

# VICTORIA CHEUNG

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## EDUCATION

(UCSF) University of California, San Francisco  
(UCSD) University of California, San Diego  
Genentech Discovery Program  
Cold Spring Harbor Laboratory

**PhD** Genetics conc. Systems Neuroscience  
**BS** Microbiology  
**Certification** L.E.A.D Supply Chain  
Vision: Linking Circuits, Perception, and Behavior

## SKILLS

### TECHNICAL:

Data Analysis (Python, R, MATLAB)	Adobe Creative Suite (Ai, Lr, Ps )	Animal Research/Surgery
Linux (bash, zsh)	Arduino	PCR/qPCR
AWS (EC2, S3)	CAD (Onshape, Cura, eMachineShop)	Microscopy
Experimental Design	Histology/Immunohistochemistry	Image Processing (FIJI, Zen)
SQL (PostgreSQL)	Single-cell Omics	

### DOMAIN KNOWLEDGE:

Biochemistry	Microbiology	Neuroscience/Systems Neuroscience
Genetics/Single-cell Omics	Molecular Biology	Physiology

## CAREER EXPERIENCE

### [Freenome](#) | **Computational Biologist**

*APR 2022 — PRESENT*

- Apply bioinformatics, data science, and computational methods to analyze multi-omic data to reveal, model, and interpret changes in both the cancer (pathways, gene activities, proteins) and the immune system (composition, activity, and repertoires) associated with clinical outcomes.
  - Generate new insights and interpretations.
  - Leverage existing computational methods and develop new ones to extract immunological signals from existing and new data.
- Partner cross-functionally in the scientific planning and execution of collaborative projects, such as molecular and cancer biologists, immunologists, computational biologists, medical affairs, commercial, business development.
- Execute research projects to model various biological changes resulting from diseases such as cancer, autoimmune disease, and infection with various business partners.

### [Genentech](#) | **Oncology Bioinformatics and Molecular Oncology PhD Intern**

*SEP 2021 — APR 2022*

- Characterized gene signature development and refinement for T cell signaling pathways in cancer models
  - Wrote a data processing pipeline utilizing Scanpy, Numpy, Pandas, scikit-learn, SciPy
  - Performed statistical analyses on different drug treatment populations.
    - Gene set enrichment analysis
    - Differential gene expression analysis
  - Utilized supervised batch correction techniques and unsupervised clustering algorithms (UMAP, topic modeling) to visualize and analyze single cell RNA seq data outputs.
- Wrote custom plotting functions using Matplotlib to better visualize the effect of drug treatments.

### [UCSF @Evan Feinberg Lab](#) | **Graduate Researcher in Single-cell Omics, Systems Neuroscience**

*JUL 2016 — DEC 2021*

#### Project 1

- Developed a multiplexed, high-throughput, single-cell sequencing method for neurons that preserve connectivity information in addition to obtaining molecular identity (VECTORseq).
  - Wrote the data processing pipeline using Python after genome alignment using Cellranger (10x Genomics) on an AWS EC2 instance.
    - Used unsupervised machine learning techniques such as t-SNE/UMAP clustering to match molecular identities to cellular function and role in behavioral output.
    - Implemented nearest neighbors algorithms to account for batch differences when merging datasets.
  - Streamlined brain dissociation techniques and increased neuron survivability yield 100-fold based on data-driven outcomes from clustering analyses.
  - Validated clustering results of single-cell sequencing against the [2020 10x sequencing dataset from the Allen Atlas](#) and that the methodology was functional.
    - Evaluated range of highly variable genes expressed per cluster for the validation of cell identity.
  - Managed collaborations with the Chan-Zuckerberg Biohub (Spyros Darmanis Group, now @ Genentech)

#### Project 2

- Designed an audition-based behavioral paradigm to study sensorimotor integration in the context of mice.

- Wrote custom software to support custom-built hardware using serial communication between MATLAB and an Arduino microprocessor, which increased productivity by 6-fold from the parallelization and automation of data acquisition, storage, and analysis.
- Used this system in exploring how sensory input is represented in the brain and transformed into behavioral commands, using mice as the model organism.
  - Wrote custom analyses software to automate, refine, and interpret both raw behavioral data and fiber photometry signals.
- Used CAD software to design and 3D print custom behavioral apparatuses.
- Refined surgical protocols to increase survival surgery success by 20%. Delivery of viruses, drugs, and organic dyes into the mouse brain.
- Performed physiology recordings on brain slices to validate optogenetic and fiber photometry experiments
- Assembled fiber photometry and optogenetic manipulation equipment to record and perturb neuronal activity in the context of quantitative behavioral assays.

#### *Insight Data Science @Silicon Valley* | **Health Data Science Fellow**

*MAY 2020 – JULY 2020*

- Developed a predictive clinical calculator to assess Acute Kidney Injury in hospitalized patients, which would result in better management, care/medication dosing, injury prevention, and reduced hospital length of stay, thus freeing up occupied resources and minimizing financial costs to both patient and hospital.
- Utilized PostgreSQL querying to gather relevant data from the MIMIC-III database and manipulated the data with Python Pandas from 25 tables of data, 46,000 patients, thousands of diagnoses and lab tests, and clinical documentation--generating over 3 million rows of data and 70 unique features comprising lab tests and demographic information.
- Used supervised machine learning in Python such as regression models from scikit-learn and XGBoost to forecast Acute Kidney Injury, with a predictive accuracy of ~91%.
- *Medium Article in Towards Data Science:* [Predicting Acute Kidney Injury in Hospitalized Patients Using Machine Learning](#)

#### **OTHER EXPERIENCE**

##### *Genentech certification course* | **Genentech Discovery Program: L.E.A.D. Supply Chain**

*JULY 2020 – AUG 2020*

- Learned about the fundamentals of supply chain, how the supply chain spans a variety of roles throughout Genentech's delivery of therapies as well as its involvement in providing medication access to underserved communities and its drive towards sustainability.
- Chatted with supply chain business leaders to interact with individuals in the industry.
  - Discussed the transferability of skills from the PhD to business/supply chain.
- Participated as Operations Lead in a **supply chain simulation** where my team and I **placed second** overall.

##### *UCSF @Guo Huang Lab* | **Graduate Researcher**

*APR 2016 – JUN 2016*

Area of Research: Regenerative Potential of Cardiomyocytes

- Performed heart explants for cell culture and subsequent drug studies for the purpose of exploring organ regeneration and repair in neonatal mice—with an emphasis on the pathways that regulate resident stem cell activation and mature cell de-differentiation/proliferation.
  - Explored organ regeneration and development from an evolutionary standpoint across different species of animals *i.e.* naked mole rat, finch, rat, mouse, zebrafish.
- Utilized innovative and integrated approaches in engineering, single cell analysis, advanced imaging microscopy, drug delivery, and genome manipulation technology.

##### *UCSF @Dengke Ma Lab* | **Graduate Researcher**

*SEP 2015 – DEC 2015*

Area of Research: Homeostatic Response to Extreme Abiotic Factors

- Created a functional mutant line in *C. elegans* via cDNA microinjections and exposed the mutants to extreme abiotic environments via behavioral assays to understand cellular intrinsic tolerance of hypoxia/anoxia and hypothermia.
  - Utilized RNA-seq to identify genes implicated in cryopreservation/hypoxia-tolerance with therapeutic potential.
  - Obtained qualitative behavioral data on how animals sensed and responded to changes in internal states to elicit behavior and maintain homeostasis.

##### *UCSD @ Andrew D. Huberman Lab* | **Research Fellowship – UC LEADS & STARS**

*DEC 2012 – JUL 2015*

Area of Research: BINOCULAR PLASTICITY & DYNAMIC STRATEGY IMPLEMENTATION IN CUTTLEFISH

- Developed a model of visual perception and prey capture using cuttlefish to study the neural circuit organization supporting flexible eye movements.
  - Underlying goal: provide insight into amblyopia (lazy eye)
- Optimized behavioral parameters and refined surgical techniques for the novel model organism.
  - Increased consistency between experiments for reproducibility.
- Optimized tracking and analysis of dynamical eye movements using multi-planar high-speed imaging and *Simi Motion* software.
  - Increased productivity and output by 40%

- 3D-reconstructed neuron structure for morphometric analysis using *Neurolucida*.

UCSF @ David R. Copenhagen Lab | **Research Fellowship– UCSF Summer Research Training Program (S RTP)** JUN 2014 — SEP 2014

Area of Research: EFFECTS OF LIGHT DEPENDENT  $\text{Ca}^{2+}$  SIGNALING DURING RETINAL DEVELOPMENT

- Explored the effects of light dependent  $\text{Ca}^{2+}$  waves in the developing mouse retina with a focus on the coupling of amacrine cells to melanopsin ganglion cells via gap junctions.
- Characterized appropriate transgenic lines and established baseline comparisons in adult retina to observe and document deviations from the developed animal to the developing animal.
  - Performed retinal dissections for cell coupling studies.

## MENTORSHIP | DIVERSITY

UCSF @ Evan Feinberg Lab | **Mentor for Undergraduates**

JUN 2016 — SEP 2021

- Trained and mentored 3 undergraduates on performing research tasks on how to: think independently, plan experiments, perform surgical protocols, and analyze data. Provided career/research advice.
- Post-graduation outcomes of the 3 undergraduates:
  1. data analyst @BoxLunch
  2. research scientist @Alkalest
  3. applying to medical school

UCSF SRTP | **Student Advisor**

JUN 2019 — AUG 2019

University of California, San Francisco (UCSF) Summer Research Training Program (S RTP)

- Developed curriculum to teach rising junior and senior undergraduates on:
  - how to become a strong graduate school applicant
  - how to create compelling posters and presentations
  - how to write personal statements
  - how to read and dissect scientific papers

UCSF Science & Health Education Partnership (SEP) | **Student Teacher**

JAN 2016 — JUN 2016

- Created and developed a series of interactive and investigative lesson plans to teach freshman biology.
- Mentored URMs and socioeconomically disadvantaged students on different career paths in science.

UC LEADS (University of California, Leadership Excellence through Advanced Degrees) | **Scholar**

MAR 2013 — JUN 2015

- Mentorship program for underprivileged and socioeconomically disadvantaged undergraduates for success in graduate school to later assume positions of leadership in industry, government, public service, and academia following completion of a doctoral STEM degree
  - Two-way avenue:
    1. Received mentorship from prior two cohorts as part of the incoming cohort
    2. Provided mentorship to the next two cohorts while progressing through the program

## CONFERENCES | TALKS

### SCIENTIFIC:

2021	UCSF S.O.L.V.E. Health Tech: Digital Health Equity Summit	attendee
2021	COSYNE (computational and systems neuroscience)	attendee
2018	UCSF Tetrad	oral (15 min) presentation
2017	SFN Annual Conference	attendee
2017	UCSF Tetrad	<a href="#">poster presentation</a>
2016	UC LEADS Research Symposium	attendee
2015	UC LEADS Research Symposium	poster presentation
2014	SFN Annual Conference	<a href="#">poster presentation</a>
2014	UCSF Summer Research Training Program Symposium	<a href="#">poster</a> + oral (15 min) presentation
2014	UCSD Academic Enrichment Program	poster presentation (invited)
2014	SACNAS National Conference	poster presentation
2014	UCLEADS Annual Research Symposium	poster presentation
2013	UCSD Academic Enrichment Program	poster presentation (invited)
2013	SACNAS National Conference	poster presentation
2013	UCSD STARS Summer Research Conference	oral presentation (15 min)

### DIVERSITY:

2022	SRTP Co-Curriculum: What Can You Do With a PhD?	panelist (1hr)
2019	Northern California Forum for Diversity in Graduate Education	panelist (1hr)
2018	Northern California Forum for Diversity in Graduate Education	panelist (1hr)

**HONORS | AWARDS**

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2022	UCSF Diversity Graduation, Graduate Division Speaker
2017	Helmsley Scholar
2015	UC LEADs Symposium Presentation Award
2014	SACNAS National Research Conference Travel Scholarship
2013	UCSD STARS Scholarly Presentation Award
2013	SACNAS National Research Conference Travel Scholarship
2013	UCSD Provost Honors
2012	UCSD Provost Honors
2011	UCSD Provost Honors
2012	Kaiser Permanente Volunteer Award
2011	Kaiser Permanente Student Achievement Award

**MEDIA PRESENCE**

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2019	<a href="#">UCSF Article: Students Who Are First in Their Family to Attend College Share Stories, Experiences</a>
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**PUBLICATIONS**

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- Cheung, V.**, Chung, P., and Feinberg, E.H. (2022) [Transcriptional profiling of mouse projection neurons with VECTORseq](#). STAR Protocols, 3(3):101625
- Cheung, V.**, Chung, P., Bjorni, M., Shvareva, V.A., Lopez, Y.C., and Feinberg, E.H. (2021) [Virally Encoded Connectivity Transgenic Overlay RNA sequencing \(VECTORseq\) defines projection neurons involved in sensorimotor integration](#). Cell Reports, 37(12):110131
- Cheung, V.** “[Predicting Acute Kidney Injury in Hospitalized Patients Using Machine Learning](#)” Towards Data Science. Medium, 20 Jun. 2020. Web.