

Efraín Rodríguez-Ocasio

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Profile

First year graduate student with almost three years of research experience in academic settings and over a year of experience in industry at two Fortune 500 Companies via internship and undergraduate research programs. Possesses diverse leadership, community involvement and institutional service background, as well as ample written and oral communication experience for technical and non-technical audiences.

Education

Iowa State University of Science and Technology

Chemical and Biological Engineering
PhD Student 2019-Present

University of Puerto Rico at Mayagüez

Major: Industrial Biotechnology
Minor: Project Management
Bachelor of Science (2019)

Awards & Certificates

- 2019 **Resolution of Gratitude for Service** - Governing Board of the University of Puerto Rico (Cert. 172 2018-29)
- 2015 **Gibco Tissue Culture Certification** – Thermo Fisher Scientific
- 2015 **Industrial Biotechnology Role Model Award** - Industrial Biotechnology Program
- 2015 **Most Innovative Award** – P&G Summer Research Symposium
- 2010 **Eagle Scout** – Boy Scouts of America

Research

Summary: 34 nonconsecutive months of academic research experience accumulated under four different PIs at three NSF research centers and my university.

Summer 2018

Microbial Metabolic Engineering Intern

NSF Engineering Research Center for Biorenewable Chemicals (CBiRC), Dr. Laura R. Jaboe's Laboratory, Iowa State University

- Reverse engineered a short-chain fatty acid tolerant *E. coli* strain product of adaptive laboratory evolution for applications in the rational engineering of organisms to efficiently produce biorenewable chemicals.
- Performed gene-knockouts via the CRISPR-Cas9 System to study the role of individual genes in phenotype characteristics of the new strain.

- Conducted tolerance tests to determine the scope of tolerance conferred by mutation found on the *rpoC* gene which encodes for the RNA polymerase β' subunit.

Feb-May 2018 **Polymeric Biomaterials Research Assistant**

NSF Engineering Research Center for Cell Manufacturing Technologies (CMA^T), Dr. Jorge Almodóvar's Laboratory, University of Puerto Rico at Mayagüez

- Collaborated in the development of polymeric biomaterials for applications in tissue regeneration and cell manufacturing.
- Studied the Layer-by-Layer assembly of polymers under varying pH conditions for future characterization of interactions between biomaterials and Human Mesenchymal Stem Cells in terms of quality, variability and differentiation.

Summer 2017 **BioXFEL Intern**

BioXFEL NSF Science and Technology Center, Dr. Edward Snell's Laboratory, Hauptman-Woodward Medical Research Institute

- Studied the activation and regulation of a cytokine paradoxically involved in both tumor suppression and formation.
- Established an optimized mammalian expression system necessary for the development of a bioassay.
- Selected to represent the BioXFEL Program and be one of eight student presenters at the Buffalo Summer Research Day.

Jan 2013 **Biophysics Research Assistant**

-May 2015 Dr. López-Garriga's Laboratory, University of Puerto Rico at Mayagüez

- Studied protein-protein interactions and their association/dissociation profiles with Hydrogen sulfide to elucidate the transport mechanisms of the gas in the *Lucina pectinate*/Bacteria symbiotic model system.
- Employed UV-VIS spectroscopy and kinetic studies to elaborate a hypothesis for the role of a cysteine-rich protein with unknown structure and function.
- Conducted hanging-drop and capillary counter diffusion experiments to screen for the crystallization conditions of the cysteine-rich protein and identified four conditions for the optimization phase.

Industry

Summary: Sixteen non-consecutive months of experience at three different challenging industry research centers and one API manufacturing site. Led multiple independent projects with vast written and oral communication to technical and non-technical audiences.

- 2018-Present **Technical Services and Manufacturing Sciences COOP Student**
PR05 Biotechnology Plant, Eli Lilly & Company
- Leading a process development research project and employing HPLC and UPL to study the stability of a protein therapeutic.
- Summer 2016 **Synthetic Biology Intern (exceeded expectations)**
Materials Science and Technology Department, R&D, P&G
- Addressed human safety concerns for novel process with significant business impact by performing enzyme immobilization and leachability studies.
 - Presented technical recommendations and successful communication of business impact to high-level management enabled continuation of the project.
 - Employed relevant techniques: ELISA, bacterial transformation, over-expression and protein purification
- Summer 2015 **Synthetic Biology Intern (exceeded expectations)**
Materials Science and Technology Department, R&D, P&G
- Applied molecular biology and enzymology techniques to investigate the viability of employing enzyme on a Billion-Dollar product.
 - Established expression, purification and characterization protocols for a class of enzymes with the potential to generate multimillion-dollar profits.
 - Identified additional applications for the project and effectively communicated the proposal to stakeholders, enabling new research opportunities.
 - Employed relevant techniques: Enzyme Kinetics, bacterial transformation, overexpression, protein purification, SDS-PAGE.
- Summer 2014 **Products Research Intern (exceeded expectations)**
Paper Sector, R&D, P&G
- Contributed to a new belt of technology through strategy development for upstream pipeline of a \$2 Billion Brand.
 - Developed models for functional and emotional benefit perceptions and contributed to the organization's strategic plan.
 - Insights and models were shared and adopted across brands and business units, generating \$50K+ in recurring cost savings.
- Summer 2014 **Product Development Intern (exceeded expectations)**
Paper Sector, R&D, P&G
- Identified the root cause of technical problem in a manufacturing process and established a collaboration network with six technical centers to allocate the proper resources and equipment to offer a solution.

- Developed an analytical test for quality assurance and created the standard operating procedure for operators.

Presentations *Summary: Four oral presentations and six poster presentations at academic conferences and other symposia.*

Oral **Rodríguez-Ocasio, E.,** Stachowski, T., Snell, E.H. “BioAssay Development for the Chemoactivation of Transforming Growth Factor $\beta 1$.” Oral Research Presentation at the UB Summer Research Day, Buffalo, NY, August 4, 2017. *Estimated Audience: ~100 people*

Rodríguez-Ocasio, E., Stachowski, T., Snell, E.H. “BioAssay Development for the Chemoactivation of Transforming Growth Factor $\beta 1$.” Oral Research Presentation at the Hauptman-Woodward Medical Research Institute Summer Research Day, Buffalo, NY, August 4, 2017. *Estimated Audience: ~15 people*

Rodríguez-Ocasio, E., Rodríguez-Pérez, J., López-Garriga, L. “Role of an unnamed protein rich in cysteine from the clam *Lucina pectinata*.” Oral Research Presentation at the ACS 49th Junior Technical Meeting, Cayey, PR, March 29, 2014. *Estimated Audience: ~30 people*

Poster **Rodríguez-Ocasio, E.,** Chen, Y., Jarboe, L.R. “Reverse engineering of short-chain fatty acid-tolerant *E. coli* strain identifies *rpoC* mutation conferring increased tolerance to other inhibitors.” Poster presented at the ISU Summer Undergraduate Research Symposium, Ames, IA, August 2, 2018.

Rodríguez-Ocasio, E., Stachowski, T., Snell, E.H. “BioAssay Development for the Chemoactivation of Transforming Growth Factor $\beta 1$.” Poster presented at the UB Summer Research Day, Buffalo, NY, August 4, 2017.

Rodríguez-Ocasio, E. “Enzyme Immobilization: The Path to A New Technology Platform.” Poster presented at the Mason Business Center Summer Symposium, Mason, OH, August 10, 2016.

Rodríguez-Ocasio, E. “Prototyping Enzymatic Release of Hydrogen Peroxide for XXXX.” Poster presented at the Mason Business Center Summer Symposium, Mason, OH, August 11, 2015.

Rodríguez-Ocasio, E., Rodríguez-Pérez, J., López-Garriga, L. “Searching for the Function of a Cysteine-Rich Protein in the *Lucina Pectinata*/Bacteria Symbiosis.” Poster presented at the Sigma Xi Poster Day, Mayagüez, PR, April 23, 2015.

Rodríguez-Ocasio, E., Rodríguez-Pérez, J., López-Garriga, L. “Anticoagulation Role of the Cysteine-rich Protein in *L. pectinata*.” Poster presented at the 7th NEA Science Day, Mayagüez, PR, February 13, 2014.

Leadership & Community *Summary: Two selected initiatives with high impact on community and the environment.*

Sept 2014
-Aug 2015

“Reforestación Colegial” Initiative

Founder and President

Created an umbrella organization for student-led green initiatives with the goal of educating about environmental protection and mobilizing students for reforestation events. Over 500 students from 50 student organizations participated in the first event, and 800 endemic species of trees were planted in less than four hours. The organization was recognized by Dr. Jane Goodall during her visit to Puerto Rico.

Aug 2013
-May 2014

Institute for Community Development

Group Leader

Volunteered as group leader of a community development project of *La Esperanza Community*. Identified needs and risks and collaborated with community leaders to empower the citizens mediated in dispute with a non-profit organization.

Institutional Service

Summary: My leadership experience propelled me into elected student representation positions. I began as President of the Arts & Sciences Student Government and escalated until the highest position as a member of the Governing Board of the University of Puerto Rico.

July 2017
-present

Governing Board of the University of Puerto Rico:

Member of the Board

Elected for two consecutive terms to represent the 60K+ students of the eleven campuses of the University of Puerto Rico, full member of the board, member of several committees, fiduciary responsibility for the \$1.3B operations of the university system amidst budget cuts of approximately 50% which were imposed by a Congressional Fiscal Management and Oversight Board.

President, Student Affairs Committee

- Chair of the committee tasked with oversight of student affairs, such as financial aid, Title IX, Student Handbook and others.

Board of Directors, UPRM Housing Facilities, Inc.

- Designated by the UPR Governing Board to the Board of Directors of the subsidiary corporation in charge of \$15M+ student housing development project.
- Unanimously elected Treasurer of the Board by its members, including the UPRM chancellor the Vice-President of the University.

Board of Directors, Viride Innovation Technologies, Inc.

- Designated by the UPR Governing Board to the Board of Directors of the subsidiary corporation in charge of commercialization of a 40% more efficient electric pole developed by faculty and students of the University.

Governing Board Committees

- Special Research Funding Committee
- Academic, Research and Innovation Affairs Committee
- Infrastructure and Technology Committee
- Development Committee

July 2016
-July 2017

President's Advisory Board, University of Puerto Rico:

Student Representative

Elected to represent the 13K+ students of the Mayaguez Campus (UPRM) in the University Board, an advisory board to the President of the University. The Board is composed by the chancellor, one student and one faculty member from each campus. During my tenure, a student strike paralyzed ten out of eleven college campuses of the university system for three months, and I was responsible for mediating the communication between the administration and the students.

Vice Chair, Budget Committee

- The committee is tasked with recommending an annual budget for the university system and implementing budget cuts of nearly \$200M.

Ex-officio member, UPRM Academic Senate UPRM

- Voting member of the Mayaguez Campus' Academic Senate, ultimate forum for all academic decisions and the deliberative body for all campus affairs.

Ex-officio member, UPRM General Student Council

- Composed by representatives from all the Colleges of the Mayaguez Campus and keynote speaker of five student assemblies with audiences of 2,000-6,000 people.

University Board Committees

- Bylaws Committee
- Institutional Committee of Strategic Planning

National Student Confederation (NCS)

- Representative from Mayaguez to the confederation, composed of student representatives from all UPR campuses and other public higher education institutions.

July 2015
-July2016

Student Government, College of Arts & Sciences

President

Elected to preside the representative body of the 5,000+ students from the largest College in the UPR System. The implemented work plan promoted undergraduate research and creative labor, entrepreneurship and professional development.

Delegate to the UPRM General Student Council

- Delegate from the College of Arts and Sciences to the General Student Council, secretary of the Bylaws Committee.

National Student Confederation (NCS)

- Elected to represent the Mayaguez Campus in the NCS

Teaching & Mentorship

Summary: Mentor to 15 high school science fair participants and four high-level student representatives in the UPR. Instructor to 27 high school teachers in two protein crystallization seminars, and evaluator in two crystallization competitions.

Science Outreach

2012, 2014

Protein Crystallization Instructor – Science on Wheels High School Teachers Training Program

2012, 2014

Evaluator – National Crystallization Competition, Mayagüez

2013

Regional Science Fair Judge – Puerto Rico Department of Education

2012

District Science Fair Judge – Puerto Rico Department of Education

2012, 2013

Mentor – CROEM High School Science Fair Students

Student

Representatives

- 2018-present **Mentor** – Wilfredo Madera-Torres, UPRM Administrative Board
2018-present **Mentor** – Julia Calderón, Eng. Student Government President
2017-2018 **Mentor** – Angelica Orsini-Rivas, Student Senator
2016-2017 **Mentor** – Kevin Gonzalez, A&S Student Government President

Professional Development *Summary: Three conferences, and seven workshops and seminars*

Conferences

- 2018 **National Conference on Trusteeship** – Association of Governing Boards, San Francisco, CA, April 22-24
- 2015 **The National Conference on Student Leadership** – Magna Publications, Washington, DC, November 18-22
- 2014 **34th Puerto Rico Interdisciplinary Scientific Meeting** – PR-LSAMP, Cayey, PR, March 29

Workshops

- 2017 **Advances in Tropical Microbial Ecology Workshop** – UPRM Biology Department, April 9-12
- 2016 **Remote Access Data Collection: Automation and Robotics at the SSRL Protein Crystallography Beam Lines Workshop** – Stanford Synchrotron Radiation Lightsource, January 19
- 2015 **Tissue microenvironmental engineering: build a blood vessel lumen in microfluidics Workshop** – UPRM Industrial Biotechnology Program, May 1-3
- 2015 **Cell Culture and Cytotoxicity Workshop** – UPRM Industrial Biotechnology Program, March 20-22
- 2014 **Amgen Biotechnology Lecture Series** – Amgen
- 2013 **Biological Interactions on Material Surfaces Workshop** – UPRM Industrial Biotechnology Program, April 26-28
- 2013 **Mycology Seminar** – Howard Hughes Medical Institute, April 15-16
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