Kian Faizi

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Education

California Institute of Technology — Sep. 2021 – present
Ph.D. in Systems Biology (GPA: 4.0) — *Pasadena, CA*

University of California, San Diego — Aug. 2017 – June 2021
B.S. in Molecular Biology, Minor in Mathematics (GPA: 3.75) — *La Jolla, CA*

- Selected coursework: Bioinformatics, Biophysics, Computational Linear Algebra, Dynamical Systems, Genome Editing, Statistics, Stochastic Processes

Experience

Graduate Student — Sep. 2021 – present
Lab of Dr. Rob Phillips, Caltech — *Pasadena, CA*

- Studying transcriptional regulation and nutrient ecology in diverse bacteria
- Expanding anthroponumbers.org, a database quantifying human impacts on the planet

Visiting Postgraduate Fellow — June 2022 – Aug. 2022
Lab of Dr. Pamela Silver, Harvard Medical School — *Boston, MA*

- Developed tools for chloroplast engineering in the green alga *C. reinhardtii* [**4**]
- On sabbatical from Caltech as an inaugural *New Science* fellow

Lab Technician — Nov. 2019 – Sep. 2021
Lab of Dr. Wolfgang Busch, Salk Institute for Biological Studies — *La Jolla, CA*

- Investigated Pareto-optimal trade-offs in the *Arabidopsis* root system using high-throughput phenotyping and graph-theoretic modeling [**3**]
- Built software for time-series segmentation and analysis of root images
- Helped develop algorithms for plant phenotyping from noisy 3D point clouds [**2**]
- Quantified root responses to nutrient deficiency using time-lapse optical microscopy [**1**]
- Created a pipeline for co-expression network analysis of scRNA-seq data to identify genetic targets for crop engineering

Volunteer Research Assistant — Nov. 2018 – Nov. 2019
Lab of Dr. Patrick Hsu, Salk Institute for Biological Studies — *La Jolla, CA*

- Developed an automated pipeline to mine over 20 TB of metagenomic sequence data for new orthologs of CRISPR-Cas13d
- Assisted with a pooled 127,000-guide Cas13d screen to inform gRNA design algorithms [**p1**]

Publications

[5] In Defense of Basic Science.

- **Kian Faizi**. To appear in *Caltech Letters* (2022)

[4] Reversing 1.5 Billion Years of Evolution.

- **Kian Faizi**. *newscience.org* (2022) doi:10.56416/720qud

[3] Network design principles in the *Arabidopsis* root system.

- **Kian Faizi**, Matthieu Platre, Arjun Chandrasekhar, Saket Navlakha, and Wolfgang Busch. *In prep.*

[2] Branch-Pipe: Improving graph skeletonization around branch points in 3D point clouds.

- Illia Ziamtsov, **Kian Faizi**, and Saket Navlakha. *Remote Sensing.* (2021) doi:10.3390/rs13193802

[1] Dynamics of *Arabidopsis* root growth under acute abiotic stress.

- **Kian Faizi**†, Matias Gleason†, Matthieu Platre†, Lukas Brent, and Wolfgang Busch. *In prep.*

Preprints

[p1] Deep learning and CRISPR-Cas13d ortholog discovery for optimized RNA targeting.

- Jingyi Wei, Peter Lotfy, **Kian Faizi**, Eleanor Wang, Hannah Slabodkin, Emily Kinnaman, Sita Chandrasekaran, Hugo Kitano, Matthew G. Durrant, Connor V. Duffy, Patrick D. Hsu, and Silvana Konermann. *bioRxiv.* (2022) doi:10.1101/2021.09.14.460134

Teaching

Principles of Biology | *Caltech* — Apr. 2022 – June 2022

Genetic Inquiry | *UCSD* — Aug. 2020 – Dec. 2020

Posters and Presentations

Phosphorus dynamics, from genomes to ecosystems | *Talk* — Oct. 2022

- Phillips Lab retreat (Biarritz, France)

Towards a free-living chloroplast | *Talk* — Sep. 2022

- New Science Demo Day (Cambridge, MA)

Co-expression analysis of single-cell RNA-seq data | *Talk* — Oct. 2020

- HDSI Research Conference (San Diego, CA)

Mining Genomes for RNA-Targeting CRISPR Effectors | *Talk* — Aug. 2019

- UCSD Summer Research Conference (San Diego, CA)

Metagenomic Discovery of Type VI-D CRISPR Effectors | *Poster* — June 2019

- UCSD Biology Student Research Showcase (San Diego, CA)

Honors and Awards

New Science Summer Fellowship ($33,000) | *New Science Inc.* — Mar. 2022

- Inaugural cohort of 5 international researchers. Project: *Engineering a free-living chloroplast*, proposed independently

Halıcıoğlu Data Science Institute Scholarship Project Award | *UCSD* — May 2021

- Recognizes a graduating student for their impact on UCSD's data science community

DOE CSGF Honorable Mention | *Krell Institute* — Apr. 2021

Halıcıoğlu Data Science Institute Scholarship ($2,500) | *UCSD* — Dec. 2019

- Project: *Single-cell transcriptomics and web mining for rapid reverse genetics in plants*, proposed under Dr. Wolfgang Busch

Eureka! Scholarship ($5,000) | *UCSD* — June 2019

- Project: *Discovery and development of Type VI-D CRISPR effectors for transcriptome engineering applications*, proposed under Dr. Patrick Hsu

Provost Honors | *UCSD* — quarterly

Service and Leadership

2022 Teaching Conference facilitator | *Caltech* — Sep. 2022

- Co-led a workshop on effective pedagogy at Caltech's annual conference for new teaching assistants

Caltech Accountability Parters Program mentor | *Caltech* — Aug. 2022 – present

- Mentored a young scientist of color during the graduate school application process
- Volunteered at FUTURE Ignited, a conference advancing diversity in STEM

CaltechASM co-founder | *Caltech* — May 2022 – present

- Co-founded the campus chapter of the American Society for Microbiology
- Planned talks, socials, and an upcoming research exchange targeting first-generation students from Cal State LA

Mycology Club member | *Caltech* Dec. 2021 – present

- Established Caltech's first indoor co-operative mushroom farm with a team of undergraduates curious about ecology
- Advertised mycology-related events and seminars in the greater LA community

Tritons Connect mentor | *UCSD* May 2021 – present

- Provided *pro bono* mentorship to undergraduates and alumni seeking research opportunities and careers in bioscience

Undergraduate Bioinformatics Club member | *UCSD* Nov. 2017 – June 2021

- Collaborated with Illumina to develop digital resources for high school students interested in bioinformatics
- Helped organize the 2018 Faculty & Industry Bioinformatics Symposium
- Volunteered at the SD Science & Engineering Festival to teach the community about DNA sequencing technology

Skills

Laboratory: Cell/tissue culture, cloning, molecular biology, CRISPR, optical microscopy
Computational: Python, bash, Arch Linux, web design, dashboarding, GUI development
Organizational: Git, LaTeX