# Xinze (Jason) Chen

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## Education

**MS** **University of California, San Diego**, Data Science — Sep 2023 – Jun 2026

- GPA: 3.8/4.0
- **Coursework:** Machine Learning, High-Dimensional Statistics, Numerical Linear Algebra, Responsible Data Science

**BS** **University of California, San Diego**, Neurobiology & Cognitive Science with a Specialization in Machine Learning and Neural Computation — Sep 2019 – Jun 2023

- GPA: 3.7/4.0
- **Coursework:** Neural Data Science, Systems Neuroscience, Probability, Python Programming, Machine Learning  Deep Learning

## Publications

**The transcriptomic and epigenomic impact of HIV and opioid use disorder in human brain cell types** — Expected submission: Fall 2025

- Manuscript in Preparation

## Research Experience

**University of California, San Diego**, Graduate Student Researcher — La Jolla, CA, Jan 2024 – Present

- Principal investigator: Eran Mukamel, PhD
- Conduct research as part of the SCORCH (Single Cell Opioid Responses in the Context of HIV) consortium investigating the epigenomic and transcriptomic effects of HIV and opioid use disorder on the human brain
- Build standardized pipeline to process and analyze multiomic sequencing data
- Analyze single-nucleus RNA sequencing (snRNA-seq) and single-nucleus ATAC sequencing (snATAC-seq) datasets to study gene expression and chromatin accessibility in brain regions such as the amygdala, prefrontal cortex, and cerebellum
- Identify differentially expressed genes and chromatin accessibility regions, uncovering genetic and epigenetic markers relevant to neurological diseases
- Integrate chromatin accessibility and gene expression data for inferring transcription factor regulatory networks
- Identify co-regulated gene modules, and cell-type-specific transcriptional programs disrupted by HIV and opioid exposure

**Scripps Research**, Research Intern — La Jolla, CA, Sep 2022 – Jun 2023

- Principal investigator: Lisa Stowers, PhD
- Applied machine learning models to analyze neural activity and facial movements
- Utilized machine learning algorithms and traditional data science techniques to process and analyze time-series data from mouse experiments
- Produced valuable insights into mice neural circuitry and facial expression associated with social behaviors

**University of California, San Diego**, Research Assistant — La Jolla, CA, Mar 2022 - Oct 2022

- Supervisor: Carlos Ruiz

- Assisted in enrolling participants and collecting data to track the efficacy of smoking cessation interventions
- Collected and organized participant data, ensuring accurate and timely data entry for research and evaluation
- Contributed to the successful data collection for the research program, improving the accuracy of the study's findings on smoking cessation outcomes

## Research Project

**Revealing the single cell determinants of brain relevant to persistent HIV infection and opioid use disorder** Feb 2024 - Present

*UCSD SCORCH Rana, 1U01DA053630-01*

- Principal investigators: Tariq Rana, PhD & Eran Mukamel, PhD & Kyle Gaulton, PhD & Allen Wang, PhD
- Conduct research as part of the UCSD SCORCH investigating the impact of HIV and opioid use disorder (OUD) on the brain
- Utilize single-nucleus RNA sequencing (snRNA-seq) and single-nucleus ATAC sequencing (snATAC-seq) to analyze gene expression and chromatin accessibility
- Perform integrative gene regulatory network (GRN) analysis to identify transcriptional rewiring across HIV and OUD conditions
- Aim to uncover molecular mechanisms underlying neuropsychiatric disorders and identify potential therapeutic targets

## Posters & Presentations

**HIV and Opioid Use Disorder: A Single-Cell Multiomic Study of the Human Amygdala** Jun 2024

**Chen, X.**, Green, A., Buchanan, J., Lee, Y., Mummey, H., Kudtarkar, P., et al.

- Poster presented at the Summer SCORCH Consortium Meeting, Baltimore, MD, June 2024
- Conducted single-cell multiomic analysis of transcriptomic and epigenomic changes in the amygdala related to HIV and OUD
- Identified key cell types and differentially expressed genes, providing insights into molecular mechanisms behind neuropsychiatric symptoms

**The Transcriptomic and Epigenomic Impacts of HIV and Opioid Use Disorder Across Human Prefrontal Cortex Cell Types** Jun 2024

Green, A., **Chen, X.**, Buchanan, J., Mummey, H., Lee, Y., Kudtarkar, P., et al.

- Poster presented at the Summer SCORCH Consortium Meeting, Baltimore, MD, June 2024
- Investigated effects of HIV and OUD on gene expression and chromatin accessibility in the prefrontal cortex (PFC)
- Highlighted 135 differentially expressed genes with immune and transcriptional regulatory changes in oligodendrocytes and microglia

## Teaching Experience

**University of California, San Diego**, Teaching Assistant La Jolla, CA

*COGS 118A: Supervised Machine Learning Algorithms & COGS 118B: Introduction to Machine Learning* Jul 2024 – Sep 2024

- Ensured smooth course operations, provided timely student support, and streamlined grading processes
- Developed scripts to manage late penalties automatically and sync grades from

GradeScope to Canvas

**University of California, San Diego**, Teaching/Instructional Assistant — La Jolla, CA
*COGS 17: Neurobiology of Cognition* — Sep 2021 - Dec 2021, Jan 2024 – Mar 2024, Mar 2024 – Jun 2024, Sep 2024 – Dec 2024, Jan 2025 - Mar 2025

- Assisted with course materials, and prepared personalized materials for discussion sections
- Held office hours to clarify difficult concepts, facilitated group discussions, and helped organize learning materials
- Improved student engagement and comprehension

**University of California, San Diego**, Teaching/Instructional Assistant — La Jolla, CA
*COGS 108: Data Science in Practice* — Sep 2022 – Dec 2022, Sep 2023 – Dec 2023, Mar 2025 - Jun 2025

- Assisted with course materials and automated grading processes to improve efficiency
- Developed and optimized auto-grading scripts and provided hands-on support during office hours and discussion sections

## Course Projects

**Using Improved Deep Neural Network to Perform Dimension Reduction and Cell Classification** — BIPN 162 Project

- Using a redesigned neural network reduces the dimensionality of Single-cell RNA sequencing data and performs cell type classifications and signaling pathway analysis
- Achieved over 95% training and testing accuracy

**H1N1 in 2009, Birth Rate & Death Rate** — COGS 108 Project

- Using statistical analysis tools in Python to visualize data and analyze if the H1N1 pandemic affects the global birth rate and death rate

**Classifying Stars by Using Their Unique Features** — COGS 118A Project

- Using supervised machine learning models (Decision Trees, K-Nearest Neighbors, Deep Neural Networks) to classify stars' spectral types by analyzing their unique features
- Achieved 76% accuracy in classifying star spectral types

Projects available at: https://github.com/JasonC1217/Jason-Chen-Projects

## Technical Skills

**Data Science, Bioinformatics, & Machine Learning:** Python, R, MATLAB, pandas, NumPy, scikit-learn, ScanPy, Seurat, ArchR, SnapATAC2, SCENIC+, PyTorch, TensorFlow

**Neuroscience & Genomics:** Single-nucleus RNA sequencing, Single-nucleus ATAC sequencing, gene regulatory network analysis, time-series neural data analysis

**Computational Skills:** Data visualization, deep learning, genetic and epigenetic analysis

**Additional Tools**: Git, Jupyter, LaTeX