Zelun Li

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Education

The High School Affiliated to Renmin University, Beijing, China Sept. 2012 – July. 2018
A-level: Biology: A*, Physics: A*, Math: A, Chemistry: A

University of New South Wales, Sydney, Australia Feb. 2019 – Dec. 2023
Bachelor of Advanced Science(Bioinformatics)/Computer Science(Artificial Intelligence) WAM: 86+
Graduated with First Class Honours
Faculty of Science Dean's List (UNSW) Awarded to the top 50 science student of the year 2020.

Research Interests

Synthetic Biology, Regulatory Genomics, Machine Learning

Research Projects

Investigation of BAM15 as a Protective Agent for Islet Transplant Feb. 2020 – May. 2020
Research Intern *Sydney, Australia*

- Cultured, and maintained pancreatic beta cells, ensuring viability and functionality for downstream analyses.
- Conducted a short review of current challenges in islet transplantation, including oxidative stress, immune rejection, and islet viability.

Advisor: Dr. Frances Byrne, Senior Lecturer at the School of Biotechnology & Biomolecular Sciences, UNSW
Mentor: Dr. Sing-Young Chen (PhD student at the time)

Engineering of Symbiodium algae in coral to increase thermal tolerance Feb. 2020 – Nov. 2020
Dry Lab part of iGEM project *Remote*

- Built a mathematical model(ODEs) of heat shock response using Python System Biology package aims to verify wet lab design decisions in lowering levels of misfolded proteins and reactive oxygen species.

Primary PI: Dr. Dominic Glover, UNSW

Detecting Early Onset of Dementia with fMRI Data March. 2020 – Dec. 2020
Taste of Research as part of an undergraduate group research program *Remote*

- Analyzed 4D fMRI data with recurrent neural network using Pytorch.

Advisor: Prof. Lina Yao, UNSW and Prof. Yu Zhang, Lehigh University

Introducing C++ templated code in Physics Simulation Software GAMBIT Nov. 2021 - Feb. 2022
Research Intern *Remote*

- Leveraged CastXML to parse templated C++ code from libraries and auto-generate C++ code in compatible format for main GAMBIT interface.

Advisor: Dr. Anders Kvellestad, University of Oslo and Dr. Tomas Gonzalo, Karlsruhe Institute of Technology

Applying diffusion model to regulatory sequences and its *in silico* verification Feb. 2023 - Dec. 2023
Honours Project *Sydney, Australia*

- Deployed Enformer model on HPC to test the efficacy of generated sequences in reactivating gene expression.
- Selected genomic sites where enhancer TSS pairs from FANTOM CAGE dataset sensitive to sequence changes *in silico* in Enformer model.
- Fine-tuned Enformer for 200bp enhancer cell type classification using Low-Rank Adaptation.

Advisor: Prof. Emily Wong, UNSW and Prof. Luca Pinello, Harvard University

Teaching Experience

COMP2041 Software Construction Feb. 2021 – Dec. 2023

Teaching Assistant *Sydney, Australia*

- Demonstrated bash and python scripting for a cohort of 20 students weekly.

Instructor: Andrew Taylor, UNSW

COMP9444 Deep Neural Networks Sept. 2021 – Dec. 2023

Teaching Assistant *Sydney, Australia*

- Gave weekly tutorials and engaged students on deep learning question sets.
- Designed a complete image classification assignment: wrote auto testing script, scaffold code and prepared data sets for a cohort of over 500 students.

Instructor: Dr. Alan Blair, UNSW

BINF2010 Introduction to Bioinformatics Sept. 2022 – Dec. 2023

Teaching Assistant *Sydney, Australia*

- Demonstrated lab exercises to guide students through bioinformatics lab practices.

Instructor: Dr. Bruno Gaeta, UNSW

BINF3020 Computational Bioinformatics May. 2023 – Aug. 2023

Teaching Assistant *Sydney, Australia*

- Demonstrated lab exercises to guide students through bioinformatics lab practices.

Instructor: Dr. Bruno Gaeta, UNSW

Publications

Cornejo-Páramo, P., Zhang, X., Louis, L., Yang, Y.-H., **Li, Z.**, Humphreys, D., Wong, E. S. (2024). "A Bag-Of-Motif Model Captures Cell States at Distal Regulatory Sequences". In: *bioRxiv*.

DaSilva, L. F., Senan, S., Patel, Z. M., Reddy, A. J., Gabbita, S., Nussbaum, Z., Córdova, C. M. V., Wenteler, A., Weber, N., Tunjic, T. M., Khan, T. A., **Li, Z.**, Smith, C., Bejan, M., Louis, L. K., Cornejo, P., Connell, W., Wong, E. S., Meuleman, W., Pinello, L. (2024). "DNA-Diffusion: Leveraging Generative Models for Controlling Chromatin Accessibility and Gene Expression via Synthetic Regulatory Elements". In: *bioRxiv*.

Skills & Interests

Programming Languages: Python, Bash, R, C++, Java, Latex, C, Assembly

Libraries/Frameworks: Pytorch, Tensorflow, Seurat, edgeR, BLAST, Biopython, PyMOL, Flask