

Caleigh Roleck
Caleigh.Roleck@rice.edu
(224) 217-8396

EDUCATION

- Rice University** Houston, TX Second Year
Doctor of Philosophy Student: Systems, Synthetic, and Physical Biology
Current GPA: 4.0/4.0
- Purdue University** West Lafayette, IN May 2019
Bachelor of Science: Biochemistry Honors, College of Science
Purdue Honors College
Minors: Statistics and Biotechnology
Current GPA: 3.73/4.0

RESEARCH

- Dr. Jeffrey Tabor's Lab** December, 2019—present
Rice University
Develop a genetic toolkit for engineering the plant growth promoting bacteria *Azospirillum brasilense*,
Burkholderia unamae, and *Pseudomonas fluorescens*
Engineer growth promoting bacteria for increased predictability and robustness of plant growth promoting
traits
Assessing ability of engineered bacteria to sense and transcriptionally respond to volatile compounds
- Disruptive Technology Laboratory** May 2019—July 2019
Naval Surface Warfare Center-Carderock
Project advisor: Garry Shields
Role: Naval Research Enterprise Internship Program
Secret Level Security Clearance, Distribution D Project (Department of Defense and Contractors)
Devise a synthetic biology solution to a problem of interest using human centered design framework
Kinetic modeling of reaction systems and flux balance analysis
- Dr. Stanton Gelvin's Lab** January, 2017—May 2019
Purdue University
Study ability of *Agrobacterium tumefaciens* and *Ensifer adherens* to genetically engineer plants through
insertion of T-DNA from plasmid into host genome
Compare susceptibility of different *Arabidopsis* mutants to genetic transformation by *Agrobacterium* and
Ensifer to determine the plant proteins that either assist or defend against either bacterial-mediated
transformation
- Purdue 2017 International Genetically Engineered
Machine (iGEM) Project** March, 2017— November, 2017
Purdue University
Role: Project Director
Project advisors and principal investigators: Drs. Jenna Rickus and Kevin Solomon
Engineer bacteria to degrade and neutralize benzene for both a proposed medical therapy
Devise and implement experimental design for verifying benzene degradation and establishing proof of
concept for the proposed therapy
Design, deliver, and analyze an Institutional Review Board-approved survey on public attitudes towards
genetic engineering applications

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Purdue 2016 International Genetically Engineered Machine (iGEM) Project March, 2016—April, 2017

Purdue University

Role: Intern

Project advisors and principal investigators: Drs. Jenna Rickus and Kevin Solomon

Engineer *E. coli* and create a bioreactor for phosphorus bioremediation

Devise and implement experimental design, including determining procedures for quantifying intracellular polyphosphate concentrations

Science Education Alliance - Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES)

August, 2016 – May, 2017

Purdue University

Principal investigators and course professors: Drs. Kari Clase and Jenna Rickus

Isolating, purifying, and characterizing a novel bacteriophage

Use bioinformatics tools to annotate phage genome and determine putative gene function

Dr. John Anderson's Lab

January, 2016 – December, 2016

Purdue University

Evaluate effects of DNA methylation on chromatin condensation

PRESENTATIONS

2021 Engineering Biology Research Consortium Annual Meeting

April, 2021

Virtual

Engineering gene regulatory parts for plant growth promoting Rhizobacteria

2020 Central US Synthetic Biology Workshop

September, 2020

Virtual

A genetic toolkit for the engineering of plant growth promoting bacteria

2019 Purdue Undergraduate Research Conference

April, 2019

Purdue Memorial Union, West Lafayette

Comparison of Agrobacterium-mediated and Ensifer-mediated genetic transformation of Arabidopsis thaliana

2018 Astronaut Scholarship Foundation Innovator's Gala Technical Conference

August, 2018

JC Marriot, Washington DC

Oral presentation: *Comparison of Agrobacterium-mediated and Ensifer-mediated genetic transformation*

2018 Purdue Plant Science Symposium

August, 2018

Beck Agricultural Center, West Lafayette

Comparison of Agrobacterium-mediated and Ensifer-mediated genetic transformation of Arabidopsis thaliana

2018 Purdue Undergraduate Research Conference

April, 2018

Purdue Memorial Union, West Lafayette

Comparison of Agrobacterium-mediated and Ensifer-mediated genetic transformation of Arabidopsis thaliana

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- 2017 iGEM Giant Jamboree** November, 2017
Hynes Convention Center, Boston
Proof of concept for engineering the human lung microbiome to degrade inhaled carcinogens
- 2017 Posters on the Hill** April, 2017
Rayburn House Office Building, Washington DC
Engineering E. coli for phosphate bioremediation with genes from polyphosphate-accumulating organism Microlunatus phosphovorius
- 2017 Purdue Undergraduate Research Symposium** April, 2017
Purdue Memorial Union, West Lafayette
Genome Annotation of the 24,900 to 33,000 base pair range of the Mycobacteriophage AFIS
- 2016 iGEM Giant Jamboree** October, 2016
Hynes Convention Center, Boston
Engineering E. coli for phosphate bioremediation with genes from polyphosphate-accumulating organism Microlunatus phosphovorius

TEACHING AND MENTORSHIP

Graduate Student Mentor

- Rice University International Genetically Engineered Machine Team February, 2020—present
Advise undergraduates on research project design, goals, execution, and presentation
Inform undergraduates of necessary experimentation, mathematical modeling, and human practices
Teach students biological laboratory work and synthetic biology and human centered design Principles
- Tabor Lab Undergraduate Student Researcher December, 2020—present
Train and mentored one undergraduate student researcher on a mini-project
- Bionetworks Research Experience for Undergraduates June, 2020—July, 2020
Assist undergraduates in developing and evaluating biotechnology research projects
Critique students' proposed experimental design, genetic constructs, and research proposal Presentations

- Engineering Biology Research Consortium Malice Analysis Facilitator** May, 2021
Assist in a US Department of Homeland Security-sponsored workshop on biosecurity
Lead a small-group discussion teaching graduate students and postdoctoral researchers to evaluate potential security concerns in research efforts

Teaching Intern

 January, 2017—May, 2019

- Biology 135: First-Year Biology Laboratory
Professor: Dr. Laurie Item (January 2017-May 2017) and Dr. Nancy Pelaez (August 2017-present)
Supervise biology laboratory classes and provide feedback, grading and guidance to students
Give lectures on topics such as pH, osmolarity, phylogenetic trees, and population genetics
- Roles*
- NSF#1661124 Exploring Biological Evidence Instructor January, 2018—May, 2019
Help students understand the richness and complexity of evidentiary constructs in biology
Examine students' developing understanding of evidence in the context of biology learning
Prompt student understanding of biological concepts with generic evidence scaffolds and discipline-specific evidence scaffolds

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Supervisor August, 2018—December, 2018
Assign responsibilities to other teaching assistants to ensure all duties met
Ensure laboratory sessions remain on track with course curriculum
January 2019 – Introduction of graduate students as supervisors instead of undergraduates

ACTIVITIES and LEADERSHIP

Rice University Systems, Synthetic, and Physical Biology July, 2020—present
Graduate Student Association Board

Roles

Recruitment Chair July, 2020—present
Assist administration with prospective student recruitment, interview weekend planning, and new student orientation activities

Purdue International Genetically Engineered Machine: October, 2015 – May, 2019

Conducts synthetic biology outreach and research
Organize discussions and lectures relevant to synthetic biology

Roles

Alumni Advisor November, 2017—May, 2019

Serve as an advisor and assistant to the current executive board and iGEM Team Director
Advise the current iGEM team on research project design, goals, execution, and presentation
Connect the current iGEM team to opportunities for research collaborations and fundraising

Director of Science November, 2017—November, 2018

Develop and implement a laboratory training program
Develop a curriculum and deliver lectures to introduce new organization members to concepts important for completion of an applied synthetic biology research project

Director of iGEM Team November, 2016—November, 2017

Manage creation of iGEM project and development of project and experimental design
Establish goals for iGEM project and ensure goals are met
Supervise team of interns and delegate responsibilities in relation to iGEM project
Initiate and coordinate project-related outreach programs

Intern February, 2016—November, 2016

Prepare deliverables (poster, presentation, and website) for the iGEM Giant Jamboree competition
Coordinate communication between club members that completed project experimentation and club member that did not complete experimentation but helped with deliverables
Organize and delegate tasks for a project report to be published in the PLOS iGEM Collection

General member October, 2015—February, 2016

Serve on committee organizing synthetic biology outreach projects

Students for Responsible Science and Engineering: September, 2016 – May, 2019

Purdue's chapter of Student Pugwash USA
Plan and host an annual scientific symposium that is free to public about the role of science in society
Organize discussions about social responsibility and ethics in science and technology

Roles

President May, 2018—May, 2019

Plan the annual scientific symposium
2019: "Science in the Media: Understanding Science Communication's Impact"

Oversee execution of organization functions, activities, and events
Provide overall direction for the formation and execution of organization goals

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Treasurer	May, 2017—May, 2018
Establish and maintain financial accounts of chapter and approve expenditures	
Oversee conference fundraising (\$20,000)	
Serve as primary liaison with the Business Office for Student Organizations	
Director of programming	January, 2017—May, 2017
Market annual symposium and organize and market non-symposium related Pugwash events	
Devise new methods for member recruitment and retention	
General member	September, 2016—January, 2017

PUBLISHED WORKS

Clark, J., Emeli, T., Roleck, C., Klein, M., & Pelaez, N. (2018). Organizing and Presenting Data. In N. Pelaez, *Biology 135: Investigating Biological Mechanisms* (2nd ed., pp. A36-A42). Plymouth, MI: Macmillan Learning Curriculum Solutions.

CERTIFICATIONS

Engineering Biology Research Consortium "Malice Analysis : Assessing Your Project
for Security Concerns 2020

AWARDS AND HONORS

SSPB Leadership and Service Award	2021
Best Undergraduate Teaching Intern Honorable Mention	2019
Purdue Department of Biological Sciences	
Purdue Department of Biological Sciences Outstanding Junior	2018
Awarded to one student in the junior class	
Purdue Plant Science Symposium Second Place Poster	2018
Astronaut Scholarship	2017, 2018
Undergraduates who show creativity and initiative in natural and applied sciences	
Class of 1952 Academic Success Scholarship	2017, 2018
Purdue Undergraduate Research Symposium, Second Place Poster	2017
College of Engineering Division	
William H. Phillips Scholarship	2017
Biology Undergraduate Scholarship	2016, 2017
Purdue College of Science Continuing Student Scholarship	2016
Trustees Scholar, Purdue University	2015