Cong Li

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Education

- **University of Science and Technology of China(USTC)** Hefei, China
  Bacholor of Life Science; GPA: 4.04/4.30; Ranking: 1/76 *Sep 2021-Present*

Skills Summary

- **Programming Languages**: Python, C, HTML
- **Tools**: Docker, Git, Fiji, pytorch, brainpy, scipy, Origin, Graphpad, matplotlib
- **Experimental Skills**: Molecular cloning: PCR, cell culture, transformation, competent cell preparation; Biochemistry skills: gel electrophoresis, column chromatography; Experience in microinjection in C.elegans
- **English**: TOEFL, 98 (Reading 30, Listening 24, Speaking 17, Writing 27)

Academic Experience

- **Simulation of sharp-wave ripples and sequence relay in CA3 region of mice** USTC
  Group Leader, Under the supervision of Haiyan Liu *Sep.2023 - Dec.2023*
  - **Optimized simulation work published on Elife**: An optimized version of the simulation work published on Elife. A group of AdExpIF neurons connected by biexponential synapses was constructed. By considering the STDP and STD of synapses, we successful simulated the sharp-wave ripples, sequence replay and its early termination in CA3 region of mice.
- **Construction of optical platform and software implementation of multi-worm tracking** USTC
  Group Leader, Under the supervision of Quan Wen *Jun.2023 - Apr.2024*
  - **Construction of optical platform**: To meet the demand of observing nematode group behavior over a large spatial range while guaranteeing the resolution, a 2×2 camera array was constructed. We set one camera as the main camera which would using its capturing shoot level to control the other three cameras to capture images. In addition, we equipped the platform with a mechanic focusing system and controllable light source.
  - **Software implementation of multi-worm tracking**: We developed a python program to stitch all the images captured by the four cameras, in which we use SIFT to detect the feature points in the images captured by corresponding cameras and then selecting out the most relevant feature points to get the transformation matrix for stitching those images. Next, we used a software named tierpsy to track the motion of nematode population.
- **Diet Sugar Tagatose Production with Thermotolerant Yeast** USTC
  Leader of Modelling Group, Under the supervision of Jiong Hong *Nov.2022 - Oct.2023*
  - **Linker design for fusing two enzymes**: According to our design of producing tagatose, D-xylose reductase from Scheffersomyces stipites(denoted by XR) and Galactitol 2-dehydrogenase from Rhizobium leguminosarum bv. viciae(denoted by GDH) would be expressed heterogeneously in the Kluyveromyces marxianus. However, their working efficiency may be considerably low because of the diffusion of the intermediate product – galactitol. Thus, we hope to build a fusion protein which can simulate the substrate channel existing in the natural enzymes and simplify the design as simple as possible at the same time. Therefore, I tried to use Alphafold2 to predict the structure of fusion enzyme and selected out those with relatively short substrate channel. Also I tested the stability of predicted structure by Gromacs.
  - **Codon optimization**: we have found that codon context(CC) of a gene sequence usually have more contributions to the expression level than individual codon usage(ICU). However, this factor is ignored in most codon optimizing applications available in the market, like Codon Optimizer, Gene Designer and etc. So I developed a procedure to score codon sequence balancing ICU and CC and optimize the best one utilizing genetic algorithm.
- **Optimized Lipid Nanoparticle Drug Delivery System through Borneol Modification** USTC
  Group Member of Experiment Group, Under the supervision of Jiong Hong *Nov.2021 - Oct.2022*
  - **Assistance in transformation, yeast strain screening and so on**: Focus on introducing borneol synthesis-related genes to Yarrowia lipolytica for high production of borneol. The borneol will be used to construct lipid nanoparticle to deliver pharmaceutical drug. I helped in constructing the transformed yeasts and measured its borneol production by HPLC. This project won the Silver Award of iGEM in 2022.

Honors and Awards

- Silver Award of iGEM in 2022, Oct.2022
- Rose Scholarship, Nov.2022
- **National Scholarship**, Oct.2023
- Silver Award of iGEM in 2023, Oct.2023

Teaching Experience

- **Inorganic Chemistry (60 hrs.)**, School of Life Sciences, USTC (Teaching Assistant) Sep.2023-Jan.2024
- **Analytical Chemistry (40 hrs.)**, School of Life Sciences, USTC (Teaching Assistant) Mar.2024-Jun.2024

Extracurricular Activities

- Serve as a group leader in courses Mathematical Modeling of Biological Systems and Biochemistry Seminar
- Serve as a disciplinary inspection committee member within the class
- Member of Coding Life Association and Student Photographic Association
- First Prize in Dragon Boat Communication Competition
- Third Prize in Microbiology Painting Competition
- First Prize in Biochmical Song Competition