Emily E. Ackerman, Ph.D.

Gilliam Fellow, *James H. Gilliam Fellowships for Advanced Study, HHMI*
Honorable Mention, *NSF Graduate Research Fellowship*
Board of Directors, *Future of Research*

Chemical Engineering Ph.D. looking toward a future professorship with special interest in the advancement of underrepresented groups

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Education

August 2021	Doctor of Philosophy in Chemical Engineering **University of Pittsburgh**, Pittsburgh, PA | Advisor: Dr. Jason Shoemaker
May 2015	Bachelor of Science in Chemical Engineering **Rensselaer Polytechnic Institute**, Troy, NY

Research Experience

Aug 2021-Current — Department of Systems Biology
Harvard Medical School | Dr. Galit Lahav | *Postdoctoral Research*
Developed analytic pipeline to investigate common characteristics in the dynamics of p53 protein in cells of varying phenotypes.

Jan 2016-Aug 2021 — Department of Chemical and Petroleum Engineering
University of Pittsburgh | Dr. Jason Shoemaker | *Doctoral Research*
Identified host factors of influenza infection using virus-host protein network topology and controllability analyses. Evaluated network methods against high throughput biological screening methods.

Trained a novel ODE model of the host immune response to capture strain-specific influenza infection pathology. Developed software to perform shared parameter fitting on multiple data sets using Markov Chain Monte Carlo and genetic algorithms *(in progress)*. Reviewed current intrahost immune response models for viral titers' sensitivity to several immune components as well as their ability to capture the effects of interferon pre-treatment.

Prioritized drug repositioning candidates for SARS-CoV-2 infection using network controllability methods. Participated in the international COVID-19 Disease Map effort to coalesce known molecular mechanisms of COVID-19.

May 2013-May 2015 — Undergraduate Research Program
Rensselaer Polytechnic Institute | Dr. Curt Breneman | *Undergraduate Research*
Identified potential microbicide ligands to inhibit HIV GP120-CD4 binding. Used high-throughput screening methods to assemble a library of drug-like leads. Developed novel super-flexible docking/scoring method with binding site comparison in Autodock Vina and MOE. Assisted small team in writing an R21 NIH grant proposal.

Teaching Experience

Fall 2016-2018 — Teaching Assistant at the **University of Pittsburgh**
Systems Engineering 1: Dynamics and Modeling | Dr. Jason Shoemaker
Prepared and taught recitation for senior undergraduates twice a week, including new concepts and practice problems. Planned and taught guided simulations in MATLAB and Simulink. Provided extra examples after skill assessments to explain challenging material. Held office hours each week to provide individual support to student learning.

Industry Experience

Jun 2015-Aug 2015 | Intern at **Albany Molecular Research Inc.**
Computer-Aided Drug Discovery
Worked on a team of professionals towards the development of in-house docking/scoring methods for protein interactions. Optimized and automated all methods for department-wide use. Verbally presented results with all non-computational departments and management teams at end of term.

Cross-Academia Diversity and Equity Experience

Dec 2021-*Current* | Disability Advisor for the **Department of Systems Biology** at **Harvard Medical School**
Provided guidance to department leadership on accessibility of physical space, websites, etc.

Aug 2020-*Current* | Board of Directors of **Future of Research**
Co-led the Labor Task Force for the investigation of graduate student and post doc labor issues. Conceived and carried out large scale survey of workplace conditions for academic early career researchers *(in progress)*. Worked with Board of Directors and Executive Board to empower junior researchers through equitable, grassroots action.

Jan 2020-*Current* | Co-founder, executive board of the **Transforming Academic Ecosystems (TAE) Consortium**
Established peer efforts to address the mental health needs of graduate students from underrepresented groups. Held weekly meetings to guide and act on initiatives. Created and maintained website and social media. Attended monthly meetings with Howard Hughes Medical Institute administrators to set up mental health sessions at 2020 annual Gilliam Fellowship meeting.

Sept 2018-Dec 2018 | Model Client for the **Research Experience for Teachers Program (RET)**
Human Engineering Research Laboratories, University of Pittsburgh
Attended weekly meetings with 5 area STEM teachers to serve as a model client throughout the design and prototyping of an automated grabber tool. Educated teachers about how to interact with disabled clients during the design process and how engineering can impact disabled lives.

Publications

Submitted | *Ackerman E., Weaver J., & Shoemaker J. (2021)* "Disparate Interferon Production Rate Drives Strain-Specific Immunodynamics of Influenza A Virus". *MDPI Viruses*

Published | *Bennett C., Ackerman E., Carrington P., & Fox S. (2020)* "Accessibility and The Crowded Sidewalk: Micromobility's Impact on Public Space". *Proceedings, 2021 ACM Designing Interactive Systems (DIS) conference*

Published | *Ackerman E., & Shoemaker J. (2020)* "Network Controllability-Based Prioritization of Candidates for SARS-CoV-2 Drug Repositioning". *MDPI Viruses*

Published | *Ackerman E., Mochan E., & Shoemaker J. (2019)* "Strain-Specific Immune Response to Influenza Virus Infection". *Part of special issue: 8th Conference on Foundations of Systems Biology in Engineering FOSBE 2019*

Published | *Ackerman E., Alcorn J., Hase T., & Shoemaker J. (2019)* "A Dual Controllability Analysis of Influenza Virus-Host Protein-Protein Interaction Networks for Antiviral Drug Target Discovery". *BMC Bioinformatics*

Publications Cont.

Published	*Ackerman E., Kawakami E., Katoh M., Watanabe, Watanabe T., Tomita Y., Lopes T., Matsuoka Y., Kitano H., Shoemaker J. & Kawaoka Y. (2018)* "Network-Guided Discovery of Influenza Virus Replication Host Factors". *mBio*
Published	*Ackerman E., Mochan E., & Shoemaker J. (2018)* "A systems and treatment perspective of models of influenza virus-induced host responses". *MDPI Processes*

Activist Writings, Talks, and Podcasts

Aug 2021	*Ward A., Ackerman E.,* "Systems Biology (MEDICAL MATHEMATICS) with Emily E. Ackerman". *Ologies*
Mar 2021	*Ackerman E.,* "Redefining Accessibility in Design with Disabilities Advocate Emily Ackerman". *Girlboss Radio*
Mar 2021	*Ackerman E.,* "My Year of Nothing but Everything: Living in Pennsylvania During COVID-19". *Disability Visibility Project*
Dec 2020	*Wong A., Ackerman E.,* "Disabled Engineers". *Disability Visibility Project Podcast*
Apr 2020	*Ackerman E.,* "The Accessibility Gap for Tech Users and Developers". *CMU Accessibility Group*
Nov 2019	*Ackerman E.,* "My Fight With a Sidewalk Robot". *Bloomberg CityLab*

Honors and Awards

Apr 2021	Outstanding Research Assistant at the **University of Pittsburgh** *Awarded by the Engineering Graduate Student Organization*
Feb 2021	Dr. James Coull Memorial Fellowship Award for the **Department of Chemical Engineering, University of Pittsburgh** *Awarded annually to one senior Ph.D. student*
Dec 2019	Outstanding Ph.D. Paper, Summer 2019 for the **Department of Chemical Engineering, University of Pittsburgh** *"A Dual Controllability Analysis of Influenza Virus-Host Protein-Protein Interaction Networks for Antiviral Drug Target Discovery"*
Feb 2019	Chemical Engineering Department Research Day at the **University of Pittsburgh** *OXE Research Award, Best Oral Presentation* *"Network Methods for Identifying Regulators of Influenza A Virus"*
Sept 2018	James H. Gilliam Fellowships for Advanced Study program at the **Howard Hughes Medical Institute** *Gilliam Fellow*

Honors and Awards Cont.

Mar 2017 | NSF Graduate Research Fellowship
Honorable Mention

Mar 2017 | McGowan Institute for Regenerative Medicine (MIRM)
Best poster, Computation and Modeling: Third place
"Controllability Analysis of Protein-Protein Interaction Networks for Anti-Viral Drug Development"

Competition and Innovation Experience

Scientific Literature Mining: Created data mining tool for application to COVID-19 scientific literature database. Collaborated as scientific consultant for Neubig Group, a natural language processing team at CMU.

Apr 2020 | COVID-19 Open Research Dataset Challenge (CORD-19) - Round 1
AI2, CZI, MSR, Georgetown, NIH & The White House

EXGBuds: Wearable over the ear EEG device for controlling technology using eye movement. Designed and marketed with interdisciplinary team of engineers.

Jun 2017 | ABB Robotics IdeaHub - Semi-final round
How can a prototype enhance the way robots interact with humans?
ABB Robotics, Venture:Bright
Delivered project idea in semi-final interview with investors (Top 20 shortlisted teams out of hundreds of applicants). Prepared to pitch in final round in October, 2017.

Apr 2017 | Kuzneski Innovation Cup Competition - Final round
What innovations can impact people's lives in areas other than healthcare?
University of Pittsburgh, Innovation Institute
Prepared to pitch product in final Innovation Showcase in October, 2017 for prize of $15,000.

Apr 2017-Sep 2017 | Pitt Innovation Challenge (PINCH) - First and second rounds completed
How can we use wearable technology to address an important health problem?
University of Pittsburgh, Clinical and Translational Science Institute, Innovation Institute
Created introductory video to communicate technology visually. Wrote project proposal including scale up and budget projections for possible prize of $100,000.

Systems Biology Video: 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.

Sep 2016 | Vizzies Visualization Challenge - Submitted
National Science Foundation

Student Involvement

Aug 2017-*Current*
Organizer with Pitt Graduate Student Organizing Committee
University of Pittsburgh
Led unionization efforts in school of engineering through extensive communication with peers. Organized with students across the university to understand the needs of Pitt's graduate workers. Planned STEM-wide and university-wide events.

Jan 2017-May 2020
President of Graduate Women Engineering Network
University of Pittsburgh
Prepared workshops on skills and topics which benefit members such as pay negotiation, navigating impostor syndrome, and Title IX panels. Organized social events and peer mentoring groups for women in STEM to network. Planned and lead general body meetings and executive board meetings. Worked with administration to coordinate events.

Nov 2018
GWEN Representative for Women Students' Networking Conference
University of Pittsburgh
Worked with administrators, faculty, and student organizations from the Swanson School of Engineering to plan a half-day conference for undergraduate students. Presented GWEN mission to students and industry representatives.

Feb 2018
Co-planner for Women in STEM Conference
University of Pittsburgh
Arranged a full day of sessions for graduate women covering technical writing, succeeding in any career, time management, and more. Organized and judged undergraduate and graduate poster competitions. Planned in parallel with SWE undergraduates and graduate students.

Jan 2016-Jan 2017
Social Media Coordinator of Graduate Women Engineering Network
University of Pittsburgh
Responsible for all communication between executive board and general members. Planned social events for women in STEM to network. Attended executive board meetings.

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).

Oct 2016
Organizer for Disability in Academic Settings Workshop
University of Pittsburgh
Worked with another disabled student and the Office of Diversity to plan activities for engineers to better understand the effect of disabilities (OCD, dyslexia, wheelchair use) on academic experience. Conducted research on disabled experiences in academia. Created handout about assistive technology based on personal experience to stimulate innovation among engineers.

Patents

Pending
Wang K., Thakur P., Ackerman E. & Apostolides J. "Control system and method by using combination of eye, facial and hand gesture physiological information measurement" Provisional U.S. Patent Application No. 62530374, July 10, 2017.

Presentations

Nov 2021 Invited Talk	"Controls Engineering Approaches to Regulating Immunity During Respiratory Infection" *U-RISE Seminar Speaker* **University of Maryland, Baltimore County**
Oct 2021 Talk	"Interferon Production Rate is a Major Contributor to Differential Strain-Specific Immunodynamics" *5th Workshop on Virus Dynamics,* **Fred Hutchinson Cancer Research Center**
Sept 2020 Talk	"The Disability and Tech Accessibility Cycle" *Pitt Grad Student Organizing Committee, STEM and Society Lecture Series,* **University of Pittsburgh**
Jul 2020 Talk	"Identifying Regulators of Infection in Virus-Host Networks" *International Conference on Intelligent Systems for Molecular Biology, ISMB,* **Virtual**
Apr 2020 Talk	"The Accessibility Gap for Tech Users and Developers" *Carnegie Mellon University, Accessibility Group,* **Pittsburgh, PA**
May 2019 Poster	"Network Methods for Identifying Regulators of Influenza A Virus Infection *International Conference on Research in Computational Molecular Biology, RECOMB,* **George Washington University**
Feb 2019 Talk	"Network Methods for Identifying Regulators of Influenza A Virus Infection *Chemical Engineering Department Research Day,* **Pittsburgh, PA**
Oct 2018 Invited Talk	"Controllability of the Influenza Virus-Host Protein-Protein Interaction Network: Engineering Insights into Host-Virus Interactions *American Institute of Chemical Engineers, Annual Meeting,* **Pittsburgh, PA** *Area Plenary: Future Directions in Applied Mathematics and Numerical Analysis*
Jun 2017 Poster	"Controllability Analysis of Protein-Protein Interaction Networks for Anti-Viral Drug Development" *American Society of Virology Meeting,* **University of Wisconsin, Madison**
Mar 2017 Poster	"Controllability Analysis of Protein-Protein Interaction Networks for Anti-Viral Drug Development" *McGowan Institute for Regenerative Medicine,* **University of Pittsburgh**
Apr 2014 Poster	"Determination of GP120 binding site to CD4 and CD4 Mutations" *Undergraduate Research Symposium,* **Rensselaer Polytechnic Institute**

Computer Skills

Advanced Knowledge:	R, Python, Matlab, Simulink, Excel, Word, PowerPoint, Blender, Git, Bash, Mac OS, Linux (ubuntu), LaTeX
Intermediate Knowledge:	html, MOE, AutoDock, AutoDock Vina, Pymol, Aspen Plus
Basic Knowledge:	Perl, comsol

Languages

First Language:	English
Basic Knowledge:	Spanish, Portuguese