Chemistry is the central science that underpins the environment we live in, the materials we use around us, and the inner workings of health and disease. It gives us the ability to understand, synthesise and manipulate matter at the molecular level, and naturally connects with multiple disciplines within the College of Humanities and Sciences (CHS). Roger Kornberg, the 2006 Nobel Laureate in Chemistry once said, "If there is any one subject that an educated person should know in the world, that is Chemistry". So why wait? Come and join us at the Department of Chemistry right now!

Our department is the highest-ranked chemistry department in Asia. Gathered from all over the world, our teaching and research faculty possess strong expertise in a wide variety of chemistry sub-disciplines, and are committed to imparting the finest and latest knowledge to our students. Today, we offer both undergraduate and graduate programmes leading to B.Sc. (Hons), M.Sc., and Ph.D. degrees in Chemistry. As part of the CHS framework, undergraduate students can study Chemistry as their first or second major, or minor. They can also choose to specialise in chemical research, and have ample opportunities to work with our innovative professors. Many students also actively participate in industrial internships, as well as embark on exchange programmes at many overseas universities. Our strong collaborative ties with local and international academic and industry partners enable students to take learning beyond the classroom.

Chemistry is an experimental science. Therefore, the Department of Chemistry is equipped with state-of-the-art laboratories, where students get to train their technical skills using the most advanced chemical technologies and instrumentation. Coupled with an excellent and multifaceted curriculum, we will prepare our students with the right skills and knowledge to face the challenges of the future.

We look forward to having you with us!

Professor Richard Wong
Department of Chemistry, NUS
January 2021
Chemistry Major in the CHS

- A 4-year undergraduate B.Sc. (Hons) degree with flexibility in depth of study within the framework of the College of Humanities and Sciences (CHS).
- Choose your first Major in Chemistry (with option for Specialisation in Chemical Research), or elect to do a Second Major in Chemistry, Minor in Chemistry, or Minor in Analytical Chemistry.
- Graduate with Major in Chemistry degree with the CHS framework by reading 11 core and 4 elective chemistry modules in different exciting and relevant areas of chemistry.
- Option of pursuing undergraduate research work in a world-leading research laboratories as part of requirement towards Specialisation in Chemical Research. B.Sc. (Hons) students with strong research aptitude and inclination will be considered for sponsored Ph.D. programme under scholarship.
- Learn finest and cutting-edge knowledge directly from excellent teaching and research faculty in the Department of Chemistry, who possess strong expertise in a wide variety of chemistry sub-disciplines.

Second Major and Minor Programmes

Second Major in Chemistry

- In the CHS, students are encouraged to take a second major to achieve breadth for an interdisciplinary education.
- Come expand your horizon with Chemistry as your Second Major, simply by reading 10 core chemistry modules.

Minor Programmes

- If you prefer, you can also opt to secure a Minor in Chemistry or Analytical Chemistry or Nanoscience, each comprising of 5 modules.
- The Minor in Nanoscience is jointly offered with the Department of Physics, NUS.
Undergraduate Curriculum

1. **Chemistry Major** (15 Modules)

2. **Chemistry Major with specialisation in Chemical Research**
   (15 + “5” Modules)

<table>
<thead>
<tr>
<th>Year 1, 2</th>
<th>Year 3</th>
<th>Core Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM1102</td>
<td>CM3111</td>
<td></td>
</tr>
<tr>
<td>CM2112 (with lab)</td>
<td>CM3121</td>
<td></td>
</tr>
<tr>
<td>CM2122 (with lab)</td>
<td>CM3131</td>
<td></td>
</tr>
<tr>
<td>CM2133</td>
<td>CM3141</td>
<td></td>
</tr>
<tr>
<td>CM2143 (with lab)</td>
<td>CM3191 (lab)</td>
<td></td>
</tr>
<tr>
<td>CM3192 (lab)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Year 4</th>
<th>Specialisation in Chemical Research</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Four CM3xxx/CM4xxx, excluding research/internship-based modules</td>
</tr>
</tbody>
</table>

- Project work requirement for major: take either CM3288 (UROPS) or CM4288 (FYP) or CM4299 (FYI) using your UE basket. If you intend to major with specialisation, this requirement is already fulfilled.
- Other B.Sc. requirements apply: 13 CHS core curriculum modules, and rest of unrestricted modules (with UROPS, 11; CM4288, CM4299, 9; Specialisation, 7).

**Chemistry as a Second Major**
(10 modules)

<table>
<thead>
<tr>
<th>Year 1, 2</th>
<th>Year 3</th>
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</thead>
<tbody>
<tr>
<td>CM1102</td>
<td>CM3111</td>
</tr>
<tr>
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</tr>
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<td>CM3141</td>
</tr>
<tr>
<td>CM2143 (with lab)</td>
<td>CM3191 (lab)</td>
</tr>
</tbody>
</table>

**Minor in Chemistry** (5 Modules)

<table>
<thead>
<tr>
<th>Level 1, 2</th>
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<tbody>
<tr>
<td>CM 1102</td>
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<tr>
<td>CM 2112</td>
</tr>
<tr>
<td>CM 2122</td>
</tr>
<tr>
<td>CM 2133</td>
</tr>
<tr>
<td>CM 2143</td>
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</tbody>
</table>

**Minor in Analytical Chemistry**

<table>
<thead>
<tr>
<th>Level 1, 2, 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM1102</td>
</tr>
<tr>
<td>CM2133</td>
</tr>
<tr>
<td>CM2143 (with lab)</td>
</tr>
<tr>
<td>CM3192 (lab)</td>
</tr>
</tbody>
</table>
• Putting theory into practice, students are given opportunities to work with our chemistry professors on research projects, via Undergraduate Research Opportunities Programme in Science - (UROPS) and/or the Final Year Project (FYP).
• Students who complete these research project modules (along with an additional CM3xxx/4xxx module) can graduate with B.Sc. (Hons) with Specialisation in Chemical Research.
• Participate in research projects to deepen your skill, sharpen your mind, and develop your thought. All our professors perform innovative research to tackle real-world problems. Many of them are among the most influential scientists in their fields in 2019, based on Clarivate Analytics’ Highly Cited Researchers List.
• Work in our state-of-the-art laboratories, which are equipped with the latest advanced chemical technologies and instrumentation.

Research Opportunities

Internship Opportunities

• Students are given an opportunity to have first hand experience in chemical related industry during the summer break/vacation, locally/overseas.
• Students can elect to participate in the Undergraduate Professional Internship Programme (UPIP) with our industrial partners to proactively engage in career preparation and experience day-to-day working life.
• Some of institutions, companies, and research centres where our students have gone for their internships:

<table>
<thead>
<tr>
<th>A*STAR</th>
<th>Abbott</th>
<th>Arkema</th>
<th>BASF</th>
<th>Baxter</th>
<th>Croda</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSA</td>
<td>IFF</td>
<td>Illumina</td>
<td>Infineum</td>
<td>Intertek</td>
<td>Johnson&amp; Johnson</td>
</tr>
<tr>
<td>Novartis</td>
<td>P&amp;G</td>
<td>Philips</td>
<td>PUB</td>
<td>Roquette</td>
<td>Science Centre</td>
</tr>
<tr>
<td>DSO</td>
<td>DSTA</td>
<td>Eurofins</td>
<td>Firmenich</td>
<td>Givaudan</td>
<td>GSK</td>
</tr>
<tr>
<td>Mondelez</td>
<td>MSD</td>
<td>Nanolumi</td>
<td>NHB</td>
<td>Nestle</td>
<td>Nippon Paint</td>
</tr>
<tr>
<td>Shimadzu</td>
<td>Solent Chemicals</td>
<td>Solvay</td>
<td>Symrise</td>
<td>Tate&amp;Lyle</td>
<td>TUV SUD</td>
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Department of Chemistry, NUS | chadmin@nus.edu.sg | chemistry.nus.edu.sg
Students will have the opportunity to enrich their undergraduate education by spending one semester abroad at >300 partner universities under the International Student Exchange Programme (SEP) while paying only home tuition fees.

The modular credits obtained from the partner universities will be counted towards the students’ graduation fulfilments.

Students are also able to gain overseas experience is through overseas programme organised by NUS College Overseas.
Career prospects

- Career opportunities in industry, civil service and the education sector are available upon graduation.
- Professions include research scientists, process managers and quality assurance officers in the chemical, pharmaceutical, petroleum, and specialty chemicals organisations, as well as scientific officers in the civil service and science teachers in the education system.
- Our graduates are well-poised for Ph.D. research in Singapore and leading universities worldwide and have gone on to lead R&D at multinational companies or pursue academic careers as professors.

Impact on society

**Combating tuberculosis through the study of fatty molecules**

Professor Chng Shu Sin and his group recently developed elegant biochemical assays to characterise the function of the membrane protein MmpL3 as a lipid transporter, which is critical for outer membrane assembly and small molecule inhibition. This finding has significant impact on current and future drug discovery efforts to fight tuberculosis.

**Converting carbon dioxide into useful chemicals**

Professor Jason Yeo Boon Siang’s team has developed a copper catalyst capable of recycling carbon dioxide (CO₂) back into useful chemicals and fuels such as propanol, in a single step. They used agglomerates of copper nanocrystals to facilitate the electrocatalytic reduction of CO₂ at room temperature and pressure, and without the use of environmentally harmful organic solvents. Propanol can also be blended with gasoline to deliver cleaner burning fuels with lower greenhouse gas emissions, achieving a more habitable environment.
Towards new flame retardant materials

Professor Rowan Young’s team has developed a new reaction that generates poly-brominated materials from environmentally hazardous fluorocarbon waste. The team is developing new Brominated Flame Retardants, additives incorporated into many plastics to reduce flammability. This can potentially generate industrially useful materials from waste products at lower disposal cost.

Developing Next-Generation Semiconductor Materials

Researchers from Department of Chemistry, namely Professors Richard Wong, Loh Kian Ping, Wu Jishan, Chen Wei, Christian Nijhuis and Huynh Han Vinh, and Department of Electrical Engineering are partnering Applied Materials Inc., to establish the Applied Materials-NUS Advanced Materials Corporate Lab to develop novel semiconductor processes, chemistry and materials to enable the next generation of semiconductor manufacturing. This university-industry collaboration will design, synthesize and test new materials as well as processing techniques for atomic layer deposition and etching for advanced semiconductor manufacturing.

• The department offers a vibrant student life by supporting 3 active student bodies catered to different aspects of student life needs.
• Chemistry Graduate Society (CGS), representing the graduate students in the department, establishes a student support network focusing on community integration, well-being and professional development.
• Chemical Sciences Society (CSS) is the largest student body and represents the undergraduate students in the department. CSS focuses on student well-being, welfare and integration to the department and NUS.
• American Chemistry Society Singapore Chapter (ACSSC) is a recent establishment funded externally and they are interested in the promotion of chemistry learning in students in NUS and in Singapore.
• At Faculty and University-level, students have opportunities to join various co-curriculum activities or clubs based on their interests.
Scholarships & Bursaries

Scholarships
- Kiang Ai Kim Chemistry Merit Scholarship
- Huang Hsing Hua Chemistry Merit Scholarship
- NUS Science - Lawrence Chia Merit Scholarship
- NUS Science - Yeo Keng Joon Merit Scholarship

Other University-level Scholarships
- NUS Sports Scholarship
- NUS Performing & Visual Arts Scholarship

Awards
- Ang Kok Peng Memorial Award Undergraduate
- Chemistry Alumni Study Awards

Bursaries
- Kwan Fook Ngah & Kum Lai Yoke Bursary
- MG Bursary
- Tan Eng Liang Bursary
- Saw Phaik Hwa Bursary
- Tan Sau Fun Bursary

Admission Requirements

Pre-University Education

<table>
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<tr>
<th>Requirements</th>
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<tbody>
<tr>
<td>From A Level</td>
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<tr>
<td>From Polytechnic Diploma</td>
</tr>
<tr>
<td>From IB</td>
</tr>
</tbody>
</table>

Find more information on admission and financial aids at www.nus.edu.sg/oam
10 Reasons to choose Chemistry @NUS

1. **Top in Asia:**
   NUS Chemistry is a top-ten chemistry department in the world and the top department in Asia for the past 5 years based on QS World University Rankings by subject.

2. **Curriculum:**
   It has a strong emphasis on practical chemistry education that is relevant to industry. The excellent teaching laboratories are well-equipped with the state-of-the-art instruments for intensive hands-on training. The curriculum is continually revised to meet the emerging needs of the Singapore chemical industry.

3. **Flexibility:**
   The NUS Chemistry curriculum with CHS is flexible in depth with majors and minors to cater to different needs of students.

4. **Internships:**
   Through various internship opportunities, Year-2, -3 and/or -4 students can gain first-hand experience in working in the real world and better prepare themselves for the future.

5. **Research:**
   The NUS chemistry curriculum provides plenty of research opportunities through Undergraduate Research Opportunities Programme (UROPS) and Final Year Project (FYP) under the guidance of renowned chemistry professors. Students who complete these research modules (along with one additional CM3xxx/4xxx module) would be able to graduate with Specialisation in Chemical Research.

6. **Overseas exchange:**
   NUS provides abundant overseas exchange programmes to top universities in US, Europe, China, Australia and many others.

7. **Careers:**
   Through the Centre of Future-Ready Graduates, NUS students are being prepared well for their career. Chemistry graduates have diverse job opportunities in the healthcare, pharmaceutical, materials science, environment, energy and even banking and commercial sectors.

8. **Financial support:**
   With the generous donation from alumni, NUS Chemistry financially supports students in need with an array of financial aid schemes and scholarships.

9. **Location:**
   NUS campus has excellent infrastructure and a vibrant culture. The campus is centrally located and serviced by a good transport system with Kent Ridge MRT station right inside the campus.

10. **Societal impact:**
    Chemistry students have opportunities to engage in translational research and make a direct impact on the society. Research topics ranges from solving environmental problems, design & synthesis of novel cancer drugs, synthesis of next generation of materials for semiconductor industry and many others.

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