Yuan Xue (Soso)

Single-cell data science, biochemistry, machine learning,
Bioengineering Ph.D. Candidate @ Quake lab, Stanford

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Background statement

I have over a decade long experience in life sciences research. I have expertise in most modern experimental and analytical methods for high-throughput measurement, data processing, and systematic analysis. I also have research experience in protein chemistry, infectious microbiology, and cellular biology.

Education

Stanford University 2017 - now
Ph.D. Bioengineering. Thesis adviser: Stephen Quake *Stanford, CA, USA*

Stanford University 2015 - 2017
M.S. Bioengineering *Stanford, CA, USA*

UT Southwestern Medical Center 2014 - 2015
Biophysics *Dallas, TX, USA*

Reed College 2010 - 2014
B.A. Biology. Thesis adviser: Jay Mellies *Portland, OR, USA*

La Salle Catholic College Preparatory 2007 - 2010
Portland, OR, USA

Diocesan Boys' School 2003 - 2007
Hong Kong, PRC

Awards & Honors

Stanford Bio-X Travel Award 2019

Stanford Bio-X SIGF Fellow 2018

› One of 11 students awarded with a three-year fellowship to conduct interdisciplinary research on the topics of parasitology and single-cell bioinformatics co-advised by professors John Boothroyd and Stephen Quake

Reed College Larry Ruben Postbac. Research Fellow 2014

Reed College Summer Experience Awardee 2013

Reed College Independent Research Awardee 2012

iGEM Competition Team Gold Medalist 2009

Projects

Life-cycle of Toxoplasma gondii and co-transcriptomic analysis of host infection 2018-now

› Produced the first single-cell atlas of *Toxoplasma*. Built an interactive visualization website with Apache2, Flask, Bokeh. Comparative analysis to *Plasmodium berghei* revealed concerted genetic program to life-cycle.

A novel single-cell analysis algorithm: self-assembling manifolds (SAM) 2017-2019

› Single-cell sequencing reveals novel germ cell population in a parasitic flatworm, Schistosoma mansoni.

Temperature effect on DNA polymerase fidelity 2015-2018

› Characterized error rate of DNA polymerase adapted to a wide range of temperature. Found their polymerase fidelity is differentially sensitive to changes in reaction temperature. Manuscript currently in preparation.

Publications

1. **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)**. article, bioRxiv preprint
2. **Yuan Xue**, Stephen R. Quake. Temperature effect on DNA polymerase fidelity. In preparation (2019).
3. Alexander Tarashansky, **Yuan Xue**, Pengyang Li, Stephen R. Quake, Bo Wang. Self-assembling Manifolds in Single-cell RNA Sequencing Data. **Elife (2019)**. article, bioRxiv preprint
4. **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)**. article, bioRxiv preprint
5. **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)**. spotlight research article
6. 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)**. article

Teaching Experience

TA in microfluidic device laboratory (BioE301D) @ Stanford University 2018
TA in introduction to bioengineering (BioE80) @ Stanford University 2017
TA in microbiology @ Reed College 2014
Academic tutor in cellular biology and chemistry @ Reed College 2011-2014

Poster & Conference

Building a single-cell atlas of Toxoplasma interactome 2019
Invited speaker at National University of Singapore *Yuan Xue et al.*

Building a single-cell atlas of Toxoplasma interactome 2019
Invited speaker at Cell Symposia Single Cells: From Technology to Biology *Yuan Xue et al.*

Single-cell co-transcriptomic measurement resolves parasitic life cycle and host interactions 2018
Poster presenter @ Stanford Bioengineering department retreat *Yuan Xue et al.*

Building a single-cell atlas of the Toxoplasma interactome 2018
Invited speaker @ Stanford Microbiology & Immunology department retreat *Yuan Xue et al.*

Cool biochemistry measured with a hot tool 2017
Poster presenter @ Stanford Bioengineering department retreat *Yuan Xue, Stephen R. Quake*

Temperature adaptation and polymerase fidelity 2017
Poster presenter @ Gordon Research Conference (GRC): Nucleic Acids *Yuan Xue, Stephen R. Quake*

Skills

Languages English, Cantonese, Mandarin, Japanese, Python, R, C^{++}, Bash

Visualization matplotlib, seaborn, bokeh, networkX, graphviz, graph-tool

Machine learning numpy, pandas, sklearn, scikit-learn, tensorflow, keras

Workflows snakemake, cloud computing (e.g. AWS, Slurm)

Web development Flask-REST api, Apache2

Bioinformatics STAR RNA aligner, htseq-count, salmon, velocyto, samtools, cell ranger, scanpy

Experimental Smart-seq2, 10X 5' feature barcoding, molecular cloning, HPLC protein purification, gel-based assay, FACS, tissue culturing, fluorescence imaging, viral transfection, high-throughput liquid-handling

Maintained packages

singleCell_snake A snakemake pipeline for local/Slurm submission of single cell data alignment and transcript counting

DensityPlot A python package for generating density plot commonly seen in FACS analysis

bag_of_velocyto A Slurm submission script for parallel submission of RNA velocity alignment