

XUAN OUYANG

No.5 Yiheyuan Road, Haidian District, Beijing 100871, P.R.China

1900012177@pku.edu.cn [◇ GitHub](#) [◇ Personal Website](#)

EDUCATION

Integrated Science Program, Peking University, Beijing, China

Sept. 2019 - Present

- Bachelor of Science: Major GPA: 3.71/4.00
- Core Coursework: Quantitative Molecular Biology, Population Genetics, Thermal Physics, Quantum Mechanics(A), Advanced Mathematics, Mathematical Analysis I(H), Physical Chemistry I(H)

RESEARCH EXPERIENCE

Research Assistant, Center for Quantitative Biology, Peking University

Oct. 2023 - Present

Project: Investigation of Osmoregulation Strategies in *Saccharomyces Cerevisiae* Using Microfluidics.

Advisor: Jie Lin

- Formulated several experiment-feasible predictions based on the osmoregulation model in previous work.
- Constructed a microfluidic platform to validate the predictions derived from the model.

Research Assistant, Department of Physics, University of California San Diego

Aug. 2023 - Oct. 2023

Project: Evolutionary Gene Expression Strategies Exploration through the Discovery of Promoter Sequence Patterns in *E. coli*.

Advisor: Terence Hwa

- Developed the whole algorithm for optimizing transcription start sites in sigma70 family promoters.
- Developed methods to refine promoter strength from gene level to single promoter level by using RNA sequencing raw data.
- Identified promoter sequence patterns dependent on and independent of promoter strength through sequence information entropy and nucleotide frequency analysis.

Research Assistant, Department of Physics, University of California San Diego

June 2023 - Oct. 2023

Project: Revealing the Genome-wide Landscape of sRNA-mediated Gene Expression Regulation across Conditions in *E. coli*.

Advisor: Terence Hwa

- Processed omics data from scratch, generated an integrative cross-conditions gene expression dataset by integrating omics data with additional quantitative experiment results.
- Built a reliable genome-wide sRNA-mRNA interaction map by integrating ~30 publicly available datasets.
- Generated genome-wide landscape illustrating sRNA-mediated regulation of mRNA stability and translation ability under nutrient limitation conditions

Research Assistant, Center for Quantitative Biology, Peking University

Sept. 2022 - June 2023

Project: Mechanism of Accurate Division in *E. coli* and its Response to Hyperosmotic Shock.

Advisor: Jie Lin

- Reproduced a 1D MinCDE oscillation model and demonstrated the consistency between simulation and published experiment results dynamically and in a statistically average sense.
- Provided a theoretical length range for proper cell division through theoretical analyses including linear stability analysis and Fourier Transform.
- Posed theory for filamentous cell formation in simulation and theory, enlightening the filamentous cells recovery.
- Extended the model to hyperosmotic shock condition, proposed the strategy against osmotic shock that cells initiate Min system oscillation beforehand for premature division through shrinking.

Research Assistant, Center for Quantitative Biology, Peking University Feb. 2023 - June 2023
Project: Ribosome Allocation Strategies under Nutrient Shift of *Saccharomyces Cerevisiae*.
Advisor: Jie Lin

- Exploring the proteomics and transcriptomics data of budding yeast under nutrient shift.
- Built an ODE model and exploited mined data to calculate the working ratio of ribosomes and the ribosome fraction of producing ribosomes.

Research Assistant, Center for Quantitative Biology, Peking University Oct. 2021 - Jan. 2022
Project: Confirming the Order of Genetic Mutations and Selection in *E. coli* (Luria–Delbrück experiment).
Advisor: Chao Tang

- Designed and cultured *E. coli* across different stress conditions, measured the population growth.
- Theoretically and computationally analyzed experimental data, confirmed genetic mutations precede selection.
- Independently debugged experiment-related issues, guided students to achieve successful result replication.

LEADERSHIP AND ACTIVITY

Vice-president, Peking University Students' Union Nov. 2020 - Sept. 2021

- Organized the 19th “The Front of Peking University” debate competition
- Organized Spring Festival activities of Peking University Library

Lecturer, Student Union of Yuanpei College Mar. 2022 - June 2022

- Developed curriculum for the “YUAN Plus” course to teach students about skills and methods in \LaTeX over three sessions.

SKILLS & LANGUAGES

- Programming Languages: Matlab (proficient), \LaTeX (proficient), Python, R.
- Language: Mandarin (native), English (fluent)