



Andrew Frauenpreis

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Education

California Polytechnic State University, San Luis Obispo

Bachelor of Science in Biology, June 2021

Concentration: Molecular and Cellular Biology

Minor: Statistics

GPA: 3.2

Laboratory Skills

Cellular Biology: Mammalian tissue culture, human lung explant culture, transwell culture, iPSC differentiation and maintenance, human lung and intestinal organoid culture, transformation, transfection, viral isolation, FACS/MACS cell sorting

Molecular Biology: RNAFish, IHC, whole mount staining and clearing, qPCR, RNA extraction, plasmid ligation and cloning, plasmid purification, CRISPR gene editing

Protein Chemistry: ELISA, SDS-Page, Western blotting, affinity and ion exchange chromatography, size-exclusion chromatography

Software: RStudio, bash, python, IGV, Leica Imaging, HALO, ImageJ, Microsoft Office

Research Experience

Research Associate II, Pediatrics and developmental diseases

Dr. Denise Al Alam and Dr. Soula Danopoulos Lab, Lundquist Institute, Summer 2021 – Present

- Investigated the effects of cystic fibrosis on bone development using an iPSC derived osteoblast and osteoclast model which used 6 cells lines and 5 unique differentiation protocols
- Processed more than 100 Trisomy 21 (T21) and euploid prenatal lung and intestine samples for pathology, organoids, explant culture, RNA and protein extraction, and cell type isolation for primary culture of basal cells, fibroblasts, and endothelial cells
- Characterized pulmonary endothelial dysfunction in vitro and in situ. Stained native cell populations in T21 prenatal lung tissue and used an iPSC derived endothelial cell model to investigate angiogenesis, proliferation, and response to type I interferons
- Defined differences in T21 basal cell function via iPSC and primary basal cell organoid and transwell cultures
- Analyzed bulk RNAseq data gathered from 10 pairs of age and sex matched Trisomy 21 and euploid intestine samples using DESEQ2 in R
- Investigated alteration in T21 lung development in a scRNA seq dataset containing 9 prenatal lung samples at utilizing RStudio. Utilizing R packages such as Seurat and Monocle3 and pipelines in bash

Research Assistant, HIV protein trafficking and VLP production

Dr. Nathaniel Martinez Lab, Cal Poly SLO, Winter 2017 – Fall 2021

- Researched how the endocytic pathway is related to the production and release of infectious HIV-1 virions by tagging HIV-1 gag and envelope and by inhibiting key proteins in the endocytic pathway such as Rab5, Rab11, and EEA1
- Designed a system to tag sub-populations of HIV-1 gag and envelope using a nanocarrier delivery system targeted to the early endosome and ERC via transferrin conjugation
- Troubleshooted CRISPR plasmid ligation and restriction and optimized the lab immunoblot protocols for HIV virus like particle detection

Statistics Research Assistant, Data management and analysis

Dr. Kelly Bodwin Lab, Cal Poly SLO, Summer 2020 – Summer 2021

- Managed and presented data for an experiment on how different radiation therapies impacted the survival of rats thirty days after treatment using R
- Investigated how the microbial diversity in vineyards was affected by fertilizer treatment and the diversity's relation to soil quality in terms of overall community structure and nitrogen concentration using R

Algae Research Assistant, Utilizing algae as biofuel

WESTT Lab, Department of Energy, San Luis Obispo, Winter 2019

- Provided quality control of optical density and biomass data collection for three different algae experiments focused on finding the optimum lipid concentration for use in biofuel
- Maintained the CO₂ delivery system by checking the CO₂ storage system, piping, and humidifier

Publications

Belgacemi R, Ribeiro Baptista B, Justeau G, Toigo M, **Frauenpreis A**, Boyer L et al. Complex Urban Atmospheres alters Alveolar Stem Cells Niche Properties and drives Lung Fibrosis. *Am J Physiol Lung Cell Mol Physiol*. 2023 Aug 2.

Belgacemi R, Cherry C, El Alam I, **Frauenpreis A**, Glass I, Bellusci S, Danopoulos S, Al Alam D. Preferential FGF18/FGFR activity in pseudoglandular versus canalicular stage human lung fibroblasts. *Front Cell Dev Biol*. 2023 Aug 28.

Presentations

2023 Southern California Lung Symposium

“The role of type I IFN on the developing lung endothelium”

2023 American Thoracic Society International Conference

“The role of type I IFN on Trisomy 21 endothelial angiogenesis”

2022 CA Society of Physiologists APS California Chapter Annual Conference

“The effects of trisomy 21 on endothelial angiogenesis”

2019 Frost Research Symposium

“HIV protein trafficking via the endocytic pathway”

Awards and Trainings

2023 ATS Abstract Scholarship, awarded by ATS Assembly on Pediatrics

2023 Data Science for Diverse Scholars in Down Syndrome Research, NIH funded

Relevant Coursework

Organic Chemistry I, II, III and associated labs

Emerging Infectious Diseases

Advanced Statistical Computing with R

Microbial Biotechnology

Parasitology

Cell Biology

Immunology

General Microbiology I and II

Metabolism

Protein Techniques

Leadership Experience

American Society of Biochemistry and Molecular Biology President, Cal Poly, San Luis Obispo, June 2020 – June 2021

- Planned a community service event where Cal Poly SLO students virtually presented research in an approachable way to local middle school students to get them excited about science
- Hosted resume workshop events for club members and interested students with Cal Poly career services
- Led club into being more involved in campus life by attending the Cal Poly SLO Open House, hosting a week of welcome undergrad research panel, and putting the club on social media
- Ran biweekly club meetings to discuss club interests and host speakers

Teaching Experience

Study Session Leader, Cal Poly, San Luis Obispo, June 2020 – June 2021

- Assisted students in learning statistics, biology, and organic chemistry by facilitating discussion and explaining concepts
- Ran four, hour long study sessions weekly with an average of ten students per section
- Designed worksheets and utilized methods like learning cells to promote learning
- Fostered a friendly environment for students to gather and talk virtually during the COVID-19 pandemic

Microbiology Teaching Assistant, Cal Poly, San Luis Obispo, August 2020 – June 2021

- Held office hours twice a week for students to ask questions about labs
- Recorded lab demos of microbiology techniques with other TAs for students
- Graded labs and discussion topics
- Created an instructional introduction video covering lab activities for the week regarding the body's normal microflora community

Non-academic Work Experience

Student Assistant, Cal Poly Environmental Health and Safety Department

San Luis Obispo, CA, November 2017 – September 2019