Yuan Xue

Senior Bioinformatics Data Scientist

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Employment

ClearNote Health San Mateo, California, USA
Senior Bioinformatics Data Scientist *Jan 2022 – Present*

- Developed cfDNA-based cancer detection models integrating 5hmC epigenomics and low-pass WGS. Built multinomial logistic regression for tumor tissue-of-origin prediction (85.2% accuracy), and implemented tumor fraction estimation pipelines from low-pass WGS to support tumor burden monitoring. Contributed to 2 peer-reviewed publications (**Communications Biology**, **J.M.D.**), 4 conference presentations (CSHL, ESMO, ASHG, AACR), and 2 pending patents.
- Led a cross-functional team of wet-lab scientists and bioinformatics engineers, including one direct report, to translate liquid biopsy pipelines from discovery to production, spanning assay optimization and computational infrastructure (Nextflow, AWS, dbt, Snowflake). Achieved 4X improvement in cfDNA quantification and 10% lower measurement error for protein biomarker. Contributed to a pending patent.
- Led feasibility studies evaluating leading sequencing platforms (Illumina, Ultima, Element Bio, Singular) and optimized sequencer workflow, achieving a 28% cost reduction.

Research Experience

Stanford University - Quake Lab Stanford, California, USA
Doctoral candidate of Bioengineering *September 2015 – December 2021*

- Developed single-cell transcriptomic methods to profile *Toxoplasma gondii* and infected host cells. Discovered novel antigenic variation and its regulatory transcription factor. Led both computational and experimental aspects. Published in **eLife**.
- Led computational analysis of single-cell profiling of murine macrophage response to persistent *Salmonella typhimurium* infection. Identified a novel Ace+ macrophage cell type mediating intracellular bacterial persistence and characterized underlying immune pathways. Published in **Science Advances**.
- Developed biochemical and genomics assays to profile replication fidelity and kinetics of DNA polymerases across evolutionary origins (psychrophilic, mesophilic, thermophilic). Identified a novel cold-active polymerase from *Psychromonas ingrahamii*. Published in **Journal of Biological Chemistry**.

Education

Stanford University Stanford, California, U.S.A.
Ph.D. and M.S. in Bioengineering *Sept 2015 – Dec 2021*
Thesis advisers: Dr. Stephen Quake, Dr. John Boothroyd

Reed College Portland, Oregon, U.S.A.
B.A. in Biology *Sept 2010 – May 2014*
Thesis adviser: Dr. Jay Mellies

Selected publications

1. **Yuan Xue***, Yuhong Ning*, *et al.*, Wayne Volkmuth, Samuel Levy‡. 5-hydroxymethylcytosine analysis reveals stable epigenetic changes in tumor tissue that enable cancer detection in cell-free DNA. **Communications Biology (2025).**

2. Shimul Chowdhury, Michael Kesling, Micah Collins, Vanessa Lopez, **Yuan Xue**, Glenn Oliveira, Verena Friedl, Anna Bergamaschi, David Haan, Wayne Volkmuth, Samuel Levy‡. Analytical Validation of an Early Detection Pancreatic Cancer Test Using 5-Hydroxymethylation Signatures. **The Journal of Molecular Diagnostics (2024).**

3. Dania Nanes Sarfati, **Yuan Xue**, Eun Sun Song, Ashley Byrne, Daniel Le, Spyros Darmanis, Stephen R. Quake, Adrien Burlacot, James Sikes‡, Bo Wang‡. Coordinated wound responses in a regenerative animal-algal photosymbiotic metaorganism. **Nature Communications (2024).**

4. Trung Pham‡*, **Yuan Xue***, Susan Brewer, Kenneth E. Bernstein, Stephen R. Quake‡, Denise Monack‡. Single-cell profiling reveals functional diversity of granuloma macrophages during persistent Salmonella infection. **Science Advances (2023)**. bioRxiv preprint

5. **Yuan Xue**, Ido Braslavsky, Stephen R. Quake. Temperature effect on DNA polymerase fidelity. **Journal of Biological Chemistry (2021)**. bioRxiv preprint

6. Pengyang Li, Dania Nanes Sarfati*, **Yuan Xue***, Xi Yu, Alexander Tarashansky, Stephen R. Quake, Bo Wang. Single-cell analysis of Schistosoma mansoni reveals a conserved genetic program controlling germline stem cell fate. **Nature Communications (2020)**. bioRxiv preprint

7. Suchita Rastogi, **Yuan Xue**, Stephen R. Quake‡, John Boothroyd‡. Differential Impacts on Host Transcription by ROP and GRA Effectors from the Intracellular Parasite Toxoplasma gondii. **mBio (2020)**. bioRxiv preprint

8. **Yuan Xue**, Terence Theisen, Suchi Rastogi, Abel Ferrel, Stephen R. Quake‡, John Boothroyd‡. A single-parasite transcriptional atlas of Toxoplasma gondii reveals novel control of antigen expression. **eLife (2020)**. bioRxiv preprint

9. Alexander Tarashansky, **Yuan Xue**, Pengyang Li, Stephen R. Quake, Bo Wang. Self-assembling Manifolds in Single-cell RNA Sequencing Data. **Elife (2019)**. bioRxiv preprint

10. **The Tabula Muris Consortium**, Stephen R. Quake, Tony Wyss-Coray, Spyros Darmanis. Single-cell transcriptomics of 20 mouse organs creates a Tabula Muris. **Nature (2018)**. bioRxiv preprint

11. **Yuan Xue**, Jossef Osborn, Anand Panchal, Jay L. Mellies. The RpoE stress response pathway mediates reduction of enteropathogenic Escherichia coli virulence by zinc. **Applied and Environmental Microbiology (2015)**.

12. Jing Zhou, Shi-Hao Tan, Valerie Nicolas, Chantal Bauvy, Nai-Di Yang, Jianbin Zhang, **Yuan Xue**, Patrice Codogno, Han-Ming Shen. Activation of lysosomal function in the course of autophagy via mTORC1 suppression and autophagosome-lysosome fusion. **Cell Research (2013)**.

    *equal contributions; ‡corresponding authors

Conferences & Presentations

Poster presentation	CSHL Biological Data Science
5-hydroxymethylcytosine analysis reveals stable epigenomic changes in tumor tissue that enable cancer detection in cell-free DNA	*2024*
Oral presentation	ESMO Congress
5-Hydroxymethycytosine analysis reveals stable epigenetic changes in tumor tissue that enable cfDNA cancer predictions	*2022*
Invited talk	National University of Singapore
Building a single-cell atlas of Toxoplasma interactome	*2019*
Invited talk	Cell Symposia Single Cells: From Technology to Biology
Building a single-cell atlas of Toxoplasma interactome	*2019*
Poster presentation	Stanford Bioengineering department retreat
Single-cell co-transcriptomic measurement resolves parasitic life cycle and host interactions	*2018*
Invited talk	Stanford Microbiology & Immunology department retreat
Building a single-cell atlas of Toxoplasma interactome	*2018*
Poster presentation	Stanford Bioengineering department retreat
Cool biochemistry measured with a hot tool	*2017*
Poster presentation	Gordon Research Conference: Nucleic Acids
Temperature adaptation and polymerase fidelity	*2017*

Poster presentation	Gordon Research Conference: Microbial Toxins & Pathogenicity
Molecular Mechanism of Zinc Disruption of Enteropathogenic Escherichia coli Pathogenesis	*2014*

Awards & Honors

Bio-X Travel Award
Stanford Bio-X program *2019*

Stanford Interdisciplinary Graduate Fellowship
Awarded to eleven students to support their doctoral research with an interdisciplinary scope for three years. *2018*

Postbaccalaureate Research Fellowship
Reed College, Biology Department *2014*

Summer Experience Research Award
Reed College *2013*

Gold Team Medal
MIT iGEM Competition *2009*

Professional Service

Teaching Assistant	Stanford University
Microfluidic Device Laboratory (BioE301D)	*2018*
Teaching Assistant	Stanford University
Introduction to Bioengineering (BioE80)	*2017*
Teaching Assistant	Reed College
Microbiology	*2014*
Academic Tutor	Reed College
Biology, Chemistry	*2011 − 2014*

Skills

Languages: English (native), Cantonese (native), Mandarin (native), Japanese (conversational)

Technology Stack: Python, R, SQL, PyTorch, scikit-learn, DBT, Nextflow, Snakemake, AWS, Snowflake, Slurm, Docker

Bioinformatics: BWA, STAR, minimap2, bedtools, salmon, samtools, scanpy, velocyto, htseq-count, Kraken, BLAST

Domains: single-cell genomics, cfDNA fragmentomics, epigenomics, cancer diagnostics, statistical modeling, deep learning