Binglun Shao

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Education

Princeton University **Sep 2018 – May 2022**

B.S.E. in Chemical & Biological Engineering **GPA: 3.94**

- Concentrated in Optimization, Dynamics, and Information Technology
- Minored in Applications of Computing
- Honors: *summa cum laude*, Phi Beta Kappa Society, Sigma Xi Society, Richard K. Toner Thermodynamics Prize (awarded to one senior each year)

Research

Guest Researcher in Computational Biology **Jun 2021 – Nov 2022**

Flatiron Institute, Simons Foundation

- Analyzed several classes of deep learning 3D instance segmentation methods, including networks that use residual connections, transformers, spatial embeddings, and encoder-decoder structures, for the segmentation of mammalian embryonic cells and nuclei
- Generated a large ground-truth dataset of early mouse embryonic cells from 3D time series and benchmarked different nuclear instance segmentation methods
- Processed 3D time series using the best performing model to study the mechanisms by which cell-cell interactions generate fate patterns in a developing embryo
- **Advisors:** Stas Shvartsman (Princeton/Flatiron), Eszter Posfai (Princeton), Lisa Brown (Flatiron)

Student Researcher **Jan 2020 – May 2022**

Lewis-Sigler Institute for Integrative Genomics, Princeton University

- Project 1: Developed mathematical models to analyze collective growth dynamics in the *Drosophila* egg chamber and numerically simulated intercellular transport between the oocyte and nurse cells
- Project 2: Conducted optogenetic experiments on the *Drosophila* egg chamber to investigate the mechanical growth coordination between tissues by perturbing actomyosin contractility
- Project 3: Used deep learning instance segmentation to study pole cell formation during *Drosophila* embryogenesis
- **Advisor:** Stas Shvartsman

Publications

Collective oscillations of coupled cell cycles, Binglun Shao*, Rocky Diegmiller*, Stanislav Y. Shvartsman, *Biophysical Journal* (2021), https://doi.org/10.1016/j.bpj.2021.06.029. *Co-first authors.

BlastoSPIM: 3D instance segmentation of nuclei in the mouse blastocyst, Hayden Nunley*, Binglun Shao*, Prateek Grover, Jaspreet Singh, Bradley Joyce, Rebecca Kim-Yip, Abraham Kohrman, Aaron Watters, Zsombor Gal, Alison Kickuth, Stanislav Shvartsman, Eszter Posfai, Lisa M. Brown, pending submission to *Plos Computational Biology*. *Co-first authors.

Work Experience, Service, & Activities

Associate Consultant **Aug 2022 – Present**

Trinity Life Sciences (San Francisco, CA)

- Trinity is a leading life science management consulting firm that provides strategic and tactical insights to clients worldwide, which include a mix of pharmaceutical, biotechnology, medical device, and diagnostic companies
- Conducted secondary research to help client understand the state of the art in insert gene editing and identify competitors developing gene-insertion based therapies
- Analyzed the commercial potential and competitive landscape for neuroinflammatory diseases to aid client in understanding stakeholder needs and peak market opportunity

Business Development Team Member **Sep 2019 – Jan 2022**

Alimtas Bioventures - Entrepreneurship Club, Princeton University

- Developed sustainable and efficient business strategies for promising life-science technologies from the university
- Conducted rigorous due diligence in areas of competitive landscape, value propositions, and exit strategies
- Pitched finalized strategies to venture capital and biopharmaceutical companies across the country

Committee on Diversity, Equity, Climate and Inclusion (DECI) **Sep 2020 – Sep 2021**

Dept. of Chemical and Biological Engineering, Princeton University

- Served as undergraduate representative and made the DECI website more accessible and informative

Violinist in Princeton University Orchestra **Sep 2018 – May 2021**

Princeton University

- Rehearsed 6 hours each week and performed 4 concerts every year
- Toured 3 cities in Spain

Product Manager Intern **Jun 2019 – Aug 2019**

Beijing Yuanli Education Technology Co. (Beijing, China)

- Conducted market research and developed product requirements at the largest online K-12 education platform in China

Auto-Intelligence Intern **Jun 2018 – Aug 2018**

Deep Learning Co. (Shanghai, China)

- Worked with full-time engineers to deliver an automated defect-inspection solution for automotive manufacturing clients; project used state-of-the-art segmentation networks