Binglun Shao

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Education

Princeton University   **2018 – 2022**

B.S.E. Chemical & Biological Engineering, *summa cum laude*   **GPA: 3.94**
  - Concentrated in Optimization, Dynamics, and Information Technology
  - Certificate in Applications of Computing
  - Awards & honors: Richard K. Toner Thermodynamics Prize, Phi Beta Kappa, Sigma Xi

Research

Undergraduate Researcher   **2020 – 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 3D instance segmentation methods to study pole cell formation and lineage during *Drosophila* embryogenesis
  - **Advisor:** Stas Shvartsman

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

Flatiron Institute, Simons Foundation

  - Benchmarked several classes of deep learning 3D instance segmentation methods – including networks which use residual connections, transformers, spatial embeddings, and encoder-decoder structures – for the segmentation of mammalian embryonic cells and nuclei
  - Generated a large-scale ground-truth dataset of early mouse embryonic cells from 3D time series
  - Processed 3D time series using the best-performing segmentation 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)

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 **2022 – Present**

Trinity Life Sciences (San Francisco, CA)
- Completed 5 projects to date providing strategic advice to life science companies worldwide in areas including neuroinflammatory diseases, gene editing, and cell-selective drug delivery mechanisms
- Conducted literature review, competitive analysis, and interviews with physicians to help clients strategize R&D effort

Business Development Team Member **2019 – 2022**

Alimtas Bioventures – Entrepreneurship Club, Princeton University
- Developed sustainable business strategies for novel life-science technologies from Princeton
- Conducted rigorous due diligence in competitive landscape, value propositions, and exit strategies
- Pitched finalized strategies to venture capital and biopharmaceutical companies across the U.S.

Diversity, Equity, Climate and Inclusion Committee Member **2020 – 2021**

Department of Chemical and Biological Engineering, Princeton University
- Served as an undergraduate representative at the committee's monthly meetings
- Helped develop the DECI website with a focus on accessibility

Principal Second Violinist **2018 – 2021**

Princeton University Orchestra
- Rehearsed six hours a week and performed four concerts each year
- Performed and toured in Zaragoza, Barcelona, and Madrid, Spain in January 2019

Product Manager **Summer 2019**

Beijing Yuanli Education Technology Co. (Beijing, China)
- Conducted market research and developed product specifications at the largest online K-12 education platform in China

Machine Learning Intern **Summer 2018**

Auto-Intelligence (Shanghai, China)
- Worked with full-time engineers to deliver an automated defect-inspection solution for automotive manufacturing clients; project used state-of-the-art image segmentation networks