



**NANYANG
TECHNOLOGICAL
UNIVERSITY**
SINGAPORE

College of Science

DISCOVER SCIENCE @ NTU

Asian School of the Environment

School of Biological Sciences

School of Physical and Mathematical Sciences

School of Chemistry, Chemical Engineering and Biotechnology

(The first interdisciplinary school in NTU, joint between the College of Science and the College of Engineering)

www.ntu.edu.sg/science



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Dean's Message



Welcome to the College of Science (CoS) at the Nanyang Technological University (NTU Singapore). The College is home to the Asian School of the Environment (ASE), the School of Biological Sciences (SBS), the School of Chemistry, Chemical Engineering and Biotechnology (CCEB), and the School of Physical and Mathematical Sciences (SPMS), which itself comprises the Divisions of Physics and Mathematics. A young and nimble institution, the College has established a leading international reputation and provides a world-class research and education environment, addressing contemporary areas of today's science.

We are a truly interdisciplinary college. Most members of our remarkable faculty cross two or more domains – for example, we have biologists researching food science, chemists creating new materials, mathematicians making impact in computer science, physicists working in financial engineering and geoscientists working on societal impacts of climate change. We are devoted to scholarship and advancing scientific knowledge through education and research. Our research

strengths are acknowledged in international rankings, and we are leveraging our intellectual scientific strengths to address problems of major societal concern. Peaks of research excellence address sustainable Earth, global Asia, secure communities, healthy society, quantum science and future of learning, all important in national and global future research strategies.

The degree programmes within the College are also known for the quality of their graduates. CoS students and graduates have gained admission to top graduate schools around the world, including Harvard, UC Berkeley, and Cambridge. Our graduates are highly sought by top employers such as Bloomberg, BP, Citibank, GlaxoSmithKline, Google, and Singapore Airlines.

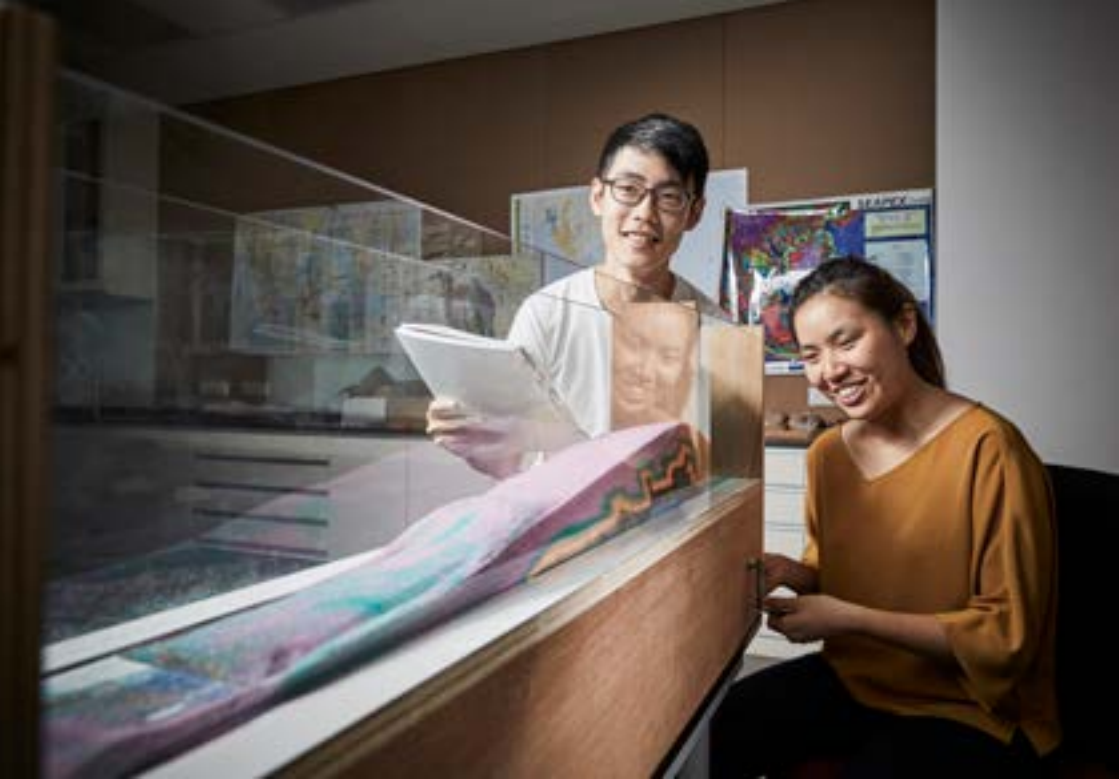
I welcome you and invite you to visit, to discover for yourself the remarkable ecosystem of education and research that is the College of Science.

Professor Simon Redfern
Dean, College of Science



ASIAN SCHOOL OF THE ENVIRONMENT

The Asian School of the Environment (ASE) at NTU is a world leader in environmental research focused on environmental challenges in Asia. We integrate earth and environmental life science, ecology, engineering and technology, humanities, and the social sciences to address Asia and the world's key environmental challenges, including climate change, deforestation, natural disasters, and sustainability.



BACHELOR OF SCIENCE (HONOURS) IN ENVIRONMENTAL EARTH SYSTEMS SCIENCE

The Environmental Earth Systems Science programme favours a small cohort which encourages an innovative and interactive learning environment. Students who choose this course will gain a strong background in quantitative skills such as spatial analysis, core science, and modern computing techniques. We also place emphasis on applying these skills through critical thinking, communication, and collaboration.



Double Major

BACHELOR OF SCIENCE (HONOURS) IN ENVIRONMENTAL EARTH SYSTEMS SCIENCE AND PUBLIC POLICY AND GLOBAL AFFAIRS

Students admitted to this multidisciplinary course will develop a strong background in quantitative environmental earth systems science and communication, public affairs, and international relations. The joint programme will give students the opportunity to build complementary skills in leadership, group work, and innovative problem-solving, empowering the next generation of public policy makers with the tools required to face the challenges of today's rapidly changing world.

Career Prospects

Environment And Conservation

- Academic research
- Environmental media and journalism
- Non-Government Organizations and Volunteer-Welfare Organizations such as WWF, Nature's Society or Birdlife
- International Governance such as World Food Bank or UNESCO

Private Sector

- Natural resource exploration, extraction, and management (oil, gas, and minerals)
- Environmental consulting
- Geotechnical consulting
- Geologic surveying or monitoring

Business & Sustainability

- Businesses or corporations that value technical knowledge, creative problem solving and leadership ability when dealing with changing environmental policy and the global move towards improved global sustainability practices
- Sustainability reporting

Entrepreneurship & Finance

- Where firms seek quantitative knowledge about the science that drive changes in the energy market.
- Reinsurance companies, who rely on a balance of earth science data and policy intuition to help assess long term risk

Public Sector

- Foreign and domestic policy
- Government roles in Environmental Planning, Policy and Management
- Water resource management or hydrogeology
- Teaching

Postgraduate Studies

- Our graduates have gone on to Masters and PhD studies in some of the world's top institutions, including Harvard, Caltech and UCLA





SCHOOL OF BIOLOGICAL SCIENCES

A cutting-edge global education in the biomedical and life sciences awaits each student in the School of Biological Sciences (SBS). Stimulating and challenging, our curriculum is designed to augment each student's capabilities and prepare them for the demands of a career in the biomedical and healthcare industries. Supported by a diverse faculty with members from over 20 countries, our students will have access to broad global perspectives from experts in the field.

At SBS, we are committed in our mission to provide a top-tier tertiary education both within and beyond the classroom. Our students are not only engaged using modern pedagogical approaches, but also provided with opportunities to participate in hands-on research and industrial internships. Students will also be able to reap the benefits of a curriculum that is constantly updated to correspond with market needs, taught by a community of research-active faculty. Furthermore, students will also be equipped with essential data science skills, allowing them to be at the forefront of the new digital economy in Biology.

For a taste of what it means to participate in hands-on research, students can join the Undergraduate Advanced Experimental Biology (UAEB) workshops. There, they will learn about life as researchers, hone lab skills for their future careers, get glimpses into the latest biological advancements and more.

The implementation of a compulsory internship in the third year of study also provides students with the opportunity to obtain first-hand experience in the real world, giving them a competitive edge as they enter the workforce. Students can further sharpen their skills by attending Professional Career Development courses, working closely with the school's Career Coach and attending our monthly Alumni Career Sharing events to find out more.



BACHELOR OF SCIENCE (HONOURS) IN BIOLOGICAL SCIENCES

The study of biology is highly relevant to everyday life. As the knowledge base in the biological sciences grows exponentially and technology becomes ever more sophisticated, the ability to think broadly about biology and the application of knowledge across boundaries of disciplines will inevitably become a very valuable and powerful asset in both the scientific environment and many walks of life.

Our mission is to provide the support and resources that students need to achieve their potential, all while celebrating the study of life. This programme will prepare students for a variety of career options, as the curriculum covers specialised and advanced topics in stem cells, cancer biology and therapy, physiology, evolutionary biology, neuroscience, amongst others.

The implementation of a compulsory internship will also enhance the possibility of securing a job after graduation. Equipped with programming, computational thinking and other essential data science skills, their grasp of digital literacy in their future career is also ensured.



Second Major

BACHELOR OF SCIENCE (HONOURS) IN BIOLOGICAL SCIENCES WITH SECOND MAJOR IN BIOMEDICAL STRUCTURAL BIOLOGY

Structural biology is increasingly important in the biomedical field, with a growing impact on healthcare and medicine. Students of this interdisciplinary programme will undertake courses related to areas of study in structure-based discovery, structure-based vaccine design, structure-based design of biologics, structure-based design of novel biomaterials and structure-based design of protein engineering.

Second Major

BACHELOR OF SCIENCE (HONOURS) IN BIOLOGICAL SCIENCES WITH SECOND MAJOR IN MEDICINAL CHEMISTRY AND PHARMACOLOGY

Conducted in partnership with CCEB, students of this interdisciplinary programme will be cross-trained in the biological sciences and chemistry, preparing them for wider career options. Providing a good foundation in chemical biology and pharmacology, students will not only be well-equipped with knowledge in both disciplines, but also with the relevant skill sets to embark on careers in biomedical and pharmaceutical research and development.



Second Major

BACHELOR OF SCIENCE (HONOURS) IN BIOLOGICAL SCIENCES WITH SECOND MAJOR IN FOOD SCIENCE AND TECHNOLOGY

Conducted in partnership with the Wageningen University (The Netherlands) and NTU's School of Chemistry, Chemical Engineering and Biotechnology, this popular programme was first introduced in 2013. Students with an interest in biology and who wish to gain a greater understanding of food processes from an engineering and industrial perspective will benefit from the interdisciplinary nature of this unique programme.

Double Major

BACHELOR OF SCIENCE (HONOURS) IN BIOLOGICAL SCIENCES AND PSYCHOLOGY

In collaboration with the School of Social Sciences, this highly inter-disciplinary degree offers students the opportunity to specialise in two major academic disciplines from the two Schools. The programme equips students with transferrable skills to pursue successful careers in a rapidly changing environment.

In Singapore, the increased levels of stress encountered by its population over the years has led to a growing emphasis on mental health awareness, as well as an increased demand for professionals with an interdisciplinary training in Psychology. Students with a curiosity in areas such as human emotions, behaviours and thoughts can now adopt a more integrated approach towards understanding those very topics, as the programme offers a more consistent depth in both disciplines.

**Eligible for NTU-Duke-NUS Medicine Pathway*

Double Major

BACHELOR OF SCIENCE (HONOURS) IN BIOMEDICAL SCIENCES AND BIOBUSINESS

In collaboration with the Copenhagen Business School and Nanyang Business School, students will be provided a unique opportunity to be cross-trained in the biomedical sciences, biotechnology, business and management, with emphasis on the biomedical and healthcare sectors in Singapore and Southeast Asia. This includes biomedical manufacturing operations management and regulatory matters relating to the biomedical and healthcare industries.

Professional immersion is also an integral part of the structure of this programme: foundational knowledge and skills will be strengthened through professional internships in various business departments at multinational pharmaceutical, biotechnology and medical technology companies and local healthcare institutions. Students will then embark on a final year project in the final semester. They can fully explore and synthesize the theoretical knowledge and internship experience in a biobusiness-related project or participate in laboratory-based biomedical science research to gain a further understanding of the relevance of research and development to bioproducts in the industry.

**Eligible for NTU-Duke-NUS Medicine Pathway*

Double Degree

BACHELOR OF SCIENCE (HONOURS) IN BIOMEDICAL SCIENCES BACHELOR OF CHINESE MEDICINE

This unique five-year double degree programme is an amalgamation of the western approach to Biomedical Sciences with Traditional Chinese Medicine (TCM). The Bachelor of Science (Honours) in Biomedical Sciences is conferred by NTU and the Bachelor of Medicine (Chinese Medicine) is conferred by the Beijing University of Chinese Medicine (BUCM). The first three years of the double degree are taught at NTU, while the final two years are taught at BUCM in Beijing. This is a bilingual course with English and Mandarin as the media of instruction. Students will learn aspects of biomedical sciences such as genetics, molecular & cell biology, immunology as well as TCM diagnostics, medications, acupuncture and moxibustion.



NTU-DUKE-NUS MEDICINE PATHWAY

This pathway is open only to NTU School of Biological Sciences students admitted to the Double Major Programme in Biomedical Sciences and BioBusiness or Double Major Programme in Biological Sciences and Psychology.

The NTU-Duke-NUS Medicine Pathway provides motivated individuals the opportunity to develop their entrepreneurial aspirations in the medical field through a myriad of engagement activities.

Through the stimulating and challenging curriculum devised by the School of Biological Sciences, graduates

will be well-trained to meet the demands of the biomedical and healthcare industries, ensuring that they maintain relevance in the industry.

Successful students will graduate with a Bachelor of Science (Honours) in Biological Sciences and Psychology / Bachelor of Science (Honours) in Biomedical Sciences and BioBusiness at Nanyang Technological University (NTU), followed by a Doctor of Medicine (MD) degree at Duke-NUS Medical School.

Career Prospects

As a life sciences graduate from SBS, you will have a good variety of career options ahead of you. A career as a medical doctor, veterinarian or research scientist, amongst others, are popular routes taken by our graduates.

Our graduates are well sought after by hospitals, research institutes, government agencies and forensic departments in the public sector. Companies have also actively sought out our life sciences graduates, with offers from the pharmaceutical, biotechnology, food, water and agriculture industries for positions such as process engineers, biotechnologists, QA specialists and clinical researchers.

There is also a great demand for life sciences graduates to contribute to the public understanding of science as journalists, science writers and information/ liaison officers. In the financial and legal sectors, analysts with life science knowledge are necessary for risk assessments, and filing patents

for molecular biology and biotechnology used for drug and medical applications. There is also the option of undertaking a postgraduate qualification with the National Institute of Education (NIE) for entry into the teaching profession.

Graduates with a Double Degree in Biomedical Sciences and Chinese Medicine are well-positioned to consider careers in both life sciences/ biomedical sciences and the Chinese Medicine industry. A large majority of the graduates are employed as Chinese Medicine Physicians (subject to passing the Singapore Chinese Medicine Practitioners' Board Exam) as well as in management and administration positions in healthcare organizations and clinics. Other graduates have also chosen to pursue further postgraduate qualifications, such as a Masters in Chinese Medicine or PhD by research, at both overseas and local universities.



Healthcare

Jobs: Acupuncturist, Clinical Researcher, Healthcare Operations Executive, Hospital Executive, Management Associate, Pharmaceutical Sales, Physician.

Companies: Eu Yan Sang, JurongHealth, Kin Teck Tong Clinic, KK Women's & Children's Hospital, Singapore General Hospital, Tan Tock Seng Hospital

Biomedical & Pharmaceutical

Jobs: Clinical Researcher, Manufacturing Biotechnologist, Process Engineer, QA Specialist, Research & Development Officer, Validation Engineer.

Companies: Amgen, GlaxoSmithKline, Johnson & Johnson, Lonza Biologics, Novartis Biopharma Operations

Public Sector

Jobs: Forensic Specialist, Gynaecologist, Health Policy Analyst, Laboratory Management, Project Officer, Research Officer

Companies: Agency for Science, Technology and Research, Genome Institute of Singapore, Institute of Molecular & Cell Biology, Ministry of Education, Ministry of Health, National Environment Agency, Singapore Police Force, SingHealth

Banking, Finance & Legal

Jobs: Fixed Income Trader, Management Associate, Patent Officer, Relationship Management, Risk Consultant, Tax Consultant

Companies: Bank of America Merrill Lynch, Citibank, DBS Bank, Deloitte & Touche, Drew & Napier LLC, Moody's Singapore

Entrepreneurs

Jobs: Founder & CEO, Owner & Physician of TCM clinic

Companies: Aitreat, Archisen, Bio30 Technologies, BlazeRidge, In Vitro Pte Ltd, TCMTREND

Postgraduate Studies

Cambridge University, Karolinska Institute, Harvard University, Duke-NUS Medical School

Others

Jobs: Communication Accounts Executive, Marketing Associate, Science Journalist, Science Writer, Service Executive



SCHOOL OF CHEMISTRY, CHEMICAL ENGINEERING AND BIOTECHNOLOGY

Newly established in August 2022, the School of Chemistry, Chemical Engineering and Biotechnology (CCEB)* hosts world-class education and research in the chemical sciences and engineering, biotechnology and biomedical engineering. It nurtures future-ready, graduates for exciting careers in growth industries, including petrochemicals, specialty chemicals, healthcare, energy, sustainability, semiconductor, food and beverage, agriculture, and data analytics.

Realise your full potential with a forward-thinking education at NTU CCEB.

**CCEB is a newly established School, formed from the merger of the Division of Chemistry and Biological Chemistry in the School of Physical and Mathematical Sciences with the School of Chemical and Biomedical Engineering. CCEB is the first NTU School that is jointly managed by the College of Science and the College of Engineering.*



BACHELOR OF SCIENCE (HONOURS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY

Students may also opt for electives in areas of Food Science and Technology, Analytical and Manufacturing Techniques in the Pharmaceutical Industry, Nanoscience and Nanotechnology. Plenty of enrichment cross-discipline courses are also available, such as Forensic Science, Artificial Intelligence in Chemistry, Biomedical Imaging and Sensing, and many more.



Second Major

BACHELOR OF SCIENCE (HONOURS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY WITH SECOND MAJOR IN BUSINESS (INTERNATIONAL TRADING)

This highly interdisciplinary programme, offered in partnership with the Nanyang Business School and the Centre of Excellence in International Trading, aims to equip students with business knowledge and competencies that are relevant to the chemical industry. Students from this second major programme will also pick up valuable soft skills and knowledge in management, business, and international trading. They will also have opportunities to participate in overseas field trips and internships. These sets of skills, together with their international exposure and technical expertise in chemistry, will give them a competitive advantage and uniquely position them to undertake executive roles in the chemical industry.



Second Major

BACHELOR OF SCIENCE (HONOURS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY WITH SECOND MAJOR IN ENVIRONMENTAL SCIENCE

This is an interdisciplinary programme between CCEB, the Asian School of the Environment (ASE) and the School of Civil and Environmental Engineering (CEE) that incorporates existing courses in Chemistry and Biological Chemistry in CCEB, Environmental Earth Systems Science ASE, and Environmental Management in CEE.

Second Major

BACHELOR OF SCIENCE (HONOURS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY WITH SECOND MAJOR IN FOOD SCIENCE AND TECHNOLOGY

The Food Science and Technology Second Major programme is a collaboration between NTU and the prestigious Wageningen University (WUR) from the Netherlands, whose Food Technology programme is considered one of the best and most innovative in Europe. Students enrolled in the programme will have opportunities to participate in overseas study trips and internships. Apart from the degree, students will also be awarded a joint certificate from NTU-WUR upon graduation.

Career Prospects For Chemistry Graduates

Chemistry graduates can find ready employment in a wide range of chemical-related industries in Singapore and overseas. These include the biomedical and pharmaceutical industries, the petrochemical industries, polymer/paint/ semiconductor industries and the food and beverage industry. A*STAR Research Institutes and other public sector agencies such as the Health Sciences Authority and DSO National Laboratories are also eager employers. Many chemistry graduates have also chosen a career in education, shaping the minds of the next generation. Others have pursued postgraduate studies, both locally and at renowned overseas universities, such as Cambridge, Oxford, and Caltech.



SCHOOL OF PHYSICAL AND MATHEMATICAL SCIENCES

The School of Physical and Mathematical Sciences offers Bachelor of Science (Honours) programmes that bring students to the frontiers of science and technology.

Our programmes span the fundamental scientific disciplines of physics and mathematics, to modern interdisciplinary topics such as nanoscience and machine learning.

Our students are taught and mentored by faculty members who are global leaders in cutting-edge research topics, and our state-of-the-art scientific facilities provide an excellent environment for research and education.

DIVISION OF PHYSICS & APPLIED PHYSICS

The Division of Physics and Applied Physics has a young and dynamic team of faculty members dedicated to providing our students with a top-notch physics-based education. Our undergraduate curricula are designed to emphasize the most relevant topics in physics and applied physics, including both theoretical and experimental aspects.

Graduates of our programme are well-equipped for careers in industrial R&D, data science, cybersecurity, finance, as well as education and academic research. The professors and researchers in our Division include world-class experts in quantum technology, nanotechnology, superconductivity, photonics, complex systems, and many other exciting fields of physics research.

Second Major

BACHELOR OF SCIENCE (HONOURS) IN APPLIED PHYSICS WITH SECOND MAJOR IN MEDICAL PHYSICS

In this Second Major programme, students receive rigorous training in applied physics, and follow up by learning about the applications of physics and other quantitative sciences to modern medicine. Topics in medical physics include therapeutic and diagnostic methods, nuclear medicine, and the physics of health.

Double Major

BACHELOR OF SCIENCE (HONOURS) IN PHYSICS AND MATHEMATICAL SCIENCES

This programme is intended for students interested in research careers requiring strong computational and problem-solving skills or students pursuing postgraduate degree in Physics and Mathematical Sciences. The curriculum equips students with an understanding of the physical world through mathematical rigour and insights. It covers courses at the interface of Physics and Mathematics such as Differential Geometry, Algebraic Topology, Quantum Mechanics, General Relativity.

BACHELOR OF SCIENCE (HONOURS) IN PHYSICS

The Physics degree equips students with the analytical, computational, and experimental skills for working at the frontiers of science and technology. Emphasis is placed on fundamental theories and concepts, with courses in advanced quantum mechanics, condensed matter physics, particle physics, computational physics, and more. Students may also opt for a course concentration in Nanotechnology.

BACHELOR OF SCIENCE (HONOURS) IN APPLIED PHYSICS

Applied Physics is a discipline that specialises in finding technological applications for the latest discoveries in physics. Students majoring in Applied Physics are exposed to cutting-edge topics such as nanotechnology, microfluidics, photonics, plasmonics, and laser physics. Students may also opt for course concentrations in Nanotechnology, Optical Technology, Semiconductor Technology, or Biophysics.



Second Major

NEW!

BACHELOR OF SCIENCE (HONOURS) IN PHYSICS / APPLIED PHYSICS WITH SECOND MAJOR IN QUANTUM TECHNOLOGIES

Human civilization is rapidly approaching the cusp of quantum technologies. In the foreseeable future, we will find our lives transformed by quantum computers utilizing quantum signal transmission and processing, communicating with each other by sending quantum encrypted information, at speeds and parallelism unimaginable in classical computers. The Physics and Applied Physics Degree Programme with Second Major in Quantum Technologies is ideal for ambitious students keen to participate in bringing about this quantum technologies revolution. Through the second major, students will learn the theoretical foundations of quantum mechanics and quantum information, be exposed to quantum algorithms and software, and be introduced to the state of the art in physical phenomena that will form the foundations of quantum hardware in the future.



Second Major

BACHELOR OF SCIENCE (HONOURS) IN APPLIED PHYSICS WITH SECOND MAJOR IN MICROELECTRONICS ENGINEERING

The field of microelectronics is responsible for numerous technological marvels, such as smartphones. The continuing development of microelectronic devices relies on our scientific understanding of the physics of the microscopic world, as well as powerful physical techniques for probing and manipulating matter at the atomic scale. Recently launched in partnership with the School of Electrical and Electronic Engineering and

the College of Engineering, the programme aims to attract good students interested in applications of microelectronics technology with a deep physical understanding of the underlying scientific principles. Graduates of this programme can be employed as research engineers, failure analysis engineers, design engineers and other technical positions which will lead to senior managerial positions.

Career Prospects

Physics and Applied Physics graduates have a wide range of career choices. Our curriculum emphasizes creativity, active collaboration, and effective communication, along with exposure to research and work attachments. Our graduates

have gone on to careers with semiconductor companies, optics and scientific equipment manufacturers, telecommunications companies, quantitative finance firms, research and development institutes, academia, and education.

DIVISION OF MATHEMATICAL SCIENCES

The Division of Mathematical Sciences, founded in 2005, is one of two divisions under the School of Physical and Mathematical Sciences. In its first year, the division admitted 47 undergraduates while having only five faculty members. Today, the division has over 400 undergraduate students, and over 35 faculty members specializing in different research areas of pure mathematics, applied mathematics, statistics, and theoretical computer science. We also have a thriving graduate program with about 50 graduate students.

SPECIAL PROGRAMMES

BSc (Hons) in Mathematical Sciences with Minor in Finance

The use of mathematical methods has now become widespread in all areas of finance and economics, and the Minor in Finance in addition to a Major in Mathematical Sciences is designed to respond to this demand and to give an edge to the mathematics student. This Minor is offered by the Nanyang Business School, exclusively to selected Mathematical Sciences students who will be taking additional courses in Banking and Finance.

BSc (Hons) in Mathematical Sciences and MSc in Financial Engineering (Direct Admission Programme)

In this Direct Admission Programme, high-performing Mathematical Sciences students may apply for direct admission to the MSc in Financial Engineering programme at the Nanyang Business School. Exemptions may be granted for up to three mathematical courses in the MSc curriculum.

Invitations to the programme are sent to qualifying Year 3/4 Mathematical Sciences majors.

BACHELOR OF SCIENCE (HONOURS) IN MATHEMATICAL SCIENCES

This programme equips students with an understanding of modern mathematics and strong analysis, reasoning, computing, and communication skills. Students tailor the curriculum to their interests by choosing one of four tracks of study, and optionally pursuing concentrations in Computational Mathematics or the Mathematics of Information and Communication. Students have the chance to specialise in the Business Analytics track, combining foundational mathematics courses with business and finance courses from the Nanyang Business School and the School of Computer Science and Engineering. Students can be admitted to the Business Analytics Track based on performance and interviews after the first year of study.

BACHELOR OF SCIENCE (HONOURS) IN DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

This programme equips students with a strong foundation in mathematics, statistics and computer science, and prepares them for a career in the rapidly expanding field of data science and artificial intelligence (AI) as data scientists or AI scientists. Students will study core courses in Mathematical Sciences and well as Computer Sciences to build up foundational knowledge and develop interdisciplinary insights. In the later part of the programme, students will deepen their understanding by reading more advanced topics such as optimization, regression analysis, high-dimensional statistics, data mining, machine learning and cryptography. Riding on the wealth of NTU's strong collaboration with the industry, students will also benefit from participation in internship and industry-oriented research projects.

Double Major

BACHELOR OF SCIENCE (HONOURS) IN MATHEMATICAL AND COMPUTER SCIENCES

A Double Major programme combining a strong mathematical foundation with in-depth knowledge of computer science. This programme is run jointly by the School of Physical and Mathematical Sciences and the School of Computer Science and Engineering. Students are provided with strong foundations in the two majors, Mathematical Sciences and Computer Science, coupled with specialised training in one of four areas at the interface of Mathematical Sciences and Computer Science: Theoretical Computer Science, Cryptography and Cybersecurity, Financial Modelling, and Data Science. Graduates of the programme are well-equipped to work in the rapidly developing fields of financial technology, cybersecurity, and data analytics. They are also well-positioned for postgraduate degrees in mathematics, computer science, and related disciplines.

Double Major

BACHELOR OF SCIENCE (HONOURS) IN PHYSICS AND MATHEMATICAL SCIENCES

This programme is intended for students interested in research careers requiring strong computational and problem-solving skills or students pursuing postgraduate degree in Physics and Mathematical Sciences. The curriculum equips students with an understanding of the physical world through mathematical rigour and insights. It covers courses at the interface of Physics and Mathematics such as Differential Geometry, Algebraic Topology, Quantum Mechanics, General Relativity.

Double Major

BACHELOR OF SCIENCE (HONOURS) IN MATHEMATICAL SCIENCES AND ECONOMICS

This highly interdisciplinary programme, in partnership with the School of Social Sciences, shapes our students into individuals with the skills most sought-after by the financial services industry. Other than the common foundational courses, the emphasis in the later study of Mathematics will be on numerical computational and statistical methods. For Economics, quantitative techniques and fundamental economic principles will be emphasised. This programme provides students with strong interdisciplinary skillsets. With a strong background in statistics and economics, graduates from this programme will also find themselves well-prepared for further studies in Economics.





Career Prospects

Mathematics graduates often play a leading role in fields as diverse as finance, IT, biotechnology, and many others. Attesting to the versatilities of mathematical training, it is very common for mathematicians to secure jobs with titles such as “Risk Analyst”, “Actuary”, “Clinical Trials Manager”, “Epidemiologist” and countless others. Mathematics gives you a superb foundation for later specialization, and a set of analytical skills that would be valued by any employer. With the rapidly

growing demand for data science and computer science specialists, Data Science and Artificial Intelligence and Mathematical and Computer Sciences graduates can expect rewarding careers as data scientists across various sectors, ranging from government agencies, such as the healthcare and transportation authorities, to industry players, such as e-commerce, infocomm and the financial services sector.



NEW

SECOND MAJOR IN SUSTAINABILITY

We live in a time of large-scale challenges, where climate change, deforestation, biodiversity loss and ocean acidification are no longer only considered from an environmental perspective, but also in terms of social justice, economic development, technological adaptation, and political will. The survival of our growing population depends on the natural resources we continue to overexploit, but there is increasing awareness on how the concept of sustainability strives to address this. By understanding how our environment, economy and society interact, with technological innovation and the education of both the public and decision makers, we can maintain the health of our planet for the benefit of current and future generations.

Singapore aims to equip its workers with relevant skills so they can benefit from the green economy as the nation pursues its sustainability goals. To ensure NTU students have the knowledge and skills to embark on these emergent opportunities, the Second Major in Sustainability is offered to NTU students in single degree programmes.

Second Major in Sustainability programmes offered in CoS:

- Bachelor of Science (Honours) in Environmental Earth Systems Science with Second Major in Sustainability
- Bachelor of Science (Honours) in Biological Sciences with Second Major in Sustainability
- Bachelor of Science (Honours) in Chemistry and Biological Chemistry with Second Major in Sustainability
- Bachelor of Science (Honours) in Mathematical Sciences with Second Major in Sustainability
- Bachelor of Science (Honours) in Physics/Applied Physics with Second Major in Sustainability



NEW

SECOND MAJOR IN ENTREPRENEURSHIP

With the goal to prepare NTU graduates to impact the world and address its grand challenges, the Second Major in Entrepreneurship (SMiE) is introduced in partnership with the Nanyang Technopreneurship Centre and Nanyang Business School. The second major to equips students with fundamental entrepreneurship competency and broaden their understanding of enterprise and innovation. It aims to enrich students with an entrepreneurial mindset to deal with uncertainties in a VUCA (Volatile, Uncertain, Complex and Ambiguous) world and be the drivers of technology innovation. The SMiE also aims to expand the students' network and be part of the entrepreneurship ecosystem, and allow them to seize opportunities from new technologies and support them to venture into technology startups. It provides them with hands-on experience in technopreneurship through experiential learning and a 20-week local/overseas internship with startups, venture capital firms, or other entrepreneurship-related organisations.

Second Major in Entrepreneurship programmes offered in CoS:

- Bachelor of Science (Honours) in Environmental Earth Systems Science with Second Major in Entrepreneurship
- Bachelor of Science (Honours) in Biological Sciences with Second Major in Entrepreneurship
- Bachelor of Science (Honours) in Chemistry and Biological Chemistry with Second Major in Entrepreneurship
- Bachelor of Science (Honours) in Mathematical Sciences with Second Major in Entrepreneurship
- Bachelor of Science (Honours) in Applied Physics with Second Major in Entrepreneurship



SECOND MAJOR IN DATA ANALYTICS

Data analytics tools are evolving at a rapid pace. With a large quantity of data available at our fingertips, there are opportunities to gain actionable insights by leveraging on these data. Data analytics is expected to radically change the way we live and do business in the future. Companies are investing in data analytics capabilities to keep up with the known and unknown developments and competition. To align students with emerging employment trends, the College of Science and the College of Engineering jointly offer the Second Major in Data Analytics. This ensures that our students stay competitive in the job market, with the ability to tackle real-world problems and challenges with innovative techniques in multidisciplinary settings.

Second Major in Data Analytics programmes offered in CoS:

- Bachelor of Science (Honours) in Environmental Earth Systems Science with Second Major in Data Analytics
- Bachelor of Science (Honours) in Biological Sciences with Second Major in Data Analytics
- Bachelor of Science (Honours) in Chemistry and Biological Chemistry with Second Major in Data Analytics
- Bachelor of Science (Honours) in Mathematical Sciences with Second Major in Data Analytics
- Bachelor of Science (Honours) in Physics/Applied Physics with Second Major in Data Analytics

TAKE CHARGE AND SHAPE YOUR FUTURE TODAY! —

Eager to build a portfolio of skills and experiences at CoS to secure your dream internship in two years' time? Let the NTU Career & Attachment Office (CAO) empower you to reach your full potential and fulfil your career aspirations!

Make use of our [OWN IT! Roadmap](#) to get a head start on launching a successful career today! With excellent connections to over 3,500 global and local organisations, including MNCs, SMEs, Public Service Ministries & Agencies, CAO facilitates meaningful internships, networking events and employment opportunities to propel you towards career success and help you make your mark.

Career Coaching & Guidance

Let your dedicated Career Coach guide you on your career journey throughout your four years here in CoS. You can explore career options that matches your interests through coaching sessions.

Industry-Specific Career Consultations & Recruitment Events

CAO offers a comprehensive range of industry-specific career consultations and recruitment events to facilitate employment. Speak to the Career Consultant of your industry of interest to gain deeper insights and connect to the industry, or to prepare for an actual upcoming interview.

Career & Employability Skills Workshops

CAO offers a suite of career and employability skills workshops designed to encourage in-depth participatory learning and equip you to be career-savvy for the Future of Work. Register for the workshops [here](#).

Career Experiential Education

CAO collaborates with industry partners to help you explore career options through a suite of experiential education programmes such as Company Visits, Alumni Networking Sessions, Hackathons and Job Shadowing. Find out about the programmes [here](#).

Mentorship Community

Want to learn from industry leaders and tap on their wealth of knowledge and experiences? Join our ConnectingMinds Mentorship programme, where you can connect with over 800 mentors, of which 80% are NTU alumni. You will stand to gain deeper insights into job roles and career paths, build industry and life skills, and expand your network and connections.

Work-Integrated Education & Global Experiences

CAO partners industry leaders to incorporate real-world work experiences into your education through Work-Integrated Education (WIE) programmes such as credit-bearing internship and Work-Study Degree Programme (WSDP). CAO also offers overseas internship opportunities to widen your perspectives of the working world and prepare you to compete both locally and internationally. Through our strong industrial connections, CoS undergraduates have undertaken internships and found jobs at organisations such as 3M, Baxter and DSTA.

Career Resources

CAO provides you with an extensive range of resources to guide you through every step of your career development while you are at NTU. Resources such CAO's annual magazine, CAREERtracks, e-newsletters, videos and podcasts are co-developed with industry partners and NTU alumni for your self-paced learning and development.

Be empowered and start your career development journey with CAO today. To find out more about how CAO can help empower you on your career development journey, click [here](#). OWN IT!

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For students venturing into their first-ever internship or job search, it is normal to feel lost navigating our career path at the beginning. With all the various resources (e.g., workshops and coaching sessions) available to help us with our job search, the CAO has definitely made the process easier for me. I attended various talks organised by CAO and found the tips and advice particularly useful. I was also able to seek personalised feedback during my interactions with experienced career coaches who are up to date with the latest job trends and employer requirements. I am truly thankful to my career coach for his patience and generosity in sharing his knowledge with me. With his candid feedback and encouragement, I was able to set realistic expectations for myself in my job search.

Lim Yen Yuen

School of Physical and Mathematical Sciences

Data Analyst at Integrated Health Information Systems (IHIS)



Admission Requirements

ASIAN SCHOOL OF THE ENVIRONMENT

Programmes	Minimum Subject Requirements
Environmental Earth Systems Science	
Environmental Earth Systems Science with Second Major in Entrepreneurship NEW!	H1 Level pass in Mathematics and H2 Level pass in either Physics, Chemistry, Biology, Economics or Computing
Environmental Earth Systems Science with Second Major in Sustainability NEW!	
Double Major in Environmental Earth Systems Science and Public Policy and Global Affairs	H1 Level pass in Mathematics and H2 Level pass in either Physics, Chemistry, Biology, Computing or Economics and a good grade in either General Paper, Knowledge & Inquiry, H1 Level History, English Literature or Geography
Environmental Earth Systems Science with Second Major in Data Analytics	H2 Level pass in Mathematics and H2 Level pass in Physics/Chemistry/Biology/Computing

SCHOOL OF BIOLOGICAL SCIENCES

Programmes	Minimum Subject Requirements
Biological Sciences	
Biological Sciences with Second Major in Biomedical Structural Biology	
Biological Sciences with Second Major in Entrepreneurship NEW!	At least H1/SL or equivalent pass in Mathematics and a good H2/HL or
Biological Sciences with Second Major in Sustainability NEW!	A Level equivalent pass in Physics, Chemistry or Biology
Double Major in Biomedical Sciences and Biobusiness	
Biological Sciences with Second Major in Medicinal Chemistry and Pharmacology	At least H1/SL or equivalent pass in Mathematics and H2/HL Level pass in Chemistry

Biological Sciences with Second Major in Food Science and Technology	At least H2 or equivalent pass in Mathematics and a H2 Level or equivalent pass in Physics, Chemistry or Biology OR At Least H1 or equivalent pass in Mathematics and two H2 Level or equivalent pass in Physics, Chemistry or Biology
Double Major in Biological Sciences and Psychology	Good H1/SL or equivalent pass in Mathematics, good H2/HL/A Level or equivalent pass in Physics, Chemistry or Biology, and a good grade in General Paper or Knowledge & Inquiry
Biomedical Sciences/Chinese Medicine	At least H1/SL or equivalent pass in Mathematics and a good H2/HL/A Level or equivalent pass in Physics, Chemistry or Biology PLUS at least an O Level/SL or equivalent pass in Chinese Language
Biological Sciences with Second Major in Data Analytics	At least H2 or equivalent pass in Mathematics and Physics/Chemistry/Biology

SCHOOL OF CHEMISTRY, CHEMICAL ENGINEERING AND BIOTECHNOLOGY

Programmes	Minimum Subject Requirements
Chemistry and Biological Chemistry	
Chemistry and Biological Chemistry with Second Major in Business (International Trading)	
Chemistry and Biological Chemistry with Second Major in Food Science and Technology	
Chemistry and Biological Chemistry with Second Major in Environmental Science	Good H2/HL/A Level or equivalent pass in Chemistry and either Mathematics or Physics
Chemistry and Biological Chemistry with Second Major in Sustainability NEW!	
Chemistry and Biological Chemistry with Second Major in Entrepreneurship NEW!	
Chemistry and Biological Chemistry with Second Major in Data Analytics	Good H2/HL/A Level or equivalent pass in Chemistry and Mathematics

SCHOOL OF PHYSICAL AND MATHEMATICAL SCIENCES

Programmes	Minimum Subject Requirements
Data Science and Artificial Intelligence	Good H2/HL/A Level or equivalent pass in Mathematics and either Physics, Chemistry, Biology or Computing
Mathematical Sciences	Good H2/HL/A Level or equivalent pass in Mathematics
Mathematical Sciences with Second Major in Sustainability	
Mathematical Sciences with Second Major in Entrepreneurship	
Mathematical Sciences with Minor in Finance	
Double Major in Mathematical and Computer Sciences	Good H2/HL/A Level or equivalent pass in Mathematics and good grade in General Paper or Knowledge & Inquiry
Mathematical Sciences with Second Major in Data Analytics	Good H2/HL/A Level or equivalent pass in Mathematics and Physics/Chemistry/Biology/Computing
Physics	Good H2/HL/A Level or equivalent pass in Physics and Mathematics
Applied Physics	
Applied Physics with Second Major in Medical Physics	
Applied Physics with Second Major in Microelectronics Engineering	
Double Major in Physics and Mathematical Sciences	
Physics/Applied Physics with Second Major in Data Analytics	
Physics/Applied Physics with Second Major in Quantum Technologies NEW!	
Physics/Applied Physics with Second Major in Sustainability NEW!	
Applied Physics with Second Major in Entrepreneurship NEW!	

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