Kiara Reyes Gamas

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EDUCATION

Rice University — **Houston, TX**
Ph.D. in Systems, Synthetic, and Physical Biology — *August 2019 – December 2024*
B.S. in Bioengineering — *August 2015 – May 2019*

Nanyang Technological University — **Singapore**
GEM Trailblazer Semester Study Abroad — *January – May 2017*

RESEARCH EXPERIENCE

Stadler and Silberg Groups — **Rice University**
PhD Candidate — *January 2020 – December 2024*

- Wrote a sequence-based Python software to design broad and narrow targeting RNA-based environmental sensing tools to tag a microbial community (*in review*) [video here] [git repo]
- Built a DNA genetic memory tool in lab with molecular biology techniques to track conjugative events and elucidate horizontal gene transfer dynamics within a microbial community (*in prep*)
- Developed wastewater monitoring assays to track SARS-CoV-2 prevalence in 39 Houston wastewater plants and alert the Houston Public Health Department of COVID-19 outbreaks

Junghae Suh Synthetic Virology Lab — **Rice University**
Undergraduate Researcher — *October 2015 – May 2019*
Summer Cardiovascular Research Internship Program (SCRIP) Intern — *May 2017 – August 2017*

- Coordinated experiments with a team of 4 to shed light on a sequence in the adeno-associated virus (AAV) *cap* gene that is critical for cellular transduction in mammalian cells
- Wrote and implemented a MATLAB function to quantitatively analyze nuclear and cytoplasmic localization of AAV in confocal images to streamline data analysis
- Assisted testing a computational model using energetic interactions to predict functional residues in the AAV capsid protein by designing and physically making virus mutants *in vitro*

AWARDS AND FELLOWSHIPS

Bioelectronics NSF Research Traineeship (NRT) Program — **Rice University**
Trainee – $34,000 award — *August 2020 – December 2022*

- Trained in interdisciplinary team science while collaborating with 13 other trainees and faculty across several disciplines making up bioelectronics
- Participated in formalized team science training through coursework on interdisciplinarity, workshops, and engagement with stakeholders in industry, government, and other institutions

INVITED TALKS AND POSTERS

Controlling the taxonomic composition of biological information storage in microbial communities

- AICHE Synthetic Biology: Engineering, Evolution & Design (SEED) – poster — *June 2024*
- AICHE International Conference on Microbiome Engineering (ICME) – poster — *November 2024*

Information storage across a microbial community using universal RNA memory

- Rice University Synbio Supergroup Seminar Series – invited talk — *October 2023*
- Gordon Research Seminar in Synthetic Biology – invited talk, poster — *July 2023*
- Gordon Research Conference in Synthetic Biology – poster — *July 2023*

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PUBLICATIONS

Reyes Gamas, K.; Seamons T., Dysart M.J., Fang L., Chappell J.; Stadler L.B.; Silberg J.J. Controlling the taxonomic composition of biological information storage in 16S ribosomal RNA. *In review* **2025**. doi:10.1101/2025.04.29.651329

Reyes Gamas, K.; Chappell, C.R. Integrating ecological and human communities into the governance of genetically modified microbes for environmental release. *Accepted at Journal of Science Policy and Governance (JSPG)* **2025**. doi:10.22541/au.173697550.09834800/v1

Kalvapalle, P.B.; Staubus, A.; Dysart M.J.; Gambill L.; **Reyes Gamas, K.**; Lu L.C.; Silberg J.J.; Stadler L.B.; Chappell, J. Information storage across a microbial community using universal RNA barcoding. *Nature Biotechnology* **2025**. doi:10.1038/s41587-025-02593-0

LaTurner, Z. W.; Zong, D. M.; Kalvapalle, P.; **Reyes Gamas, K.**; Terwilliger, A.; Crosby, T.; Ali, P.; Avadhanula, V.; Santos, H. H.; Weesner, K.; Hopkins, L.; Piedra, P. A.; Maresso, A. W.; Stadler, L. B. Evaluating Recovery, Cost, and Throughput of Different Concentration Methods for SARS-CoV-2 Wastewater-Based Epidemiology. *Water Research* **2021**. doi:10.1016/j.watres.2021.117043

Grandel, N. E.; **Reyes Gamas, K.**; Bennett, M. R. Control of Synthetic Microbial Consortia in Time, Space, and Composition. *Trends Microbiol.* **2021**. doi:10.1016/j.tim.2021.04.001

Thadani, N. N.; Zhou, Q.; **Reyes Gamas, K.**; Butler, S.; Bueno, C.; Schafer, N. P.; Morcos, F.; Wolynes, P. G.; Suh, J. Frustration and Direct-Coupling Analyses to Predict Formation and Function of Adeno-Associated Virus. *Biophysical Journal* **2021**. doi:10.1016/j.bpj.2020.12.018

Robinson, T. M.; Ho, M. L.; Wahlig, B.; Gough, V.; Banta, A.; **Reyes Gamas, K.**; Kang, B.; Lee, E.; Chen, W.; Suh, J. An Essential N-Terminal Serine-Rich Motif in the AAV VP1 and VP2 Subunits That May Play a Role in Viral Transcription. *Virology* **2020**. doi:10.1016/j.virol.2020.04.008

INDEPENDENT PROJECTS

Post-Consumer Waste Composting at Rice University — **Rice University**

Undergraduate Researcher/ Sustainability Intern — *January 2018 – May 2018*

- Co-led research project on the feasibility and implementation of a post-consumer waste program at Rice culminating in a pitch presentation to the Vice President of Administration at Rice
- Worked as an intern at Rice's Center for Sustainability and Energy Management to implement final proposal by researching collection and transportation logistics and implementation costs
- Successfully passed on the project to younger Rice undergraduates who furthered it into the current composting program diverging >1,200,000 lbs of food waste as of December 2024

RELEVANT COURSEWORK

COMP 543: Graduate Tools and Models for Data Science — **Rice University**

PhD Candidate — *August – December 2022*

- Big Data & Machine Learning: Conducted large-scale data processing using Hadoop and Spark, generating supervised/unsupervised learning models (linear regression, SVMs, neural networks).
- Deep Learning & Optimization: Developed models using TensorFlow and LSTMs, using gradient descent, Newton's method, and Expectation-Maximization (EM).
- Computational & Statistical Analysis: Proficient in Python, SQL, and Java for data-driven modeling, feature engineering, and predictive analytics.

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LEADERSHIP EXPERIENCE

Senior Design (Capstone Bioengineering Course) **Rice University**

Team Representative *August 2018 – May 2019*

- Led a team of 5 to create a novel, non-invasive device to measure intracranial pressure (ICP) in babies younger than 18 months
- Participated in all aspects of project development including literature review, brainstorming, prototyping, implementing electrical circuits, writing signal processing, computer aided design
- Served as the team point of contact by communicating with mentors, (adult) patients, and executives of companies developing ICP measurement devices to understand the market

Rice International Student Association **Rice University**

Internal Vice President *January 2018 – May 2019*

- Collaborated with a 10-person working group to create the Rice International Student Association (RISA) to advocate for and represent international students at Rice
- Led committee head meetings with Socials, Opportunities, and Community Project committee heads to organize goals for the year and make sure they are met

Bioengineering Curriculum Review Committee **Rice University**

Committee Member *August 2017 – May 2019*

- Worked closely with the administration on how to improve the curriculum and serve students in their post-graduate career based on survey and institutional research

Student Association Environmental Committee **Rice University**

Committee Chair *August 2017 – May 2018*

- Managed a team of 12 to bring sustainability initiatives to Rice campus, such as becoming a member of the Post Landfill Action Network and the Power Shift Network
- Mentored freshmen to lead student resolution supporting post-consumer waste composting on campus which led to an independent research project to expand composting at Rice

Center for Career Development (CCD) **Rice University**

Peer Career Advisor (PCA) *April 2016 – May 2017*

- Advised students on professional skills through peer-directed office hours, assisting students in resume and cover letter building, job and internship basics, and professional attire consultation
- Expanded visibility of CCD resources by coordinating programs with other PCAs, including a resume review event and a LinkedIn workshop

Bioengineering Fundamentals **Rice University**

Project Manager *August 2016 – December 2016*

- Managed a team of 7 through 3 problem-based learning engineering design projects focused on the circulatory system; delegated project roles to team members based on their strengths
- Brainstormed and designed a mathematical model for β-thalassemia (a genetic type of anemia)
- Designed a modified atherectomy device to treat coronary heart disease that removes plaque from coronary arteries and then coats them with collagen to prevent further plaque buildup

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TEACHING AND MENTORSHIP EXPERIENCE

Institute of Biosciences and Bioengineering (IBB) Summer Academy **Rice University**

Graduate mentor *July 2022*

- Mentored a high school student from the Science Academy of South Texas, aiding her to get a glimpse at the college experience and day-to-day life as a graduate student
- Taught mentee how to assemble a plasmid and basic molecular cloning techniques
- Guided mentee in constructing and delivering the culminating oral presentation on her experience by introducing public speaking techniques, visual design basics, and presentation software use

Chemistry of Cooking (CHEM 178) **Rice University**

Teaching Assistant *January 2022 – May 2022*

- Assisted instructors Dr. Lesa Tran Lu and Chef Johnny Curet in leading hands-on labs on the principles of chemistry applied to cooking and in preparing labs for guest Chef speakers
- Created a molecular caprese bruschetta recipe to teach the principles of emulsions, protein crosslinking, and diffusion through emulsification, gelification, and spherification
- Assisted 11 students in brainstorming, testing, and cooking their final assignment consisting of serving administrators, chemists, social scientists, and local chefs 20+ copies of an original recipe and drink accompanied by an oral presentation highlighting the chemistry behind their recipe

Computation With Biological Data (BIOS 470/570) **Rice University**

Teaching Assistant *August 2021 – December 2021*

- Assisted instructor in grading Ilastik and MATLAB coding assignments on the following subjects: Github use, basic code vectorization, data input and output, object-oriented programming, sequence and gene expression analysis, image analysis, statistics, and mathematical modeling
- Assisted students in completing their final projects applying programming skills they learned to their own biological research by hosting office hours on these principles

SKILLS

Software and coding*:*

Python3, Benchling, MATLAB, Affinity Designer, Affinity Photo, Affinity Publisher, Microsoft Office Suite, Ilastik, SolidWorks, R, Adobe Illustrator, Adobe Photoshop, LabView, ImageJ, C++, Java, Microsoft SQL, Hadoop, Spark, TensorFlow

Languages:

Native or bilingual proficiency in Spanish, English, and French

Research skills:

Image analysis in MATLAB, metagenomic analysis, DNA design, PCR, qPCR, ddPCR, DNA assembly (restriction digest, Gibson, and GoldenGate), transformation (chemical and electrical) in bacteria and yeast, bacterial conjugation, gel electrophoresis, DNA and RNA purification, HPLC, liquid handling robot use, mammalian cell culture, ELISA, spectroscopy, FRET, confocal microscopy, flow cytometry

Certifications*:*

Engineering Biology Research Consortium (EBRC) Malice Analysis April 28, 2021

Cordon Bleu Diplômes de Cuisine Basique et Pâtisserie Basique 2013