling of the Viral DNA Sensing Pathway Predicts Antiviral Host Responses* **Robert W. Gregg**, Sarkar N. Saumendra, Jason E. Shoemaker

Outreach

Aug. 2019- *Dec. 2019*	**Reviewer for Ingenium: An Undergraduate Research Journal** Served on the Graduate Student Editorial Board for Ingenium, a yearly peer-reviewed compilation of articles highlighting undergraduate research within the Swanson School of Engineering. Provided critical reviews for abstract and manuscript selection in bio-engineering and chemical engineering.
Jan. 2017- *Jun. 2018*	**Vir-ed: Educational VR Application** Led and managed a team of software engineers at Full Sail University to develop an educational virtual reality app teaching users about my PhD research. Communicated with non-experts to simplify complex biochemistry resulting in a gaming experience where users learn how viruses cause infections. The free app is available on the Google play store, search: *Vir-ed*.
Oct. 2016	**Volunteer at ChemFest (National Chemistry Week Celebration)** Carnegie Science Center Demonstrated and carried out basic experiment about Bernoulli's Principle with kids ages 2-14 to raise interest in STEM. Taught scientific principles of experiment to older age group (10-14).
Sep. 2016	**NSF "Vizzies" Visualization Challenge** - Video Submitted Conceptualized and created an animated video highlighting basic concepts in systems biology. Targeted material to high school students to generate interest in the field. Created in a group of two using Blender.

Awards

2019	Engineering Graduate Student Organization (EGSO) Travel Grant ($1,000)
2016	Wellington C. Carl Pittsburgh Foundation Scholarship ($10,000)
2011-2015	Koller-Diez Centennial Scholarship ($160,000)
2013	Clifton Rehabilitative Nursing Center Scholarship ($500)
2011-2015	Durfee Alumni Scholarship ($10,000)
2011	John Pimental Memorial Scholarship ($1,000)
2011	Bausch and Lomb Honorary Science Award
2011	John and Abigail Adams Scholarship ($13,000)
2010	Mildred C. Carrol Book Award
2005	Fall River Dollars for Scholars Scholarship ($150)

Computer Skills

Advanced	MatLab + Simulink, Microsoft Office, R, Julia, LaTeX
Intermediate	Linux (ubuntu), Mathematica, Osirix, Blender, Python
Basic	Solid Works, PTC Creo, LabView, HTML, JavaScript

Updated January 6, 2020