上海交通大學 SHANGHAI JIAO TONG UNIVERSITY

中国科学院大学 University of Chinese Academy of Sciences

SJTU & UCAS

Joint Summer Research Internship Program

2018

2018 SJTU & UCAS

Joint Summer Research Internship Program

Shanghai Jiao Tong University (SJTU) and University of Chinese Academy of Sciences (UCAS) welcome undergraduate students from all over the world this summer to study in Shanghai and Beijing, the top two cities in China.

Shanghai Jiao Tong University (SJTU) enjoys a long history and a world-renowned reputation. Through unrelenting effort over the past 120 years, SJTU has become a comprehensive, research-oriented, and top international university in China. SJTU boasts an increasing level of scientific research excellence and technological innovation.

The University of Chinese Academy of Sciences (UCAS) is a research university focusing on graduate education and promoting the fusion between talent cultivation and scientific research. Its predecessor, the Graduate University of Chinese Academy of Sciences, was the first graduate school in China, set up in 1978 with the approval of the State Council of PRC. In 2014, UCAS started enrolling undergraduate students. According to the Global University Ranking released by Essential Science Indicators (ESI) in November, 2017, UCAS is ranked No.114 in the word and No. 2 in China.

The SJTU & UCAS Joint Summer Research Internship Program provides excellent opportunities for top undergraduate students to experience academic and cultural immersion in two international universities over the summer. A wide range of research projects in various disciplines are provided, and students can not only study at world-class research laboratories, side-by-side with prominent research professors, but also be prepared for further study through intensive research experiences with faculty mentors and enrichment activities.

In addition, participants will develop their research skills by attending lectures on topics such as "How to Write a Research Essay," "How to Cooperate in a Project," and more. Students will also learn about Chinese and Chinese culture, enhancing their intercultural awareness and communication.

What Participants will receive?

> Experience the excitement of college and institute life at both SJTU and UCAS
> Discover traditional and modern Chinese culture in Shanghai and Beijing
> Knowledge of top research projects in China
> The opportunity to work with top Chinese professors, fellows, and students
> A good basis for a career in academic research
> The opportunity to co-author a scientific paper
> A rewarding and unforgettable experience in China

Eligibility Requirements

> International students and students from Hong Kong, Taiwan, Macao are eligible to apply.
> Students must have completed at least one year of an undergraduate program and be enrolled as current undergraduates.
> Hold at least a 3.0 GPA on a 4.0 scale or equivalent.
> Students of non-English speaking countries must provide an English language proficiency certificate: an IELTS score no less than 6.0, or a TOEFL score of no less than 78 points. If you are studying in a full English-taught program, please provide the relevant certificates.
> Additional requirements vary by laboratory.

Duration

6 weeks (11 July, 2018-17 August, 2018), divided into:

> 3 weeks (11 July, 2018-27 July, 2018) at SJTU in Shanghai.
> 3 weeks (30 July, 2018-17 August, 2018) at UCAS in Beijing.

Program Coordinator

JIA Ziyi (SJTU)
Email: zyjia @sjtu.edu.cn

WANG Shuolei (UCAS)
Email: wangshuolei@ucas.ac.cn

Application Procedures

Create ID and password → 01
Complete Online Application (By April 30) → 02
Receive the result on the website (In 2 weeks after application) → 03
Confirmation of Admission on the website (By 15 May) → 04

Please apply through the website: http://apply.sjtu.edu.cn[1]

The following items should be uploaded alongside the online application:

> A scan of the identification page of your passport. The passport must be valid for at least 6 more months for the visa application.
> ID photo (similar to a passport photo)
> Curriculum vitae (CV)
> Copy of your most recent academic transcript
> Motivation letter
> Recommendation letter
> Report of your past research experience (if available)
> Language proficiency certificate (if available)

Program Fee*

Application fee (non-refundable)	400RMB
Tuition fee	8000RMB

** Tuition fee is waived for all participants by host universities*

Online Application Deadline

30 April, 2018

List of Projects

Project 1 Novel Cooling Technologies
Project 2 Cloning and functional characterization of rice male sterile genes
Project 3 Molecular mechanisms controlling inflorescence and spikelet development in rice and barley
Project 4 Molecular Characterization of GMOs
Project 5 Design of nanostructures for enhanced photoelectrical catalysts

[1] *It is very important that you fill in your name correctly on the online application. You should type in your legal name as it appears on your passport exactly.*

Project 1

Novel Cooling Technologies

Contact Information

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Prof. Jing Liu, Prof. Wei Rao (UCAS))
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Project Description and Objectives

This project focuses on two novel cooling technologies: dehumidification cooling technology and advanced liquid metal cooling technology.

The rotary desiccant wheel cooling system operates on principles of adsorption, dehumidification and evaporative cooling. The system adopts natural substances as a working fluid and can be driven by low grade thermal energy such as solar energy. Due to these advantages, the solar powered rotary desiccant wheel cooling system is recognized as a preferable alternative to the conventional vapor compression air conditioning system and has received increasing interest in recent years. Based on whether an auxiliary refrigeration system is adopted, the systems are divided into two categories: separate solar powered rotary desiccant wheel cooling systems and hybrid solar powered rotary desiccant wheel cooling systems.

As a class of newly emerging materials, liquid metals exhibit outstanding performance in a wide variety of thermal management areas, such as convective cooling and phase change material (PCM) for thermal buffering etc. Due to the high thermal conductivity of liquid metals, these types of unconventional cooling technologies are superior for tackling extreme, complex and critical thermal issues and energy utilizations. Through comprehensive interpretations on a group of representative liquid metal thermal management strategies, the most basic approaches will be introduced for developing liquid metal cooling systems in this project.

One of the objectives of this project is to further develop the latest dehumidification cooling system and to provide information on potential applications. The objectives of the highly efficient dehumidification cooling technology are:
--Understanding technologies for sustainable energy production, conversion and utilization;
--Understanding limitations and opportunities of the dehumidification cooling technology;
--Gaining experience, through challenges and opportunities, during the testing and simulation of the dehumidification energy systems;
--Developing your own vision for a dehumidification cooling scenario in the future.

The other objective of the project is to develop an advanced liquid metal cooling system. The main tasks include:
--Understanding different types of liquid metal cooling technologies for saving energy and reducing power consumption for electronics cooling;
--Understanding the applications and advantages of liquid metal cooling technology;
--Learning basic skills and simulation methods of the liquid metal thermal system;
--Developing a personalized liquid metal thermal management system.

Eligibility Requirements

> Understanding lab safety.

> Interested students should have basic knowledge of air-conditioning, dehumidification or cooling technology, etc.

> Interested students will learn the basic concepts of liquid metal cooling technology, grasp basic skills to measure 2D thermal distribution of a liquid metal cooling system, and obtain basic information on simulation calculations.

Main Tasks

> Become familiar with dehumidification cooling technology and liquid metal cooling technology
> Propose a new system design and execute simulations
> Proceed with the experimental validation of the concept
> Write a technical report on the results

Website

http://www.sjtuirc.sjtu.edu.cn/en/profile.html (SJTU)
http://www.bioheat.ac.cn (TIPC)

Project 2

Cloning and functional characterization of rice male sterile genes

Contact Information

Prof. Dabing Zhang (SJTU)
Email: zhangdb@sjtu.edu.cn

Prof. Xiaofeng Cao, Prof. Weicai Yang (UCAS)
Email: xfcao@genetics.ac.cn, wcyang@genetics.ac.cn

Project Description and Objectives

The life cycle of flowering plants alternates between diploid sporophyte and haploid gametophyte generations. Male gametophytes (pollen grains) develop in anther of the stamen within the flower, and require cooperative functional interactions between gametophytic and sporophytic tissues. During the male sexual reproduction, there are numerous biological events, including cell division, differentiation and degeneration of somatic tissues consisting of four surrounding cell layers, as well as meiosis and mitosis of the germ cells during development of pollen grains. We are combining systematic biology (genomics, transcriptomics, proteomics, metabonomics) with other approaches such as genetics, cell biology, biochemistry, and structural biology to elucidate the molecular mechanisms underlying each biological process of male reproduction, e.g., cell-to-cell communication, programmed cell death, and fatty acid metabolism.

Eligibility Requirements

> Applicants should have basic knowledge of biology.

> Experience in biological research would be an advantage.

Main Tasks

The student will be involved in all stages of the project:

> Design experimental scheme
> Perform experiment
> Analyze experimental results
> Write the experiment report
> Finish a research report.
> Give two presentations on previous publications and two on original research.

Website

zhanglab.sjtu.edu.cn (SJTU)
http://sourcedb.cas.cn/sourcedb_genetics_cas/yw/zjrc/cm/200907/t20090731_2287246.html (UCAS)

Project 3

Molecular mechanisms controlling inflorescence and spikelet development in rice and barley

Contact Information

Prof. Dabing Zhang (SJTU)
Email: zhangdb@sjtu.edu.cn

Prof. Xiaofeng Cao, Prof. Weicai Yang (UCAS)
Email: xfcao@genetics.ac.cn, wcyang@genetics.ac.cn

Project Description and Objectives

Rice and barley, the model grass plants, form specialized morphology of inflorescence and spikelet, which determine grain yield. Using a variety of approaches, such as forward and reverse genetics, biochemistry, and cell biology, we are investigating the molecular mechanisms and the regulatory network involved in the morphogenesis and development of inflorescence and spikelet in rice and barley.

Eligibility Requirements

> Applicants should have basic knowledge of biology
> Experience in biological research would be an advantage

Main Tasks

The student will be involved in all stages of the project:

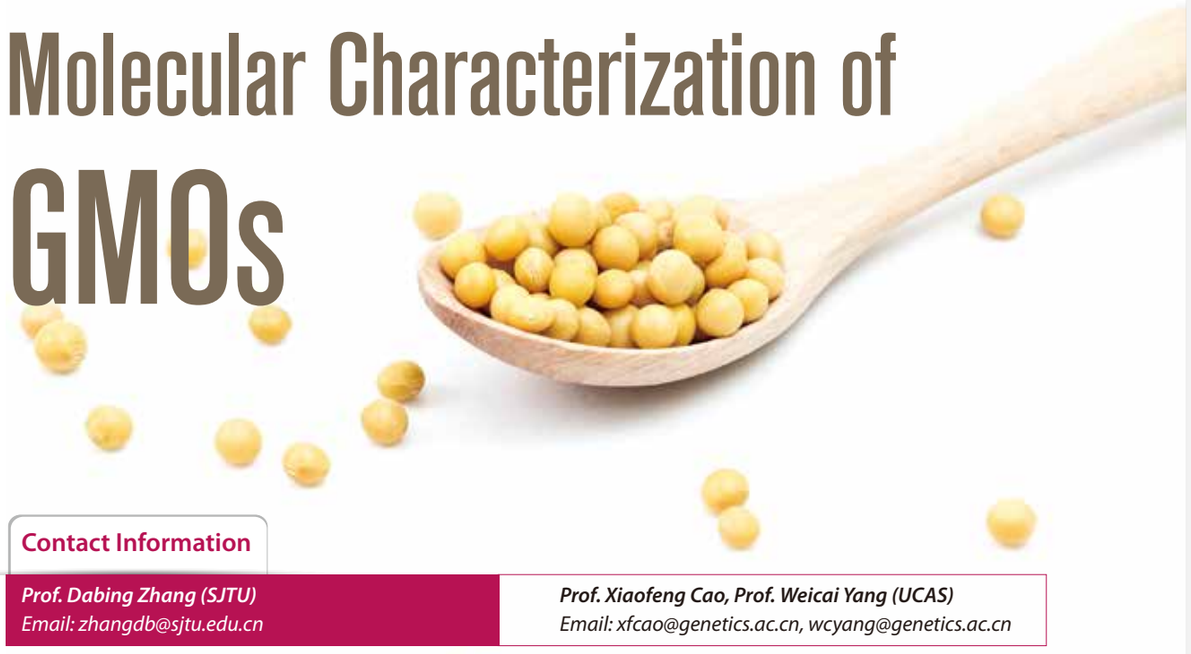
> Design experimental scheme
> Perform experiment
> Analyze experimental results
> Write the experiment report
> Finish a research report.
> **Give two presentations on previously published papers and two on original research.**

Website

zhanglab.sjtu.edu.cn (SJTU)
http://sourcedb.cas.cn/sourcedb_genetics_cas/yw/zjrc/cm/200907/t20090731_2287246.html (UCAS)

Project 4

Molecular Characterization of GMOs



Contact Information

Prof. Dabing Zhang (SJTU)
Email: zhangdb@sjtu.edu.cn

Prof. Xiaofeng Cao, Prof. Weicai Yang (UCAS)
Email: xfcao@genetics.ac.cn, wcyang@genetics.ac.cn

Project Description and Objectives

As more and more GMO crops, like transgenic maize and soybean, have been approved and consumed as food and feed, the safety of transgenic organisms has been more concerned than ever. Molecular characterization of transgenic organisms is required for assessing the safety of transgenic organisms. We are developing new detection methods to identify changes that occur at genomic, transcriptomic, proteomic and metabolic levels, and currently digging changes between the transgenic lines, the control lines, and the conventional cultivated lines. This research will lay the foundation for safety assessment of GMOs.

Eligibility Requirements

> Applicants should have basic knowledge of biology.
> Experience in biological research would be an advantage.

Main Tasks

The student will be involved in all stages of the project:

> Design experimental scheme
> Perform experiment
> Analyze experimental results
> Write the experiment report
> Finish a research report.
> **Give two presentations on previously published papers and two on original research.**

Website

zhanglab.sjtu.edu.cn (SJTU)
http://sourcedb.cas.cn/sourcedb_genetics_cas/yw/zjrc/cm/200907/t20090731_2287246.html (UCAS)

Project 5

Design of nanostructure for enhanced photoelectrical catalysts

Contact Information

Dr. Peng Zhang (SJTU)
Email: pengzhang2010@sjtu.edu.cn

Dr. HE Jun (UCAS)
Email: hej@nanoctr.cn

Project Description and Objectives

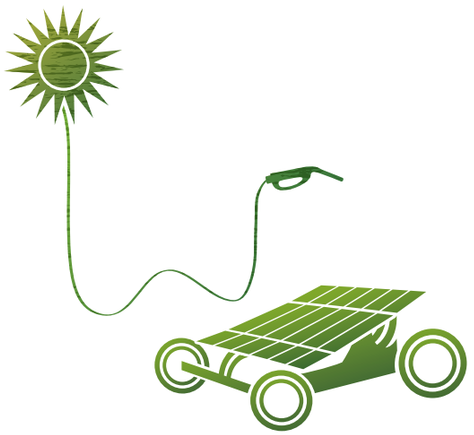
This project proposes to investigate the silicon wafer with proper morphology/microstructures, cocatalysts, multilayer surface structures that can promote the solar driven hydrogen production from water splitting. Hydrogen is a clean energy that only produces water when consumed in burning or in hydrogen fuel cells. However, the current production of hydrogen mainly comes from the petroleum or coal reforming industries, through processes which still produce CO2 and consume fossil fuels. Using solar energy to split water through photocatalysis is a totally green process. However, the efficiency, cost, and lifetime of the photocatalysts are still a challenge for the large scale photocatalysts. We are working on the modification of the surface structure of semiconductor materials to improve the efficiency, lower the cost, and/or elongate the lifetime of Si as a photocatalyst.

Eligibility Requirements

> The students should have a background in chemistry and physics, solar energy and semiconductors.

Main Tasks

> Finish a research report.
> Give one presentation on a previously published paper and one on original research.
> Conduct experiments with at least 5 samples.



Website

SJTU: http://eemater.sjtu.edu.cn/
UCAS:http://www.nanoctr.cn/hejun/ketizu/201511/t20151127_4479329.html?randid=0.2909771367313361&sign=ABZ0cnNfd2NtX3ByZXZpZXdfYWNjZXNzAAAH4AAAAAIAAAALAAAACQAAABcAAAAX