

Chi Kit Sou

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Education

Tsinghua University

Sept 2020 – Jun 2025

Department of Chemical Engineering

GPA: 3.51 / 4.0

Major in Chemical Engineering and Industrial Biological Engineering

- **Awards:**

- **iGEM Startups Biohackathon & VCL Grand Prize, 2023**

- Team up with cofounders from Europe, Asia and Africa, the top 1 team among 38 teams from different countries.

- **The Most Investable Team of SDG Open Hack @Tsinghua University, 2020 & 2021**

- Proposed an app to raise awareness about city hygiene and excrescence.

- **Scholarship:** Academic Merit Scholarship, Sports Merit Scholarship, Macau College Scholarship

- **Selected Courseworks:**

Calculus I & II	College physics	Mathematical experiment	C++ programming
Biochemistry	Molecular biology	Synthetic biology	Industrial biology
Corporate Finance	Investment	Accounting	Microeconomics

University of Cambridge

Oct 2025 – Jun 2029

Department of Chemistry

Offer Accepted

PhD in Chemistry, Focus on Chemical biology and Synthetic biology

Publications

1. Junzhu Yang#, Chi-Kit Sou#, Yuan Lu*, Cell-free biocatalysis coupled with photo-catalysis and electro-catalysis: Efficient CO₂-to-chemical conversion, Green Energy & Environment, 2024. (cover article)
2. Shangsong Li#, Dong Liu#, Yuping Hu#, Zhijie Su, Xinai Zhang, Ruirui Guo, Dan Li, Yuan Lu*. Soft magnetic microrobot doped with porous silica for stability-enhanced multimodal locomotion in a nonideal environment. ACS Applied Materials & Interfaces, 2022. (Zhijie Su refers to Chi Kit Sou)

Research Experience

Prof. David Weitz, Harvard University

July 2024 – Oct 2024

Project: High-throughput screening of nanobodies by templated emulsification.

- Accelerated the discovery and development of antibodies for neuroblastoma, addressing the need for rapid antibody therapies to target randomly mutated peptides displayed the tumour cell surface.
- Developed a novel method for nanobody library preparation by randomizing only the complementarity determining regions (CDRs), creating a generic library that can be evolved to target any antigen.
- Genotype-phenotype association (GPA) using templated emulsification, co-encapsulating single DNA molecules and hydrogel beads that could capture both DNA and nanobodies.
- Bio-conjugation of DNA primers and benzylguanine (BG) onto agarose using click chemistry, enabling hydrogel beads to capture DNA and nanobodies with a SNAP tag in droplets.

Prof. Yujia Qing & Prof. Hagan Bayley, University of Oxford

July 2023 – Dec 2023

Project: Protein nanopore engineering of long beta-barrel for protein sensing.

- Electrophysiology assay and single channel recording of membrane protein channels.
- Extending the protein beta-barrel using bioinformatics, revealed the ion conductivity and the length of the protein beta-barrel are inversely proportional.
- Developed protocols for expression and purification of Protective Antigen, a heptameric membrane protein capable of translocating enzymes into the cytoplasm, and explored its potential for protein sensing.

Prof. Nigel Scrutton, University of Manchester

Feb 2023 - June 2023

Project: Photoenzyme: fatty acid photodecarboxylase engineering.

- Developed and optimized the preparation protocol and assay for photoenzymes, which can convert fatty acids into hydrocarbons by blue-light activation.
- Expanding the substrate scope, originally limited to palmitic acid, to include shorter-chain fatty acids ranging from C4 to C12, whose hydrocarbons are used in gasoline and jet fuel.
- Utilized carbon dioxide and NADPH as probes to detect enzyme kinetics for real-time monitoring, replacing conventional assay with time-consuming gas chromatography.
- Investigated the mechanism of photoenzymes, which catalyse fatty acids with cofactor flavin adenine dinucleotide (FAD) by absorbing blue light.

Prof. Yuan Lu, Tsinghua University

Sep. 2022 - Feb.2023

Project: Cell-free synthetic biology, an enzymatic pathway of CO₂ fixation with photosynthesis.

- Constructing a new enzymatic pathway to turn CO₂ into valuable chemical compounds, with NADPH and ATP cofactors regeneration by thylakoids.
- Enhancing the overall quantum yield of the photocatalytic system using quantum dot materials.
- Immobilizing thylakoids and enzymes using molecular sieves and metal-organic frameworks (MOFs) enhances reusability and robustness for photocatalysis under long-term illumination.
- Switching NADH-dependent enzymes to NADPH depending to couple with the NADPH regeneration of thylakoids.

Conferences

- **Harvard Chinese Life Science Annual Symposium, 2024**
Participated a lecture of in vivo delivery of CRISPR system given by Prof. Feng Zhang from Broad Institute.
- **iGEM Grand Jamboree, Paris, 2023**
Were invited with sponsoring to pitch at the biggest conference of synthetic biology.
- **27th International Symposium on Synthesis in Organic Chemistry, 2023**
Participated a lecture about metal organic frameworks (MOFs) given by Prof. Omar Yaghi from UC Berkeley.

Professional Skills

- **Research softwares:** SnapGene, AlphaFold, ChimeraX, PyMol.
- **Computing and programming:** Matlab, Python, Comsol, C++ , LaTeX.
- **Scientific graphing:** Blender, Adobe Illustrator and Photoshops, Biorender.
- **Wet-lab skills:** Protein expression and purification, Microfluidics, DNA recombination, Mini & Maxi-prep, PCR, Gel electrophoresis, Enzymes kinetic measurement, Cryo-EM, Confocal microscopy, Click chemistry, LC-MS, Random-mutagenesis, DNA library preparation.

Others

- **iGEM Synbio in Space, Project member, 2024**
Self-organised initiative for investigation the potential application of synthetic biology in space exploration.
- **Selected Course Projects**
"Microalgae as cell factory to convert CO₂ into value-added products" from Industrial Biology.
"Polysaccharides-based targeted oral drug delivery systems" from Research Training.
"Selective hydrogenation of acetylene: Reactor design and simulation" from Reaction Engineering.
- **UCL Summer School, 2021**
Scientific computing with Python and C++.