ARJUN PATEL

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EDUCATION

University of California, San Diego, La Jolla, CA November 2025
Doctor of Philosophy in Bioengineering
GPA: 3.833

Georgia Institute of Technology, Atlanta, GA, May 2019
Bachelor of Science in Biomedical Engineering, minor in Engineering and Business
GPA: 4.0

PUBLISHED PAPERS

Rychel, Kevin; Chen, Ke; Catoiu, Edward A; Olson, Connor A; Sandberg, Troy E; Gao, Ye; Xu, Sibei; Hefner, Ying; Szubin, Richard; **Patel, Arjun**; Feist, Adam M; Palsson, Bernhard O (2024). *Laboratory evolution reveals transcriptional mechanisms underlying thermal adaptation of Escherichia coli.* **Genome Biol Evol**, 2025 Sep 30;17(10):evaf171.

Kundu, Biki Bapi; Krishnan, Jayanth; Szubin, Richard; **Patel, Arjun**; Palsson, Bernhard O; Zielinski, Daniel C; Ajo-Franklin, Caroline M (2025). *Extracellular respiration is a latent energy metabolism in Escherichia coli.* **Cell**, 188(11), 2907–2924.e23.

Catoiu, Edward A; Krishnan, Jayanth; Li, Gaoyuan; Lou, Xuwen A; Rychel, Kevin; Yuan, Yuan; Bajpe, Heera; **Patel, Arjun**; Choe, Donghui; Shin, Jongoh; Burrows, Joshua; Phaneuf, Patrick V; Zielinski, Daniel C; Palsson, Bernhard O (2025). *iModulonDB 2.0: dynamic tools to facilitate knowledge-mining and user-enabled analyses of curated transcriptomic datasets.* **Nucleic Acids Research**, 53(D1), D99–D106.

Patel, Arjun; Banwani, Neha; Mink, Raegan; Prabhakaran, Divya M; Khairnar, Snehal V; Feist, Adam M; Palsson, Bernhard O; Anand, Amitesh (2025). *Aerobicity stimulon in Escherichia coli revealed using multi-scale computational systems biology of adapted respiratory variants.* **bioRxiv**, 2025.03.13.642450.

Beulig, Felix; Bafna-Rührer, Jonas; Jensen, Peter E; Kim, SH; **Patel, Arjun**; Kandasamy, Vijayalakshmi; Steffen, CS; Decker, Katherine; Zielinski, DC; Yang, Laurence; Ozdemir, Emre; Sudarsan, Suresh; Palsson, Bernhard O (2025). *Trade-off between resistance and persistence in high cell density Escherichia coli cultures.* **mSystems**, 10(7), e0032325.

Patel, Arjun; McGrosso, Dominic; Hefner, Ying; Campeau, Anaamika; Sastry, Anand V; Maurya, Svetlana; Rychel, Kevin; Gonzalez, David J; Palsson, Bernhard O (2024). *Proteome allocation is linked to transcriptional regulation through a modularized transcriptome.* **Nature Communications**, 15(1), 5234.

Dalldorf, Christopher; Rychel, Kevin; Szubin, Richard; Hefner, Ying; **Patel, Arjun**; Zielinski, Daniel C; Palsson, Bernhard O (2024). *The hallmarks of a tradeoff in transcriptomes that balances stress and growth functions.* **mSystems**, 9(7), e00305-24.

Rychel, Kevin; Tan, Justin; **Patel, Arjun**; Lamoureux, Cameron; Hefner, Ying; Szubin, Richard; Johnsen, Josefin; Mohamed, Elsayed Tharwat Tolba; Phaneuf, Patrick V; Anand, Amitesh; Olson, Connor A; Park, Joon Ho; Sastry, Anand V; Yang, Laurence; Feist, Adam M; Palsson, Bernhard O (2023). *Laboratory evolution, transcriptomics, and modeling reveal mechanisms of paraquat tolerance.* **Cell Reports**, 42(9):113105.

Goel, Nikita; Srivastav, Stuti; **Patel, Arjun**; Shirsath, Akshay; Panda, Tushar Ranjan; Patra, Malay; Feist, Adam M; Anand, Amitesh (2023). *TCA cycle tailoring facilitates optimal growth of proton-pumping NADH dehydrogenase-dependent Escherichia coli.* **Microbiology Spectrum**, 11(6), e02225-23.

Anand, Amitesh; **Patel, Arjun**; Chen, Ke; Olson, Connor A; Phaneuf, Patrick V; Lamoureux, Cameron; Hefner, Ying; Szubin, Richard; Feist, Adam M; Palsson, Bernhard O (2022). *Laboratory evolution of synthetic electron transport system variants reveals a larger metabolic respiratory system and its plasticity.* **Nature Communications**, 13(1), 3682.

Anand, Amitesh; Olson, Connor A; Sastry, Anand V; **Patel, Arjun**; Szubin, Richard; Yang, Laurence; Feist, Adam M; Palsson, Bernhard O (2021). *Restoration of fitness lost due to dysregulation of the pyruvate dehydrogenase complex is triggered by ribosomal binding site modifications.* **Cell Reports**, 35(1), 108961.

Zielinski, Daniel Craig; **Patel, Arjun**; Palsson, Bernhard O (2020). *The expanding computational toolbox for engineering microbial phenotypes at the genome scale.* **Microorganisms**, 8(12), 2050.

Imbach, Kathleen; **Patel, Arjun**; Levine, Aaron D (2018). *Ethical considerations in the translation of CAR-T cell therapies.* **Immuno-oncology Insights**.

PUBLISHED PATENTS

Patel, A., 2017. Solid Particulate Measuring Devices, Systems and Methods. WO2018045287

CONFERENCES

9th Conference on Constraint-Based Reconstruction and Analysis 2024, San Diego, California

- Hosted and organized a pre-conference workshop on COBRA methods and software developments to facilitate community discussion and accelerate codebase improvements.
- Presented progress and provided a status update on the COBRAme Web Application.

Denmark Technical University Biosustain Annual Seminar 2023, Copenhagen, Denmark

- Presented a poster on the paper, "*Proteome allocation is linked to transcriptional regulation through a modularized transcriptome.* **Nature Communications**, 15(1), 5234."

Denmark Technical University Biosustain Annual Seminar 2021, Copenhagen, Denmark

- Hosted an iModulon workshop to teach the basics of independent component analysis and applications/use cases of iModulons in various organisms.

INVITED TALKS AND GUEST LECTURES

Tata Institute of Fundamental Research, Mumbai, India (Remote) January 16, 2025

- Delivered a lecture on systems biology and genome-scale metabolic and expression modeling applications to undergraduate students, highlighting approaches for integrating multi-omic data with computational models.

SELECTED AWARDS, HONORS, and SCHOLARSHIPS

Nell and Spencer Waggnor Scholarship, Winston-Salem Foundation, awarded May 2015

Faculty Honors, Georgia Institute of Technology, awarded Fall 2015, Spring 2016, Fall 2016, Fall 2017, Spring 2018, Fall 2018

Dean's List, Georgia Institute of Technology, awarded Fall 2015, Spring 2016, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018 (all semesters)

Omicron Delta Kappa Freshmen Leadership Award, Georgia Institute of Technology, awarded Spring 2016

Outstanding Student Evaluations Teaching Assistant Award, Math Department at the Georgia Institute of Technology, awarded Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018

- Awarded to Teaching Assistants who received a 4.9/5.0 or higher with 90% or more feedback on end of year course evaluations.

Alpha Eta Mu Beta Biomedical Engineering Honor Society, Georgia Institute of Technology, awarded Spring 2017

Georgia Tech Honor's Program, Georgia Institute of Technology, awarded Fall 2015

RESEARCH EXPERIENCE

Graduate Research Student, Professor Bernhard Palsson's Systems Biology Research Group, University of California, San Diego, September 2019 – Present

- Work with machine learning techniques on large-scale multi-omics datasets to elucidate and compare underlying regulatory networks.
- Conduct research in systems biology by integrating multi-omics data, unsupervised machine learning (ICA), and genome-scale metabolism and expression models to study proteome allocation and stress responses in E. coli.
- Develop a web-based platform to make modeling and analysis tools accessible to the broader scientific community.
- Collaborate with external research groups to implement constraint-based modeling approaches and integrate experimental data with ME-models, accelerating diverse systems biology projects.

Undergrad Research Assistant, Professor Denis Tsygankov's Integrative Systems Biology Lab, Georgia Institute of Technology, August 2017 – August 2019

- Developed an algorithm through MATLAB to accurately create a Voronoi graph from a cell cluster image.
- Analyzed the validity of lines and polygons as seeds for Voronoi Graphs in the context of biological cells.
- Created a MATLAB GUI that easily allows a user to upload a cell cluster image and get the resulting Voronoi Graphs.

Undergrad Research Assistant, Biotech/Public Policy with Professor Aaron Levine, Georgia Institute of Technology, May 2017 – August 2017

- Explored ethical and policy challenges related to the translation of Chimeric Antigen Receptor (CAR) T Cell Therapies.
- Collected and synthesized documents related to the field and major companies involved.
- Co-First Authored a paper on the work completed.

WORK EXPERIENCE

Innovations Intern, Center for Technology Innovation and Commercialization, Wake Forest University, May 2016 – August 2016

- Guided faculty and staff in moving their innovations to the marketplace.
- Structured provisional patent applications for inventions to be protected and licensed to interested companies.
- Engineered and created a novel drug delivery device patented by WIPO (WO2018045287).

PROJECTS

Gradey Memorial Hospital Design Project, Georgia Institute of Technology, August 2018 – May 2019

- Partnered with Grady Memorial Hospital to redesign overbed tables for hospital beds, addressing usability, safety, and durability challenges.
- Conducted 100+ patient and stakeholder interviews to gather requirements and ensure patient-centered design.
- Led the full design and prototyping cycle, from ideation and CAD modeling through prototyping and testing.
- Developed a working product that improved patient accessibility and ease of use with potential clinical adoption.

Boeing Capstone Project, Georgia Institute of Technology, August 2017 – May 2018

- Worked with Propulsion Engineers working on the engine casing for the Boeing 777X.
- Created a MATLAB GUI that can down-select high priority load cases simulated during finite element analysis. The program is utilized roughly 50 times a year and saves about 17 hours each iteration.

LEADERSHIP EXPERIENCE

Graduate Teaching Assistant, Bioengineering Department, University of California San Diego, January 2020 – June 2022

- Graded assignments, hosted discussion sections, and managed administrative tasks for Systems Biology and Bioengineering III: Building and Simulating Large-Scale in Silico Models.

- Managed the online forum, graded coursework, and held office hours for ~100 students in Dynamic Simulation in Bioengineering.
- Designed and graded exams, hosted discussion sections, and provided instructional support for Modeling and Computation in Bioengineering class.

Undergraduate Teaching Assistant, Intro to Linear Algebra, Intro to Biomechanics, Georgia Institute of Technology, August 2016 – May 2019

- Formulated a work plan for recitation that captivates the student's attention, encourages group collaboration, but most importantly assists the student in understanding the material.
- Graded 150+ quizzes, homework, and exams weekly.
- Teaching Evaluation of 4.97 out of 5

Director of Projects/Director of Logistics, Georgia Tech's TEAM Buzz Executive Board, Georgia Institute of Technology, August 2015 – May 2019

- Responsible for evaluating a number of factors to determine what a successful project entails including, but not limited to, volunteer volume (about 1000 students), tasks performed, and proximity.
- Responsible for selecting the projects volunteers are assigned to.
- Responsible for setting up logistics for the day of service including contacting local companies and ordering breakfast and lunch for volunteers.
- Responsible for creating a contingency rain plan and dealing with emergencies on the day of service.

SKILLS/INTERESTS

Technical Skills

- **Modeling & Simulation**: Genome-scale metabolic models and reconstructions (GEMs), ME-models (COBRAme, DynamicME, StressME), Flux Balance Analysis (FBA), kinetic/constraint-based modeling.
- **Programming & Data Science**: Python (pandas, NumPy, SciPy, scikit-learn, matplotlib, plotly), MATLAB, Java.
- **Software/Frameworks**: Docker, Git/GitHub, Flask, AWS EC2.
- **Data Analytics**: Multi-omics data integration (transcriptomics, proteomics, metabolomics), statistical modeling, unsupervised machine learning methods (regression, clustering, dimensionality reduction).
- **Other Tools**: SolidWorks, LaTeX, Microsoft Excel/Word/PowerPoint.

Certifications

- **CITI Program**: Human Subjects Research / Responsible Conduct of Research.

Interests

- 3rd Degree Black Belt in Tae Kwon Do.
- Proficiency in Clarinet.
- Sports (Basketball, Baseball – avid Charlotte Hornets & San Diego Padres fan)