Overseas Summer Undergraduate Research Opportunities Programme in Science (UROPS) at Shanghai Jiao Tong University (SJTU) 2026 (in-person)

Programme Overview

Zhiyuan College of Shanghai Jiao Tong University (SJTU) is offering FoS students the opportunity to take part in a summer research programme as part of FoS' Overseas Summer Undergraduate Research Opportunities Programme in Science (UROPS).

Note that this programme is **NOT** the Summer Research Internship administered by GRO.

Zhiyuan College is dedicated to cultivate curiosity-driven future scientists by transforming students' curiosities into an aspiring learning and creative activities, enhancing students' higher academic pursuits, stronger challenge spirits and more initiative cooperation consciousness, cultivating them to be future scientific leaders with critical thinking, knowledge integration, communication and collaborations, as well multicultural understanding and global perspectives.

The available projects cover a wide range of topics and fields of research. The list of projects available can be found at the end of this document. Students are welcome to contact the supervisors for more information.

Location

The programme takes place in Shanghai, China.

Dates

The exact period of exchange should be negotiated between the student and the supervisor. Due to the minimum duration requirement and the NUS academic calendar, the period of exchange should be 10 to 12 weeks long and fall within the NUS Special Term: **11 May 2026 – 1 August 2026**.

Credit Transfer

This programme may be mapped to a 4-unit UROPS course code or a 4-unit department dummy exchange course code (counting towards unrestricted electives).

Refer to the course mapping instructions (with effect from AY26/27) and credit transfer policy (with effect from AY26/27) found on the FoS SEP website for information on course mapping and credit transfer. Do note that there is an exception for Overseas Summer UROPS regarding the number of credits that can be transferred.

Additional assessment may be required by the NUS department for transferring of credits. Not all UROPS course code can be counted towards major requirements. Please check which graduation requirement the UROPS will count towards and if you are unsure, please check with your department.

Students can transfer a total of 12 units from a maximum of 2 overseas summer/winter programmes without having to pay NUS tuition fee during their course of study. Any additional units mapped will be subjected to NUS Special Term fees.

Eligibility Criteria

NUS students must:

- Be a full-time Faculty of Science student, with a primary major in science
- Have a clean disciplinary record
- Have completed 4 – 6 semesters in NUS by the start of the programme (i.e. current Year 2 and Year 3 students)
- Have a minimum GPA of 3.75
- Not be intending to graduate at the end of AY2025/2026 Semester 2
- Not be called up for National Service during the programme dates. A deferment letter will not be provided.

An internal offer does not guarantee your placement in the programme. Your admission outcome is at the discretion of the partner institution.

Number of Places

There are 6 places available.

Programme Cost

Students do not need to pay NUS Special Term fees or tuition fees to SJTU if they do not exceed the credits transfer limit stated under the section "Credit Transfer" above. However, students are responsible for their own airfare, accommodation, meals, personal expenses, etc.

Estimated cost (*Please note that the figures provided are only estimates*)

Item	Cost
Return Airfare	SGD500
Accommodation	SGD1,800
Food and Transport	SGD800

Financial Assistance

The financial aid available for this programme are the NASA Enhancement Bursary, the Science Student Overseas Exposure Fund (SSOEF), and the Opportunity Enhancement Grant (OEG). Students may also apply for the Overseas Student Programme (OSP) Loan. Refer to the respective links for more information.

Please note that application for NASA Enhancement Bursary should be done through EduRec, as mentioned in the page linked above. Do not apply for NASA Enhancement Bursary through the application form linked in the FoS Financial Assistance Schemes page.

Programme Application Procedure and Deadline

Login to EduRec and submit your application under External Study Type "Research Attachment/Internship/ Industrial Attachment", External Study Setup ID: **03684**. Please refer to the Guide for Student Programme Application before starting your application.

Application Deadline: **Tuesday, 27 January 2026, 11:59pm Singapore Time**

Documents required (upload into your online application in EduRec):

1. Latest NUS unofficial transcript
2. Curriculum Vitae – Highlight any prior research experience that you may have to support your application
3. Personal Statement – Indicate your choice of project, your area of research interest and why you are interested in the mentioned project

Note:

- Admission into the programme is at the discretion of SJTU

If you face difficulties uploading the documents, submit the required documents via SCI UG Queries (category: SAP) by **27 January 2026, 11:59pm Singapore Time**.

Applications would be **deemed incomplete if the required documents are incomplete or not submitted** by the stipulated deadline, and therefore disqualified from the application.

To be fair to students who abide by the deadline, incomplete or late application will strictly not be considered.

Insurance

All students travelling overseas for activities or purposes approved, endorsed, organised, sponsored or authorised by NUS will be covered by the NUS Student Travel Insurance Policy. Click here for more information.

Exclusions to the NUS Student Travel Insurance may apply. Students are to ensure that they have sufficient travel insurance coverage, and may consider purchasing additional travel insurance if required.

Contact

If you have any questions, please submit your enquiry via SCI UG Queries (category: SAP).

Updated: 16 January 2026

Department	Professor	Field of Research	Project Title	Project Description	Pre-requisites	Email Address
School of Biomedical Engineering	Yuan FENG	Biomechanics and mechanobiology	Mechanobiology of neuronal cells	The development and degeneration of neuronal cells have distinct biomechanical behavior. In our lab, we have observed softening effect at both tissue and cellular level for neurodegenerative diseases such as Alzheimer's disease. The project aims to discover what induced the softening of the brain tissue and neuronal cells, and how can we use mechanical modulation to intervene the progression of neurodegeneration.	Basic cell biology knowledge and bench experiment skills, with a passion for neuroscience and biomechanics	fengyuan@sjtu.edu.cn
	Xianting DING	AI for Science; Biosensors; Tumor Diagnostics	AI for Science : Application of AI in clinical tumor biomarker identification and biosensor development	Welcome to this summer research project at the intersection of artificial intelligence (AI), clinical oncology, and translational engineering. Over the coming weeks, we will embark on a cutting-edge exploration of how AI can revolutionize the way we identify cancer biomarkers and develop next-generation diagnostic tools. Cancer remains a leading cause of mortality worldwide, and its early, accurate detection and monitoring are critical for improving patient outcomes. While genomics has provided tremendous insights, the proteome—the full set of proteins expressed by a tumor—offers a more direct, dynamic, and functional view of disease biology. Recent advances in high-throughput proteomics technologies, such as mass spectrometry and Olink assays, now allow us to generate incredibly detailed protein expression profiles from thousands of clinical blood or tissue samples (large-scale cohorts). These cohorts include patients at different disease stages, with different subtypes, and under various treatments, creating a rich but immensely complex data landscape. Herein lies both the challenge and the opportunity. Traditional statistical methods often struggle to capture the subtle, non-linear patterns and intricate interactions within this high-dimensional proteomic data. This is where Artificial Intelligence, particularly machine learning (ML) and deep learning (DL), steps in as a transformative force. In this project, we will leverage these AI techniques to mine large-scale clinical proteomics datasets with the primary goal of identifying robust and clinically actionable tumor biomarkers. Our work will involve developing and applying AI pipelines to: Discover Novel Biomarker Signatures: Move beyond single proteins to identify complex multi-protein panels that can accurately distinguish cancer from non-cancer, predict disease aggressiveness, or forecast therapeutic response. Decipher Protein Networks: Use AI to model functional protein pathways and interactions that drive tumor progression, uncovering not just correlates but potential causal mechanisms. Bridge Discovery to Device: This is where our project takes a unique applied turn. The most promising protein biomarkers identified by our AI models will serve as direct targets for the design and conceptual development of novel biosensors. We will explore how these biomarker signatures can be translated into the engineering requirements for biosensing platforms (e.g., electrochemical, optical, or nanomaterial-based sensors) aimed at point-of-care or minimally invasive detection. For you as summer interns from Singapore, this project offers a hands-on immersion into a highly interdisciplinary and frontier area of "AI for Science." You will gain experience in: The principles of clinical proteomics and cohort study design. Building and interpreting AI/ML models for biological discovery. Understanding the pipeline from computational biomarker discovery to translational sensor development. Working in a collaborative environment that blends data science, biology, and biomedical engineering. We are excited to have you contribute to this journey, where your efforts will help push the boundaries of how we detect and understand cancer, ultimately aiming to bring smarter, faster, and more accessible diagnostic solutions from the lab closer to the clinic.	Basic statistical knowledge	dingxianting@sjtu.edu.cn
School of Agriculture and Biology	Ruohe YIN	Light signaling in plants	How Plants Sense the Dark Side of Sunlight: UVR8-Mediated UV-B Signaling in tomato	UV-B radiation (280–315 nm) is a natural part of the sunlight that reaches the Earth's surface. Although UV-B is invisible to the human eye, plants can perceive it through a specific UV-B photoreceptor called UVR8 (Rizzini et al., Science 2011,332, 103-106). Accumulating evidence shows that UV-B acts as an important environmental signal that regulates many aspects of plant growth, development, and metabolism (Podolec et al., Annu Rev Plant Biol 2021, 72, 793-822). In natural environments, plants are often exposed to multiple stresses at the same time. For example, drought (water shortage) frequently occurs together with strong sunlight, which includes UV-B radiation. This suggests that UV-B and drought may interact with each other to influence plant development and stress responses. In this project, our preliminary experiments show that pretreating tomato plants with UV-B light can significantly improve their tolerance to drought stress. This finding suggests that plants may use UV-B as an early warning signal to prepare for upcoming drought conditions. However, the molecular and physiological mechanisms behind this response remain largely unknown. An undergraduate student participating in the Overseas Summer Undergraduate Research Programme in Science (UROPS) will be involved in both physiological and molecular studies to investigate the crosstalk between UV-B signaling and drought tolerance in tomato. Understanding this interaction is important for improving crop stress resistance and achieving sustainable agriculture. This project is generously supported by a recently awarded NSFC–ISF (China–Israel) international research grant.	Applicants should have a strong interest in plant molecular biology and a basic understanding of plant physiology.	ruohe.yin@sjtu.edu.cn
School of Life Sciences and Biotechnology	Boyang QIN	Microbiology; Biological imaging; Artificial intelligence	Bacterial biofilm targeting protease design drived by aritificial intelligence and lightsheet microscopy	Bacterial biofilms are surface-attached communities of cells and represent a basic form of multi-cellular organization. Biofilms confer survival advantages to constituent cells, including the ability to share public goods and a 1000-fold increase in resistance to antibiotics compared to isogenic free-living cells. Despite the ubiquity and importance of biofilms, we know little about the single-cell events that enable their formation and dispersal. Does heterogeneity of gene expression exist between cells or cell lineages during biofilm development? If so, does it drive different cell fates? In this project we will develop new technologies in imaging, experimentation, and protein modeling to gain a comprehensive understanding of the biophysical and molecular mechanisms driving biofilm formation and dissolution, with aims to inspire alternatives to conventional antibiotic therapies to curb pathogenic biofilms. PI website: https://life.sjtu.edu.cn/teacher/En/boyangqin	Background in Basic molecular biology, PCR, cloning, microscopy, AI tools such as AlphaFold preferred	qinb@sjtu.edu.cn
	Lei LI	Synthetic Biology and Chemical Biology	AI-driven high-throughout discovery of antimicrobial peptides	Deep learning model; AMP discovery; Mode-of-action; Mouse model	Major in Biology, Chemistry or Computing Science	lei.li@sjtu.edu.cn
	Yaojun TONG	Synthetic biology	Magnetogenetic Control of Engineered Probiotics for Ulcerative Colitis Diagnosis and Therapy	Inflammatory bowel disease (IBD) is a chronic, relapsing disorder for which current therapies rely on long-term systemic administration of immunosuppressive drugs and biologics, often accompanied by substantial side effects, high costs, and limited lesion specificity. Endoscopy remains the gold standard for diagnosis and monitoring, but is invasive and poorly suited for frequent, longitudinal assessment. Here we propose to develop a magnetically engineered probiotic strain of Escherichia coli Nissle 1917 that integrates noninvasive imaging, inflammation sensing, and localized therapy into a single living platform. At the magnetic interface, we will combine genetically encoded magnetization, achieved by rewiring iron uptake and storage pathways, with surface coating of paramagnetic materials on the bacterial envelope to boost MRI contrast and flexibly tune magnetic responsiveness. In parallel, we will construct synthetic genetic circuits that implement an AND logic gate responsive to IBD-associated inflammatory cues, thereby driving on-demand production of butyrate and expression of adhesion factors to promote mucosal healing and targeted colonization at diseased sites. Using murine colitis models, we will conduct proof-of-concept studies to quantify MRI visibility, targeting specificity, and therapeutic benefit. This work will establish a generalizable framework for MRI-visible, magnetically steerable, programmable therapeutic probiotics and lay the groundwork for translating magnetogenetics- and materials-assisted "live biotherapeutic" strategies in IBD and related disorders.	Microbiology, Synthetic biology, Molecular biology	yaojun.tong@sjtu.edu.cn

Department	Professor	Field of Research	Project Title	Project Description	Pre-requisites	Email Address
Bio-X Institutes	Jinwei ZHU	Molecular neuroscience	Molecular mechanism of ALS2-mediated vesicle trafficking in amyotrophic lateral sclerosis (ALS)	Amyotrophic lateral sclerosis (ALS) is a fatal neurodegenerative disease characterized by the progressive loss of motor neurons, and dysfunction of organelle dynamics is a common pathological feature underlying ALS. ALS2, an important protein associated with ALS pathogenesis, has been implicated in vesicle trafficking, but its specific regulatory mechanisms and pathological relevance remain to be fully elucidated. This project aims to dissect the structural and functional mechanisms of ALS2-mediated vesicle trafficking, and explore how dysfunction of the ALS2-Rab5-endosome axis impairs motor neuron function and promotes ALS pathogenesis.	Protein biology; Cell biology; Neuroscience	jinwei.zhu@sjtu.edu.cn
Institute of Translational Medicine	Hui LYU	bioinformatics, medical informatics, AI, biology, math, statistics, physics	AI-Human Interactive System for Medical Multi-Disciplinary Treatment	Based on autonomous research program DREAM and debate program MD2GPS, the project is to develop the next generation AI system that can assist doctors in MDT. The newly developed system will achieve higher accuracy with explainable models.	college level math and programming experience	huilu@sjtu.edu.cn
School of Pharmaceutical Sciences	Yan PANG	Biomedcial, Drug Delivery, Biomaterials	Engineering Fungal Living Materials for Ocular Surface Diseases	Refractory ocular diseases, such as severe infectious keratitis, uveitis, as well as choroidal melanoma and retinoblastoma, often require drug treatments lasting for months or even years. However, traditional drug delivery systems like eye drops and hydrogels exhibit weak ocular surface adhesion, limited drug-loading capacity, passive release mechanisms, and susceptibility to drug degradation and inactivation. These limitations make it challenging to achieve prolonged local drug retention and controlled release, resulting in suboptimal long-term therapeutic outcomes. Living microorganisms (e.g., fungi) possess unique properties, including genetically programmable drug synthesis, active secretion, and sustained metabolism, offering new opportunities for constructing novel long-acting ocular drug delivery systems. Nevertheless, the viability of living units is highly sensitive to the chemical environment, and their lack of local adhesion poses risks of activity loss and leakage, representing critical scientific challenges that urgently need to be addressed. This project proposes the development of fungal living materials for long-term ocular drug delivery based on a strategy of "sustained metabolic activity and robust local adhesion." By integrating gene editing and non-destructive surface modification technologies, we aim to preserve fungal viability while enabling stable ocular retention and dynamic drug release functions. This approach will establish a novel model of "prolonged residence + sustained release," opening new avenues for the treatment of chronic ocular diseases and the development of intelligent drug delivery systems.	Interested in using non-invasive methods to conquer ocular diseases	yanpang@sjtu.edu.cn
School of Medicine	Zhaoyuan LIU	Immunology	The development of immune cells	To use scRNA-seq and lineage tracing models to investigate the development of immune cells.	Major in biology or medicine	zhaoyuan_liu@sjtu.edu.cn
	Zhou CHEN	Neuronal signaling, ion channels, memory, channelopathy	Neuronal signal processing encoded by voltage-gated ion channels	This project asks how neuronal ion channels, more specifically dynamic expression and functional regulation of these ion channels, modulate postsynaptic potentials (both excitatory and inhibitory) and subsequently affect memory encoding in mammals. The long-term goal is to understand the molecular mechanisms of nonsynaptic plasticity and thereafter provide new insights for memory encoding.	Background of neuroscience, neurobiology or related subjects.	zhou.chen@sjtu.edu.cn
	Haikuo Li	Genetics, genomics, nephrology, bioinformatics, molecular biology	Investigating mechanisms of kidney injury and fibrosis using spatially resolved multiomics	Chronic kidney disease (CKD) affects ~10% of the population worldwide and ultimately can lead to kidney failure. Kidney fibrosis is the common final pathway in virtually all forms of CKD, yet the underlying mechanisms, particularly the epigenetic and transcriptional regulation of injury and repair responses, remain poorly understood. This project leverages cutting-edge spatial multiomics technologies, including DBiT-seq, spatial ATAC-seq, and spatial CUT&Tag, to profile human and mouse kidney tissues in healthy and diseased states, with the goal of identifying therapeutic targets that can ameliorate kidney disease progression. Our lab (https://thelilab.github.io/) has extensive expertise in developing and applying spatial and single-cell omics technologies, including split-pool barcoding methods (e.g., sci-RNA-seq and SHARE-seq), spatially resolved transcriptomics, epigenomics, metabolomics, multimodal data integration, and advanced bioinformatics. Undergraduate interns will be integrated into ongoing projects aligned with their interests, receiving hands-on training in kidney biology, multiomics experimental techniques, library generation and computational analysis. The PI will provide strong mentorship, including opportunities for co-authorship on manuscripts, guidance on research careers, and support for future academic or professional development.	We welcome applications from all passionate NUS undergraduates interested in kidney biology, multiomics technology development, or applications to human health and disease. Candidates with backgrounds in tissue injury and repair, fibrosis, bioengineering, bioinformatics, or AI/machine learning are particularly encouraged to apply.	lihaikuo@sjtu.edu.cn
Shanghai Institute of Immunology (School of Medicine)	Bing SU	③Immunology (Gut & Hepatic Immunity), ③Metabolic Research ③Cell Signaling	Intracellular Protein Kinase Networks in Gut & Hepatic Immunity and Metabolic Regulation	Our research delves into the intricate mechanisms of the intracellular protein kinase networks, specifically the mitogen-activated protein kinase (MAPK) cascades (Nature, 2021) and the mammalian target of rapamycin (mTOR) pathway (Cell Discov, 2024; Cell, 2006). We aim to comprehensively understand how these pathways mediate signal transduction in the context of gut & hepatic immune responses and metabolic regulation. In immune-metabolic crosstalk (gut & liver): For the gut: We focus on intestinal immune cells (macrophages, T lymphocytes, innate lymphocytes) and stromal cells, investigating how MAPK/mTOR pathways link immune activation to local metabolic changes (e.g., regulating gut epithelial glucose uptake or microbial metabolite-mediated immune cell function) to maintain gut homeostasis (J Clin Invest, 2024; Nat Commun, 2022; Cell Rep Med. 2021）. For the liver: We explore how these kinase pathways coordinate hepatic immune cell activity (Kupffer cells, intrahepatic T cells) and metabolic processes (e.g., hepatic glucose/lipid metabolism). For example, we study how mTOR signaling balances Kupffer cell anti-inflammatory phenotypes (to prevent metabolic liver injury) and their role in regulating hepatocyte lipid accumulation, as well as how MAPK cascades modulate intrahepatic immune cell metabolism during liver steatosis. We employ techniques including cell culture (primary immune/hepatic cells), molecular assays (Western blotting, RNA-seq, flow cytometry for metabolic phenotype detection), and in vivo models (gut/liver metabolic disorder mouse models). By integrating these data, we aim to clarify the regulatory roles of kinase networks in immune-metabolic interactions.	③A solid foundation in basic biology, including knowledge of cell biology, immunology, and biochemistry. Familiarity with concepts such as cell signaling, gut/liver-resident immune cells, and cellular metabolic pathways (e.g., glucose/lipid metabolism) is essential. ③Experience in molecular biology techniques is highly desirable: DNA/RNA extraction, PCR/qPCR, cloning, and protein detection (e.g., Western blotting). ③Proficiency in cell culture techniques: Culturing primary immune cells (e.g., macrophages) or hepatic cells, maintaining cell viability, and performing functional/metabolic assays (e.g., cell glucose uptake detection). ③Good analytical skills: Ability to design simple experiments, analyze immunological/metabolic assay results, and interpret findings logically. ③Strong written/oral communication skills: Capable of documenting experimental procedures/results and presenting work in group meetings.	bingsu@sjtu.edu.cn
Institute of Natural Sciences	Dan HU	Applied Math or Computer Science	Theories and training methods of diffusion models	Learning theories and training methods of diffusion models, trying applications.	Partial differential equations	hudan80@sjtu.edu.cn
	Noah Fan Qi YUAN	condensed matter physics theory	Theoretical studies on unconventional superconductivity	Transport, topology and critical behaviors of unconventional superconductivity	basic solid state physics and mean field theory	yuanfanqi@sjtu.edu.cn
	Fabo FENG	Exoplanet detection and characterization , Transit photometry, Astrometry and orbital dynamics, Planet formation and evolution, Analysis of space-based survey data (Kepler, TESS, Gaia)	Detection of Jupiter analogs by transit and astrometry	In this project, the student will study long-period transiting exoplanets, which are difficult to detect with traditional transit surveys due to their infrequent transits. The student will analyze single- and double-transit candidates identified by Kepler and TESS, and use Gaia astrometric constraints to confirm cold giant planets or brown dwarfs. The student will then apply this combined transit and astrometry technique to Tianyu observations to identify and validate new long-period, Jupiter-like transiting planets.	Intro astronomy or astrophysics course, Some experience with Python, Basic data analysis and plotting skills, Intro physics and calculus, Interest in learning and working with real space-mission data (Kepler, TESS, Gaia)	ffeng@sjtu.edu.cn

Department	Professor	Field of Research	Project Title	Project Description	Pre-requisites	Email Address
Tsung-Dao Lee Institute	Hao ZHOU	Astrophysics	Multi-wavelength and multi-messenger astrophysics with LHAASO	LHAASO has detected more than 90 very-high-energy to ultra-high-energy gamma-ray sources. Over one third of them are still unassociated, which physical nature are not clear. Multi-wavelength and multi-messenger studies are the key to search for their counterparts. We will perform spectral and temporal analysis on these sources with data collected by LHAASO and other instruments.	1) Basic knowledge on high-energy astrophysics 2)Data analysis experience with physics or astronomy instruments; 3) Coding skills with Python or C++	hao_zhou@sjtu.edu.cn
	Kim Siang KHAW	Interdisciplinary (Physics and Civil Engineering)	Application of Muography Techniques to Civil Engineering and Geology	This project investigates the application of muography—an imaging technique utilizing naturally occurring cosmic-ray muons—to address significant challenges in civil engineering and geology. The core objective is to develop and refine methodologies for non-destructive, large-scale volumetric imaging for infrastructure assessment and subsurface mapping. Students involved in this project will gain direct hands-on experience in the muography pipeline, including the simulation of muon interactions with complex geometries and the subsequent analysis of field data acquired from detectors deployed on real-world structures like dams, bridges, or tunnels. This practical involvement encompasses data processing, noise reduction, and the interpretation of muon absorption radiographs to identify anomalies such as internal voids, structural defects, or geological density variations, thereby bridging theoretical physics with practical engineering and geophysical diagnostics.	Linear Algebra	kimsiang84@sjtu.edu.cn
	Qingdong JIANG	condensed matter physics	Quantum geometry and superconductivity	learning the role of quantum geometry in superconductivity	quantum field theory and solid state physics	qingdong.jiang@sjtu.edu.cn
	Shu Li	Experimental Particle Physics; Deep Machine Learning; AI application in High Energy Physics; Particle Detection Techniques; Large Hadron Collider at CERN	Illuminating Beyond Standard Model New Physics with the God Particle Higgs Boson and the Dark Mediator Dark Photon	Utilizing the Monte Carlo simulations, AI assisted Deep Machine Learning Techniques and resourceful Large Hadron Collider Data to explore the beyond Standard Model (BSM) new physics phenomena in particle physics, in particle with the god particle Higgs boson and the dark matter mediator Dark Photon as the probe to BSM	Basic knowledge about Quantum Mechanics, introductory particle physics and computing/programing languages would be advantageous but not mandatory. Most importantly, you would have to love particle physics in general :-)	shuli@sjtu.edu.cn
	Yosuke MIZUNO	Astrophysics	Effect of radiative cooling in black hole accretions and outflows	In this research project, we investigate the radiative cooling effect in the magnetized accretion flows onto a black hole from existing three-dimensional general relativistic magnetohydrodynamic simulations.	Basic knowledge of hydrodynamics and programming language such as C, Fortran, and Python.	mizuno@sjtu.edu.cn
School of Chemistry and Chemical Engineering	Bei DING	Physical Chemistry or Biological Chemistry	Protein Structure and Dynamics Using Artificial Intelligence and Ultrafast Spectroscopy	The objective of this internship is to gain exposure to biochemistry research, gain knowledge about protein by reading textbooks, follow up with today's cutting-edge scientific advances from the literature, and develop skills in using PYMOL software, sequence alignment and MD simulation. In the last week, an academic presentation is required about things learnt. The internship will provide valuable hands-on experience, enhanced technical abilities, and contribution to academic and professional growth.	Strong interest in physical chemistry or biological chemistry	bei.ding@sjtu.edu.cn
	Qi SHEN	DNA nanotechnology, AI-assisted protein design, Enzymatic DNA synthesis and DNA data storage, Enzyme evolution	AI-Guided Design of DNA Polymerases for Enzymatic DNA Synthesis	Enzymatic DNA synthesis offers a promising route to overcome the length, fidelity, and sustainability limitations of conventional chemical synthesis, with broad applications in DNA data storage, artificial chromosomes, and synthetic biology. However, current DNA polymerases exhibit insufficient efficiency, processivity, and substrate compatibility, limiting practical implementation. This project aims to apply artificial intelligence–assisted protein design to accelerate the discovery and optimization of DNA polymerases for high-performance DNA synthesis. By integrating deep learning–based sequence–structure–function modeling with enzyme engineering and experimental validation, the project seeks to establish a rational framework for improving enzymatic DNA synthesis.	1. Solid background in biochemistry and molecular biology, including protein expression, purification, and enzymatic assays. 2. Experience in enzyme engineering and structural biology preferred. 3.Proficiency in Python; familiarity with PyTorch or related deep learning frameworks is a strong advantage.	qishen@sjtu.edu.cn
	Wenmao HUANG	single molecule biophysics; DNA nanotech	single molecule manipulation of DNA nanostructure	Using our single molecule manipulation technique-magnetic tweezer, to study the mechanical response of various designed DNA nanostructure and DNA nanomechine.	Physics, chemistry or material backgroud are welcomed	wenmaohuang@sjtu.edu.cn
	Yameng REN	Chemistry, Photoelectrochemistry, Chemo-Biological Hybridization, Artificial Photosynthesis	Development and High-Value Conversion of Efficient Photo-Driven Carbon Fixation Based on Chemo-Biological Hybrid Systems	Integrating the efficient light-harvesting capacity of chemical synthetic materials with the catalytic properties of microorganisms to construct chemo-biological hybrid systems for light-driven carbon fixation and conversion is a crucial pathway toward achieving carbon neutrality goals and advancing green manufacturing. However, existing systems face key scientific challenges, including low electron transfer efficiency at abiotic – biotic interfaces leading to energy losses, and reliance on sacrificial agents that limit system sustainability. This project will employ a biomimetic approach to construct an artificial electron transfer chain, coupled in series with dye-sensitized photoanodes to drive the synthesis of high-value-added chemicals. By building a sacrificial-agent-free dye-sensitized microbe hybrid system, the project aims to achieve co-production of carbon fixation and valuable chemicals driven by light.	Possesses a strong interest in scientific research and demonstrates diligence and perseverance. Priority will be given to undergraduate students who have completed coursework or possess foundational knowledge in fields such as electrochemistry, photochemistry, or biocatalysis.	yameng.ren@sjtu.edu.cn
	Yannan LIU	Polymer, optoelectronic device	Research on Conjugated Polymers and Their Device Performance	Conjugated polymers are a special class of organic semiconductors characterized by a backbone with alternating single and double (or triple) carbon-carbon bonds. This "conjugation" allows the delocalization of π-electrons along the polymer chain, enabling them to conduct electricity while maintaining the flexible, processable properties of plastics. This unique combination has earned them the nickname "conducting plastics" or "synthetic metals." This project focuses on two interconnected pillars: 1) the design and synthesis of new polymeric materials, and 2) the fabrication and optimization of functional devices that leverage their optoelectronic properties.	No	lyannan@sjtu.edu.cn
School of Mechanical Engineering	Baowen ZHOU	Artificial Photosynthesis and Biomass Energy Conversion	Photocatalytic Conversion of Lignocellulosic Biomass into Green Fuels and Chemicals	This research internship program focuses on the photocatalytic conversion of lignocellulosic biomass into green fuels and value-added chemicals using solar energy. AI-assisted approaches will be introduced to support photocatalyst material design and reaction pathway optimization by correlating catalyst properties with product selectivity and conversion efficiency. Through the integration of experimental photocatalysis and data-driven analysis, the project aims to improve solar-to-chemical conversion efficiency and promote sustainable biomass utilization.	Background in energy engineering, materials science, chemistry, or related fields; basic knowledge of photocatalysis and semiconductor physics; experience with experimental characterization techniques or data analysis is preferred.	zhoubw@sjtu.edu.cn
		Renewable Energy, Green Hydrogen, Water Splitting	Chirality Engineering Non-noble Metal Catalysts for Industrial Water Electrolysis toward Green Hydrogen	The project will focus on exploring non-noble metal catalysts for driving water electrolysis to produce green hydrogen at industrial scale by chirality engineering	Majors in Chemistry, Materials, and Environment	zhoubw@sjtu.edu.cn

Department	Professor	Field of Research	Project Title	Project Description	Pre-requisites	Email Address
	Ning LIU	Plasma; Fluid Mechanics; Materials.	Interaction bewteen water droplet and plasma in a ferroelectric barrier discharge	Ferroelectric materials, serving as an electrode barrier layer, can enhance plasma reactivity by providing more high-energy electrons and excited species. Meanwhile, water micro-droplets, due to their high curvature, can concentrate these active components (such as electrons/excited species), leading to unprecedented enhancement of interfacial reactivity. Leveraging this principle, this project employs the combined benefits of plasma and water micro-droplets to efficiently convert methane into hydrogen and carbon monoxide. By utilizing various in situ ultrafast spectroscopic techniques, this project will elucidate the interaction mechanisms between water micro-droplets and gases during the methane-to-hydrogen process.	Engineering; Physics; Chemistry.	nl9j@sjtu.edu.cn
School of Computer Science	Guoxing CHEN	Computer Security	Enhancing Security and Privacy through Confidential Computing: Innovations and Applications	Confidential computing is an emerging paradigm aimed at protecting data in use by leveraging hardware-based Trusted Execution Environments (TEEs). This project explores the design, implementation, and optimization of confidential computing systems to address critical security and privacy challenges in modern applications.	Programming Proficiency, Cryptography Basics, Operating Systems and Systems Security	guoxingchen@sjtu.edu.cn
	Xie CHEN	Machine Learning; Speech Processing; Multimodal and Human–Computer Interaction	Speech-to-Speech Interaction System	The Speech-to-Speech Interaction System project aims to develop an intelligent system that enables natural, real-time spoken interaction between humans and machines. The system takes raw speech as input, performs multi-level speech understanding, high-level reasoning, and generates fluent, expressive speech responses as output, forming a complete speech-in → speech-out interaction loop.	Fundamental knowledge in machine learning and deep learning; Basic understanding of speech and audio processing; Familiar with Python, Pytorch and Linux	chenxie95@sjtu.edu.cn
School of Integrated Circuits (School of Information Science and Electronic Engineering)	Linjie ZHOU	This project addresses challenges in coherent optics and photonic sensing, specifically FMCW LiDAR with Optical Phased Arrays (OPAs).	Heterodyne Efficiency Optimization in Angular-Steered OPA FMCW LiDAR	This project investigates why FMCW LiDAR systems lose beat frequency signals when the Optical Phased Array (OPA) steers beams off-axis. When OPA outputs at an angle, signal and local oscillator beams misalign at the detector, preventing interference. The student will: (1) develop MATLAB/Python simulations calculating spatial mode overlap versus steering angle, (2) experimentally measure beat signal degradation using lasers, beam splitters, and detectors with controlled beam misalignment, (3) evaluate solutions including synchronous LO steering, fiber coupling, or alternative architectures. Deliverables: simulation code, experimental data, technical report, and final presentation.	Required: Optics fundamentals (wave optics, interference, Gaussian beams) Programming in MATLAB or Python Laboratory skills and laser safety awareness Preferred: LiDAR or FMCW system knowledge Optical simulation tools (Zemax, COMSOL) Signal processing basics (Fourier analysis). The student should be self-motivated, comfortable with independent learning, and able to read technical literature. No prior coherent detection experience necessary—background materials will be provided.	ljzhou@sjtu.edu.cn
	Qingqing WU	Field of Research 6G Wireless Communications Intelligent Reflecting / Reconfigurable Intelligent Surfaces (IRS/RIS) AI-enabled Wireless Networks Near-field and XL-MIMO Systems Integrated Sensing and Communication (ISAC) UAV-assisted and Low-Altitude Communication Networks Machine Learning for Signal Processing and Network Optimization	Faster, Smarter, Greener (Fast SG): AI and Intelligent surfaces for 6G Wireless Communications	The evolution towards sixth-generation (6G) wireless networks is expected to support immersive communications, integrated sensing and communication (ISAC), ultra-massive connectivity, and intelligent network control. Intelligent surfaces—including intelligent reflecting surfaces (IRS), reconfigurable intelligent surfaces (RIS), holographic metasurfaces, and movable/reconfigurable antenna arrays—have emerged as a transformative paradigm to actively manipulate the wireless propagation environment rather than passively adapting to it. This project focuses on the integration of artificial intelligence (AI) with intelligent surfaces to enable environment-aware, self-optimizing, and learning-driven 6G wireless systems. By leveraging machine learning techniques such as deep learning, reinforcement learning, and graph neural networks, the project aims to design intelligent surface–assisted communication frameworks that can dynamically adapt to complex propagation environments, user mobility, and hardware constraints. Key research topics include AI-driven surface configuration and beamforming, channel modeling and sensing with intelligent surfaces, joint communication–sensing–computation optimization, and real-time learning under practical constraints. The project will also explore the role of intelligent surfaces in emerging 6G scenarios such as near-field XL-MIMO, low-altitude UAV networks, and integrated sensing and communication (ISAC).	Programming experience in Python and/or MATLAB	qingqingwu@sjtu.edu.cn
School of Automation and Intelligent Sensing	Hesheng WANG	Robot Motion Control, Reinforcement Learning	Research on Motion Control of Bipedal Robots in Complex Scenarios	In recent years, with the rapid development of intelligent robotics technology, research on motion control of bipedal robots has become a focal area in smart manufacturing and service sectors. This project focuses on leveraging reinforcement learning techniques to achieve robust and stable motion control for bipedal robots on complex and rugged terrains, thereby endowing them with the ability to adaptively adjust to changing environments. Furthermore, the project explores integrating methods such as teleoperation and imitation learning to enhance the robot's comprehensive capabilities in movement and manipulation. The research covers the construction of motion models, environmental perception, real-time decision-making, and optimization of control strategies, providing theoretical and technical support for autonomous mobility and task execution in diverse application scenarios.	Proficient in C++ and Python programming, with knowledge of robot kinematics.	wanghesheng@sjtu.edu.cn
		Learning-based Robotics Manipulation	Gaussian-based Cross-Embodiment Robot Learning	Currently, UMI is widely used for collecting robot manipulation data. However, relying solely on first-person fisheye perception often leads to failures due to the lack of spatial information. To overcome this limitation in 3D perception, we propose constructing a 3D environment from UMI-collected manipulation data using Gaussian Splatting. With a realistic 3D world and recorded manipulation trajectories, the original UMI data can be transformed into multi-view representations. This transformation enables cross-embodiment transfer from UMI data to various robotic hardware platforms.	1. Fundamental knowledge on 3D vision and robotics, like point cloud processing, 3D reconstruction or SLAM. 2. Experience with pytorch-based development experience	wanghesheng@sjtu.edu.cn
	Jianping HE	Control theory, differential games, reinforcement learning and adversarial learning	Learn the optimal mixed strategy for differential games	This project studies optimal mixed strategies in differential games and develops learning-based methods to compute them. The goal is to design efficient numerical and learning algorithms for adversarial and uncertain environments. Mixed strategies can restore existence and improve performance when pure strategies fail, with applications in human-robot interaction, pursuit–evasion, and robust control.	Machine learning / reinforcement learning (min–max, adversarial learning)	jphe@sjtu.edu.cn
School of Aeronautics and Astronautics	Xiao HE	AI4S; Fluid Mechanics	Scientific Knowledge Discovery via Symbolic Regression	Science is the systematic understanding of objective laws governing the natural world. Traditional scientific discovery relies on scientists' intuition to fit experimental data, which proves inefficient for solving complex nonlinear problems (e.g., Kepler took nearly two decades after inheriting Tycho Brahe's planetary observations to formulate his three laws of planetary motion). With the explosive growth of experimental and computational data, there is an urgent need for a new paradigm of scientific discovery—one that can rapidly extract formula-based knowledge from massive scientific datasets. Symbolic Regression, a machine learning method tailored for accelerated knowledge discovery, addresses this challenge. Driven by data, it explores the space of mathematical expressions to identify optimal formulas, thereby uncovering scientific laws directly.	Strong interest in AI for science research. Basic skills in Python and knowledge of fluid mechanics will be an advantage.	xiao.he2025@sjtu.edu.cn
College of Smart Energy	Yuehui LI	energy catalysis	Marine Energy-Driven Green Fuel Production	Marine energy (wave/tidal) is harvested using arrayed piezoelectric devices or hybrid converters, stabilized by rectifiers and energy storage to power catalytic systems. Electrochemical routes adopt modular membrane electrode assembly electrolyzers for CO2 electroreduction (to methanol/ethanol) or alkaline water splitting (to green H_2), using seawater as a low-cost resource with gas diffusion electrodes boosting efficiency. Piezoelectric catalysis directly converts wave mechanical stress to chemical energy via polarized catalysts ($ZnO/BaTiO_3$) for fuel synthesis, eliminating intermediate energy conversion. Key scalable strategies include anti-corrosion designs, intelligent monitoring, and integration with offshore industries, enabling cost-effective, large-scale green fuel production.	Electrochemistry fundamentals, Piezoelectric effect, Catalyst preparation, Electrochemical measurement, Marine energy harvesting, Scientific literature reading, Time management	liyuehui@sjtu.edu.cn

Department	Professor	Field of Research	Project Title	Project Description	Pre-requisites	Email Address
Global College	Songliang CHEN	Optical Computing; Optical Neural Networks; Neuromorphic and Brain-Inspired Computing; Computational Optics	Design and Learning of Optical Neural Networks Assisted by Artificial Intelligence	This summer undergraduate research project aims to introduce students to the fundamentals of optical neural networks and explore how modern artificial intelligence techniques can be used to design, train, and optimize ONN architectures. The project will focus on AI-empowered approaches, where deep learning algorithms are used to model optical components, compensate for physical imperfections, and improve inference accuracy. Students will study representative ONN architectures (e.g., diffractive neural networks and photonic matrix multiplication), implement simplified simulation models, and apply AI-based training methods using Python. Depending on progress, the project may include proof-of-concept demonstrations such as image classification using simulated optical layers.	Basic programming skills (Python preferred); Familiarity with fundamental concepts in machine learning or neural networks (at a basic level); Introductory optics or photonics (e.g., wave propagation, diffraction)	sungliang.chen@sjtu.edu.cn
Global Institute of Future Technology	Hongyi XIN	AI & Bioinformatics.	Knowledge embedding in virtual cell AI generative model	Cells operate in a latent transcriptomic space governed by often yet discovered biological processes. Current approaches often regard the gene-gene relationship as a blackbox model with limited incorporation of biological knowledge. In this project, we will explore means to embed biological knowledge in omic data representation learning and foundation model training.	Machine learning. Transformer. Graph model. Basic cellular biology. Data structure.	hongyi.xin@sjtu.edu.cn