

# Kian Faizi

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## EDUCATION

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### California Institute of Technology

*Ph.D. in Systems Biology (GPA: 4.0)*

Sep. 2021 – present

*Pasadena, CA*

### University of California, San Diego

*B.S. in Molecular Biology, Minor in Mathematics (GPA: 3.75)*

Aug. 2017 – June 2021

*La Jolla, CA*

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

## EXPERIENCE

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### Graduate Student

*Lab of Dr. Rob Phillips, Caltech*

Sep. 2021 – present

*Pasadena, CA*

- Studying transcriptional regulation and nutrient ecology in diverse bacteria
- Expanding [anthroponumbers.org](http://anthroponumbers.org), a database quantifying human impacts on the planet

### Visiting Postgraduate Fellow

*Lab of Dr. Pamela Silver, Harvard Medical School*

June 2022 – Aug. 2022

*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

*Lab of Dr. Wolfgang Busch, Salk Institute for Biological Studies*

Nov. 2019 – Sep. 2021

*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

*Lab of Dr. Patrick Hsu, Salk Institute for Biological Studies*

Nov. 2018 – Nov. 2019

*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

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### [5] In Defense of Basic Science.

- Kian Faizi. *Caltech Letters* (2022) [caltechletters.org](http://caltechletters.org)

### [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<sup>†</sup>, Matias Gleason<sup>†</sup>, Matthieu Platre<sup>†</sup>, Lukas Brent, and Wolfgang Busch. *In prep.*

## PREPRINTS

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[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](https://doi.org/10.1101/2021.09.14.460134)

## TEACHING

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**Principles of Biology** | *Caltech*

Apr. 2022 – June 2022

**Genetic Inquiry** | *UCSD*

Aug. 2020 – Dec. 2020

## POSTERS AND PRESENTATIONS

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**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

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**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

**Halicioğlu 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

**Halicioğlu 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

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**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

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**Laboratory:** Cell/tissue culture, cloning, molecular biology, CRISPR, optical microscopy

**Computational:** Python, bash, Arch Linux, web design, dashboarding, GUI development

**Organizational:** Git, L<sup>A</sup>T<sub>E</sub>X