Manxin Cao

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EDUCATION

Inner Mongolia University, Inner Mongolia, China — Sept. 2021 - Jun. 2025

Bachelor of Biotechnology

- GPA: **3.87/4.0** | Average Score: **90.60** | Ranking: **1/81** (1.2%) (Transcript)
- **Core courses:** Cell Biology (93) | Biochemistry (92) | General Biology (98) | Genetic Engineering A (92) | Genetics (90)
- **Basic courses:** College Physics B1 & B2 (96) | Organic Chemistry (96) | Advanced Mathematics B1 (93) | Advanced Mathematics B2 (91) | Enzyme Engineering (92)

SKILLS

Molecular Biology & Biochemistry: PCR, Agarose Gel Electrophoresis, SDS-PAGE, Nickel Affinity Gravity Column Chromatography, Flag-tag Protein Purification, FPLC, Size Exclusion Chromatography, Western Blotting, AlphaLISA Assay, Radioactivity Assay, Fluorescence Anisotropy

Structural Biology: Preliminary Screening for X-ray Crystallization Conditions

Observed Techniques: Transfection, SPR, Flow Cytometry, Negative Staining, X-ray Crystallography, Cryo-EM

Computational: Python(basic), R (basic)

Language: Native in Mandarin Chinese, Proficient in English (TOEFL: 100), Intermediate in French

EXCHANGE EXPERIENCE

Peking University, Peking, China — Sept. 2023 - Jan. 2024

Prof. Su, Xiaodong's lab

Exchange Student Researcher, Advisor: Professor Su, Xiaodong

- Assisted in elucidating a protein's structure to design its inhibitors. Performed numerous transformations, protein expression, and purification using nickel affinity gravity columns and size exclusion chromatography to obtain stable proteins with correct structures suitable for X-ray analysis. Additionally, I also conducted preliminary screening for X-ray crystallization.
- Proficiently performed various related operations throughout the process, such as plasmid extraction, gel extraction, agarose gel electrophoresis, SDS-PAGE and more.
- Shadowed graduate students to gain exposure to a variety of techniques, including structural analysis methods such as crystal preparation and X-ray diffraction. Also observed and gained foundational insights into methodologies such as flow cytometry, negative staining, Surface Plasmon Resonance (SPR), and transfection.
- **Note:** Due to the confidentiality of the project, specific details cannot be disclosed until publication.

PROJECTS

Project1: Construction of Engineering E. coli for Sustainable Straw Biodegradation

Prof. Mo, Rigen's lab — IMU, Inner Mongolia, China

Project Lead, Advisor: Professor Mo, Rigen — Mar. 2023 - Present

- Cloned the cellulase gene, manganese peroxidase gene, lignin peroxidase gene, and laccase gene from Trichoderma reesei and white rot fungi and transferred them into $\Delta mrdA$-Escherichia coli, which has strong cell wall permeability.
- Improved conditions for high-level expression and extracellular secretion of target proteins in engineered E. coli, increasing straw degradation potential as detected by Fourier-transform infrared spectroscopy.
- Completed the project defense and mid-term defense, leading a team of five. The project work was recognized with the second prize at the China International College Students Innovation Competition at the university level.

Project2: Structural Insights into Brucella abortus Succinate Dehydrogenase for Combating Brucellosis

Lecturer Zhou, Xiaoting's lab — IMU, Inner Mongolia, China

Project Co-Lead, Advisor: Lecturer Zhou, Xiaoting — Mar. 2024 - Present

- Optimized the expression and purification processes of succinate dehydrogenase to ensure proportional expression of all four subunits, resulting in a well-structured and functional tetramer.
- Performed skillfully in primer design, PCR, transformation, expression, purification using nickel columns and size exclusion chromatography (SEC), SDS-PAGE, and Western blotting.
- Proficiency in experimental workflow analysis, with the autonomy to independently adjust various parameters such as buffer concentrations, components, and conditions, and autonomously adaptable in refining experimental plans based on outcomes, including troubleshooting and optimizing protocols for success.

Project3: Characterization of DNMT3A Mutants in Binding to Histone Modifications for Mapping Unknown Interaction Sites

Distinguished Professor Norbert Reich's lab — UCSB, Santa Barbara, CA

Summer Research Scholar, Advisor: Prof. Norbert Reich — Jul. 2024 - Oct. 2024

- Constructed and purified DNMT3A mutants across various domains using fast protein liquid chromatography (FPLC) with nickel column and size exclusion chromatography (SEC), achieving a high yield and purity of mutant stocks.
- Performed AlphaLISA binding assays and Fluorescence anisotropy with DNMT3A mutants, systematically refining buffer conditions to minimize signals arising from non-specific binding.
- Working on constructing a truncated version of DNMT3A, devoid of a specific domain, to produce more reliable proteins for use in AlphaLISA binding assays.

HONORS AND SCHOLARSHIPS

Ministry of Education

National Scholarship — October 2023

Inner Mongolia University

The First Prize Scholarship — April 2023 & April 2024

Merit Student — May 2023 & April 2024

Model Student Scholarship — May 2024