Yuan Xue

Bioengineering Graduate Student
Stanford University

Education Background

2017 - now
Ph.D., Bioengineering
Thesis Adviser: Stephen Quake
Stanford University

2015 - 2017
M.S., Bioengineering
Stanford University

2014 - 2015
UT Southwestern Medical Center
Biophysics

2010 - 2014
B.A., Biology
Thesis Adviser: Jay Mellies
Reed College

2007 - 2010
La Salle Catholic College Preparatory, Portland

2003 - 2007
Diocesan Boys' School, Hong Kong

Awards & Honors

Stanford Bio-X Travel Award **2019**
Stanford Bio-X SIGF Fellow **2018**
-One of eleven 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. Reseach Fellow **2014**
Reed College Summer Experience Awardee **2013**
Reed College Independent Research Awardee **2012**
iGEM Competition Team Gold Medalist **2009**

Current Research Projects

Life-cycle of *Toxoplasma gondii* and co-transcriptomic analysis of host infection.
In colloration with Boothroyd lab, Dept. of Microbiology & Immunology
-Developed method to measure the co-transcriptomic changes of mammalian host cells infected by *Toxoplasma*, an intracellular parasite that infects ~20% world population.
-Comprehensive description of *Toxoplasma* life-cycle and bradyzoite differentiation on the single-cell level.
-Co-transcriptomic measurement of single infected host cells reveals differential host response to infection by heterogeneous mixture of parasites.

A novel single-cell analysis algorithm: self-assembling manifolds (SAM)
In colloration with Wang lab, Dept. of Bioengineering
-Collected single-cell sequencing data of somatic stem cells in the course of differentiation from juvenile *Schistosoma mansoni*, a parasitic flatworm that infects >250 million people worldwide.
-Applied a new manifold learning algorithm to discover novel stem cell populations and recover relevant stem cell marker genes.
-Benchmarked SAM against state of the art single-cell analysis methods and found that it improves dimensionality reduction and can recover transcriptional differences of subtle populations in single-cell data.

Cold-adaptation of DNA polymerase and temperature effect on fidelity
-Recombinantly purified DNA polymerases from one of the coldest living bacteria that lives at -12°C.
-Biochemically characterized the temperature profile of polymerase activity and measured activity at -19°C, the coldest temperature for which extension has been demonstrated in vitro.
-Measured the effect of temperature on fidelity of psychrophilic, mesophilic, and thermophilic DNA polymerases using UMI sequencing.
-Showed evidence of differential sensitivity to reaction temperature as a result of temperature adaptation.

Contact Details

Email: yuanxue@stanford.edu

Website: http://about-yuanxue.com/

Research Interests

1. Single-cell co-transcriptomic measurement of Toxoplasma life-cycle and host infection

2. Single-cell reconstruction of Schistosoma mansoni sexual development

3. Cold-adaptation of enzymes and microbes

Languages

English
Mandarin
Cantonese
Japanese
Python
R
C++

Skills

Molecular biology
Biochemistry
Machine learning
Bioinformatics

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Publications

1. **Yuan Xue**, Terence Theisen, Suchi Rastogi, Abel Ferrel, Stephen R. Quake, John Boothroyd. Single-cell transcriptional landscape of asexual life cycle in Toxoplasma gondii. In preparation (2019).
2. **Yuan Xue**, Stephen R. Quake. Temperature effect on DNA polymerase fidelity. In preparation (2019).
3. Alexander Tarashansky*, **Yuan Xue***, Stephen R. Quake, Bo Wang. Self-assembling Manifolds in Single-cell RNA Sequencing Data. In revision (2018).
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).
5. **The Tabula Muris Consortium**, Stephen R. Quake, Tony Wyss-Coray, Spyros Darmanis. Transcriptomic characterization of 20 organs and tissues from mouse at single cell resolution creates a Tabula Muris. bioRxiv (2017, under review).
6. **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).
7. 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).

Poster and Conference Presentations

1. **Yuan Xue**. Suchi Rastogi, Terence Theisen, Abel Ferrel, John Boothroyd, Stephen R. Quake. Building a single-cell atlas of Toxoplasma interactome. Invited speaker at National University of Singapore. 2019.
2. **Yuan Xue**, Suchi Rastogi, Terence Theisen, Abel Ferrel, John Boothroyd, Stephen R. Quake. Building a single-cell atlas of Toxoplasma interactome. Invited speaker presentation at Cell Symposia: Single Cells: Technology to Biology, Singapore. 2019.
3. **Yuan Xue**, Terence Theisen, Suchi Rastogi, Abel Ferrel, Stephen R. Quake, John Boothroyd. Single-cell co-transcriptomic measurement resolves parasitic life cycle and host interactions. Stanford Bioengineering Departmental Retreat. Poster presentation at Chaminade Resort and Spa, Santa Cruz, CA, USA. 2018.
4. **Yuan Xue**, Stephen R. Quake. Cool Biochemistry Measured With A Hot Tool. Stanford Bioengineering Departmental Retreat. Poster presentation at Chaminade Resort and Spa, Santa Cruz, CA, USA. 2017.
5. **Yuan Xue**, Stephen R. Quake. Temperature Adaptation and Polymerase Fidelity. Gordon Research Conference (GRC) and Seminar (GRS): Nucleic Acids. Poster presentation at University of New England, Biddeford, ME, USA. June 3-9, 2017.
6. **Yuan Xue**, Jossef Osborn, Jay Mellies. Molecular Mechanism of Zinc Disruption of enteropathogenic Escherichia coli pathogenesis. Gordon Research Conference (GRC): Microbial Toxins & Pathogenicity. Poster presentation at Waterville Valley Resort, Waterville Valley, NH, USA. July 20-25, 2014.

Teaching Experience

2018	TA in Microfluidic Device Laboratory (BioE301D)	Stanford University
2017	TA in Introduction to Bioengineering (BioE80)	Stanford University
2014	TA in Microbiology	Stanford University
2011-2014	Tutor in Cellular Biology and Chemistry	Reed College

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