

NUS ChBE Summer Chemical Technology Programme

The Summer Chemical Technology Programme is offered by Department of Chemical & Biomolecular Engineering (ChBE), National University of Singapore (NUS). This is a three-week intensive training course on modern chemical technologies covering instrumental methods, nanotechnology and modern organic chemistry. Students will have a chance to attend lectures conducted in English by professors from one of the top Universities in the world. They will also tour many world-class research laboratories and industrial sites to learn the transformative power of chemical technology and its contribution to Singapore's economy. Our social programme is equally fun. We invite students to immerse themselves in the truly unique Singapore culture and make friends from all over the world.

Our experiential teaching practice is internationally-renowned. It comprises of lectures, practical classes, group discussion, scientific tour and excursions. Our goal is to make the Summer Programme as informative and fun as possible.

Through this Summer Chemical Technology Programme, we aim to help students

- develop skills and confidence important for achieving success in a laboratory;
- develop skills and confidence to engage in productive collaborations – working in groups;
- meet students from other universities all around the world;
- gain an international academic experience in a top university; and
- truly experience the Singapore culture.

Our Summer Chemical Technology Programme is offered annually in June/July. We only accept for registration and application through our partnering sending universities. For institutional enquiries on a customized program, please contact chehead@nus.edu.sg for a discussion.

Proposed Programme for Zhejiang University

- Arrival: 14 July 2019, Sunday afternoon
- Departure: 3 August 2019, Saturday morning
- Accommodation: Marina Lodge, Republic of Singapore Yacht Club. This is located 6-minute drive from NUS or 20-minute walk to NUS, with shuttle services to nearby MRT stations. Accommodation will be a twin-bedded superior room with free wifi and complimentary breakfast served from 7 – 10 am daily. Facilities: Gym, swimming pool, two restaurants. <https://rsyc.org.sg/>



- Thematic lectures and assignments: Week 1 - instrumental analysis, Week 2 - organic chemistry, Week 3 - nanotechnology/biotechnology
- Sites visits:
 - **Singapore Synchrotron Light Source**, a synchrotron radiation facility. Synchrotron radiation is a powerful tool for analytical purposes and for advanced fabrication, which has become indispensable in many disciplines such as the life sciences, materials science, environmental analysis, and micro/nano fabrication. Synchrotron radiation enables us to look into living organisms, man-made materials and advanced engineering components, in vivo, almost non-destructively, in situ, and with spatial and time resolution, revealing detailed structural, chemical, electronic, and magnetic properties.



- **Biopolis at one-north**, one of Singapore's key projects to boost the biomedical industry as the country's next engine of economic growth. As the premier research hub for Biomedical Sciences, it hosts leading public and private biomedical research institutes and organisations, and anchors the development of the entire research and development (R&D) value chain of life sciences. This encompasses basic drug discovery, clinical development and medical technology research.



- **Singapore Science Park**, a research, development and technologies hub in Singapore. It was set up under a government initiative in 1980 to provide an infrastructure for retail and development to flourish in Singapore. Situated along Singapore's Technology Corridor, the Singapore Science Park is amongst Asia's most prestigious addresses for R&D and technology development.
- **Solar Energy Research Institute of Singapore**, Singapore's national institute for applied solar energy research. SERIS conducts research, development, testing and consulting on solar energy technologies and their integration into power systems and buildings. The Institute's R&D spectrum covers materials, components, processes, systems and services, with an emphasis on solar photovoltaic cells, modules and systems.
- **Science Centre Singapore** is dedicated to the promotion of science and technology among students and members of the public. As a leading Science Centre in the region, it has twelve exhibition galleries with more than 1,000 interactive exhibits.

Week 1 Mon 15/7/2019	Week 2 Mon 22/7/2019	Week 3 Mon 29/7/2019
9.00 am Transfer to NUS 9.30 am Welcome & Introduction 10.00 am Course overview 10.30 am Tea break 11.00 am Safety orientation and briefing 12.00 pm Lunch 2.00 pm Tour of University Town 3.00 pm Tea break 3.30 pm Facility Tour 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 1: Chemistries that enable modern world 12.30 pm Lunch 2.00 pm Tour of bio lab facilities 3.30 pm Tea break 4.00 pm Tour of bio lab facilities (con't) 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 1: Catch and release: metal-organic frameworks 12.30 pm Lunch 2.00 - 5.00 pm Lab demonstration 5.00 pm Transfer to hotel
Tue 16/7/2019 9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 1: Elemental understanding of elements: atomic spectroscopy 12.30 pm Lunch 12.30 pm Lunch 2.00 pm Lab demonstration 3.30 pm Tea break 4.00 pm Social activity 5.00 pm Transfer to hotel	Tue 23/7/2019 9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 2: Making liquid fuels from solar energy 12.30 pm Lunch 2.00 - 5.00 pm Tour of Biopolis at one-north 5.00 pm Transfer to hotel	Tue 30/7/2019 9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 2: Nanomaterials for energy storage 12.30 pm Lunch 2.00 pm Lab demonstration 3.30 pm Tea break 4.00 pm Tour of Solar Energy Research Institute of Singapore 5.00 pm Transfer to hotel
Wed 17/7/2019	Wed 24/7/2019	Wed 31/7/2019
9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 2: Vibrating chemical bonds - molecular spectroscopy 12.30 pm Lunch 2.00 pm Lab demonstration 3.30 pm Tea break 4.00 pm Facility Tour/Social Interaction 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 3: Plastics that conduct electricity - conducting polymers 12.30 pm Lunch 2.00 pm Lab demonstration 3.30 pm Tea break 4.00 pm Lab demonstration (con't) 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 3: Your waste is my gold: Biorefinery 12.30 pm Lunch 2.00 pm Assignment 3.30 pm Tea break 4.00 pm Social Interaction with NUS students 5.00 pm Transfer to hotel
Thu 18/7/2019	Thu 25/7/2019	Thu 1/8/2019
9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 3: Molecules which light up - fluorescence and phosphorescence 12.30 pm Lunch 2.00 pm Lab demonstration 3.30 pm Tea break 4.00 pm Facility Tour/Social Interaction 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 4: Moore's law and Electronic materials 12.30 pm Lunch 2.00 pm Tour of Singapore Science Park I & II 3.30 pm Tea break 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 4: Chemistry of Life: Metabolic engineering 12.30 pm Lunch 2.00 pm Tour of Singapore Science Centre 5.00 pm Transfer to hotel
Fri 19/7/2019	Fri 26/7/2019	Fri 2/8/2019
9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 4: Identities of molecules - NMR and chiroptical techniques 12.30 pm Lunch 2.00 pm Tour of Singapore Synchrotron Light Source 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Tour of NEWater Facilities 12.30 pm Lunch 2.00 pm Interaction with Graduate Students 3.30 pm Tea break 4.00 pm Introduction to Research Methodology 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 5: Microbes for Molecules 12.30 pm Lunch 2.00 pm Quiz 3.30 pm Tea break 4.00 pm Presentations 5.30 pm Networking Dinner 7.00 pm Transfer to hotel
Sat 20/7/2019	Sat 27/7/2019	Sat 3/8/2019
9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 5: A running competition - liquid chromatography and gas chromatography 12.30 pm Lunch 2.00 pm Quiz 3.30 pm Tea break 4.00 pm Tour of Membrane Lab 5.00 pm Transfer to hotel	9.00 am Transfer to NUS 9.30 - 12.30 pm Lecture 5: Chemistry of textile: Functional polymers 12.30 pm Lunch 2.00 pm Quiz 3.30 pm Tea break 4.00 pm Tour of Materials Lab 5.00 pm Transfer to hotel	7.30 am Departure for airport
Sun 21/7/2019 Free	Sun 28/7/2019 Free	