Pin-Chung (Tony) Cheng

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Palo Alto, CA, United States

Summary

Genomics Scientist at Stanford University specializing in epigenomics and brain aging. MD/PhD with a track record of developing high-resolution single-cell multi-omic technologies, including a 250-fold improvement in lineage tracing resolution. Combines deep wet-lab expertise with scalable bioinformatic pipelines to advance translational research in aging, cancer, and regenerative medicine.

Skills

- **Automation:** QIAcube HT (96 DNA), QIAcube Connect (cfDNA), KingFisher, SPT Firefly.
- **Computational:** AI tools (Claude Code/Science, Crusor/Grok, Gemini), Python, R, Linux/Bash, Scanpy, Seurat, variant calling (SNP/CNV), HipSTR, bwa, Bismark, MethylPy, samtools, bcftools, bedtools, Docker, AWS, Nextflow, Git/Github, SLURM.
- **Genomics:** Single nuclei isolation (10X protocol, Singulator), DNA shearing (Covaris), DNA extraction, restriction enzyme digestion, adapter ligation, DNA amplification, Illumina/AVITI Sequencing.
- **Methylation Library Preparation:** Illumina 5-base solution, Zymo Bisulfite Conversion, NEB EM-Seq, single cell methylome (sciMET).
- **Probe-Based Target Enrichment:** IDT xGEN Hybridization Kit; DNA probe production via in vitro transcription and reverse transcription from DNA oligo pools (Twist Bioscience, up to 169,000 oligos).
- **Molecular biology:** PCR, qPCR, PCR-clean up, immunohistochemistry, immunofluorescence, microscopy, western-blot, Tapestation, Qubit, Benchling (ELN).
- **Cell Biology:** stem cell isolation and culture, FACS (BD/Sony).

Education

Doctor of Philosophy (Ph.D.), Biological Sciences / Quantitative Biology — *2019 – 2026*
University of California San Diego, San Diego, CA

Master of Science (M.S.), Stem Cell Biology and Regenerative Medicine — *2017 – 2018*
University of Southern California, Los Angeles, CA

Doctor of Medicine (M.D.), Medicine — *2007 – 2014*
Kaohsiung Medical University, Kaohsiung, Taiwan

Professional Experience

Genomics Scientist, Knight Initiative for Brain Resilience
Stanford University, Palo Alto, CA — *2026 – present*

- Methylation profiling of ~400 human brain samples to investigate epigenetic changes in the aging brain and uncover mechanisms of brain resilience.

Graduate Student Researcher
Altos Labs, San Diego, CA *2023 – 2026*

- Developed RETrace2, a dual-omic single-cell lineage tracing and methylation profiling technology, achieving ~250-fold improvement in resolution.
- Improved probe target capture efficiency 4X, identified 2X more informative targets and expanded probe panel from 11,000 to 92,000 targets, resulting in 21X more targets captured per cell.
- Built an oligonucleotide model to evaluate microsatellite PCR and sequencing accuracy across polymerases and sequencing platforms (Illumina NextSeq, Element Bio AVITI) reducing overall errors by 30%.
- Developed a Docker-containerized, dual-omic Nextflow pipeline for single-cell analysis using microsatellite mutations and sparse methylation data, improving process speed by 16x.
- Generated and analyzed ~4000 single-cell methylomes using ScaleBio's sciMET kit.

Graduate Student Researcher *2019 – 2023*
University of California San Diego, Kun Zhang Lab, San Diego, CA

- Analyzed single-nucleus chromatin accessibility and mRNA expression (SNARE-seq2) data in the human fetal heart and glioblastoma samples.
- Graduate Instructional Apprentice (IA) in Genetics and Bioinformatics

Research Associate *2017 – 2019*
University of Southern California, Joseph Rodgers Lab, Los Angeles, CA

- Pharmacologically targeted metabolic pathways to rejuvenate aged muscle stem cells.

Graduate Research Assistant *2016 – 2017*
Academia Sinica, Yun-Ru Chen Lab, Taipei, Taiwan

- Characterized a novel antibody targeting TDP-43 oligomers in an ALS mouse model.

Honors and Certificates

- Featured in Element Biosciences Blog for RETrace2 lineage tracing technology (April 2026)
- J Yang Scholarship Award, UC San Diego Institute of Engineering in Medicine
- Excellence in Teaching Award UC San Diego, Bioinformatics
- Taiwan Medical License, Australian Medical Council MCQ, USMLE Step 1&2 – Passed

Publications

- **Pin-Chung Cheng**, Dmitrii Kamenev, Polina Kameneva, Igor Adameyko, Peter V Kharchenko, Kun Zhang (2026). High-resolution retrospective single cell lineage tracing with mutable homopolymers. bioRxiv. (In review at Nature Communications)

- Manmeet H. Raval, **Pin-Chung Cheng**, Nicholas Guardino, … Keyue Shen, Andrew S. Brack, and Joseph T. Rodgers (2020). PDH mediated mitochondrial respiration controls the speed of muscle stem cell activation in muscle repair and aging. bioRxiv.