



University of
Nottingham

UK | CHINA | MALAYSIA

2020

Annual Report

Faculty of Science
and Engineering



Table of Contents



01 Dean's Message

03 About us

- 04 Highlights and Facts
- 05 Selected Staff Awards and Achievements

09 Teaching and Learning

- 11 National-level First Class Undergraduate Module
- 13 Provincial First-Class Undergraduate Modules
- 15 Higher Education Academy (HEA) Fellowship
- 16 Faculty Education and Student Experience Board
- 16 Teacher Development Programme
- 17 Faculty Teaching and Learning Conference Grant Scheme
- 17 Faculty Teaching and Learning Innovation Grant Scheme
- 19 Student Satisfaction

21 Research

- 22 Research Groups
- 22 New Researchers Grant Scheme
- 22 Research Conference Grant Scheme
- 23 Publication
- 25 Research Income/Funding
- 28 Provincial/Municipal Key Laboratories

29 Student Experience and Awards

- 29 Student Awards
- 34 Student Experience Programme

35 Feature: Faculty's Responses to COVID-19

40 Local and Global Engagement

- 40 International Conferences
- 41 Science and Technology Open Day
- 42 Youth Talent Scheme
- 43 External Engagement

44 Laboratory and Facilities

- 44 Laboratory and Facilities Highlights

Dean's Message

As the Autumn semester comes to a close and we start the new year 2021, I'd like to take this opportunity to thank everyone for their incredible work, dedication and commitment shown year in and year out.

2020 has been a year of unprecedented challenges for the whole University as well as the Faculty. All of us have worked tirelessly from teaching and supporting courses, conducting research, publishing scholarly articles, presenting at conferences, mentoring students, organising events and promoting our programmes. I'm glad to note that the past year has been filled with so many remarkable achievements throughout our extraordinary academic programmes.

Over the past year, we're very proud to see a steady increase in the students' satisfaction of teaching and learning with our vigorous efforts and supports in enhancing teaching excellence and student experience through various schemes. It is also impressive to see the leaping growth of our research strength with a large volume of external funding and grants gained by colleagues, and the impressive number of publications published in world-leading journals.

All of these successes are leading us on a path toward an even more extraordinary future. We need more effort than ever to fully realise our potential to address areas of critical importance and develop students with a deep understanding of complex issues. And I firmly believe we will surely achieve another new heights of success year after year with joint efforts and contributions from everyone.

I look forward to working closely with all members of the Faculty as we continue to develop in size and shape to become a world leading institute in both research and education.

Thank you for everything you do to move us forward.

Prof. Tao Wu
Dean, Faculty of Science and Engineering

About us

Faculty of Science and Engineering endeavours to provide a world-class, research-led science, technology, engineering and mathematics (STEM) education.

Our vision is to be widely recognised for excellence and leadership in both research and education, with an emphasis on interdisciplinary research, active discovery and service and learning through hands-on experiences.



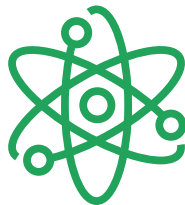
Departments and
Schools

9



Research Groups

11



Academic Staff

136

from 26 countries and
60% are international
staff

Research Staff

25



Faculty Professional
and Technical Staff

36

Student Enrolment

UG 2,602

PG 22

PhD 286

Research
Publications

334

2

Provincial Key
Laboratories



Highlights and Facts

10

UG programmes have received
successful international
accreditations

7

FoSE academics were enlisted in
2020 Zhejiang Provincial “5246”
University Leading Talent Project

FoSE staff in 2020 received
funding for

48

external research projects

1

module has been recognised
as a National Level First Class
Undergraduate Module

2

Provincial Key Laboratories

5

staff won the Lord Dearing
Award

8

modules have been recognised
as Provincial Level First Class
Undergraduate Modules

Engineering discipline ranks top

0.58%

worldwide in ESI

1

staff won the Vice-Chancellor’s
Medal

47.8%

of FoSE UG graduates were admitted
to World Top 10 universities, which is
a record high.

334

publications with 74.8% being
published in the Q1 journals,
and 51.6% being published in
the top 10% journals, based on
the data from SciVal.

70.4%

of FoSE UG graduates were admitted
to Top 50 universities in the world.

90.1%

of FoSE UG graduates were admitted
to Top 100 universities in the world.
(2019-2020 Careers and Employability
Annual report)

Field-Weighted Citation Impact
(FWCI) reaches

2.00

which is comparable to
prestigious universities worldwide

Selected Staff Awards and Achievements

2020 Zhejiang Provincial “5246” University Leading Talent Scheme:

the 2020 Zhejiang Provincial “5246” University Leading Talent Scheme has just released the entitled academic list. Seven Faculty of Science and Engineering academics have been selected to join the scheme. They are Prof. Giampaolo Buticchi as Innovation Leading Talent; Prof. He Zhang, Dr Xiaochen Zhang, Dr Xiaoling Liu as High Level Top Talent; Dr Bo Li, Dr Haonan Li and Dr Juan Wang as Outstanding Youth Talent.

Xiaosu Yi: Though the worldwide COVID-19 pandemic in 2020, Prof. Xiaosu Yi and his research team have continuously made sound achievements. All three cooperation projects with Airbus, “Green Composite Materials”, “Toughening Technology” and “Electrically Conductive Composites” have been successfully completed. The results have led to the establishment of an International Joint Research Centre of Industry-University-Research Institute, with UNNC as the core unit. In 2020, a new joint research project with COMAC, “Lightning Strike Protective Composite for Aircraft” in the framework of INNOVATION 2025 Ningbo has been approved, and a project with Shanghai Space Industry on Toughening has well concluded. Moreover, a Joint Laboratory has also been established with Lince, a supplier company for Chinese Railway Industry. There are two PCT international invention patents just landed in the United States. In terms of publication, Prof. Xiaosu Yi co-edited a new book of “Green Aviation Technology Innovation and Development, -China

and Europe Join Hands to Address Future Challenges”, in addition to many international journal papers being published.

Jim Greer: Prof. Jim Greer’s work during 2020 focused on novel materials for use in various applied and fundamental research topics. Materials studied include semimetals such bismuth and germanium tin alloys and carbon based electronics including carbon nanotubes and organic molecules, as well more conventional electronics based on silicon continue to be studied. A USA patent related to the semimetal work was granted during 2020, and key results were published in high impact journals such as Energy & Environmental Science, Nano Energy, and the Journal of Chemical Physics.

Xiaogang Yang: Prof. Xiaogang Yang and his research team have made significant breakthroughs in the areas of advanced reactive manufacturing technology and three-phase flow turbulence in the various reactors. He has successfully secured Major research grants such as NSFC Major Research Plan and NSFC-DFG International Cooperation Research Grants. Consequently, his team has successfully developed various novel chemical reactors such as bubble reactors, vortex flow reactors, ultrasonic-intensified impinging stream reactors and systemically presented the theory of shear controllable synthesis technology of functional powder materials, obtained 4 authorised invention patents and published 30 SJR Q1 ranking journal papers including 12 journal papers

published in very top journals such as Chemical Engineering Journal, International Journal of Heat and Mass Transfer and Ultrasonics-Sonochemistry.

Tao Wu: Prof. Tao Wu has secured the Zhejiang Provincial Key R&D Programme with a total funding of RMB 4.3 million, which is a breakthrough of UNNC in ZJNSF. Prof. Tao Wu and his research team also successfully applied for the Zhejiang provincial key laboratory in 2020.

Ruibin Bai: Prof. Ruibin Bai was awarded IEEE Senior Member in 2016. During his time at UNNC, he has been awarded 4 National Natural Science Foundation of China grants, 3 from Zhejiang Province (including 1 “Outstanding Young Scientist Grant”) and 4 from Ningbo Sci&Tech Bureau as the principal investigator, with total fund over 10 million RMB. He has published over 70 academic papers in the influential journals and conferences, including IEEE Transactions on Evolutionary Computation, INFORMS Journal on Computing, Information Sciences, EJOR, Transportation Research Part B &E). Two of conference papers won the best paper awards (ACM GEC 2009 & ICOSCM2015) and one was nominated for the best paper award finalist in IEEE SSCI 2013. The algorithms and systems that his team developed are being used in Ningbo-Zhoushan Port and Shanghai PingAn Good Doctor, helping the companies in saving millions of costs each year. He serves as an Associate Editor for Networks (an SCI-indexed journal) and chairs the IEEE Computational

Intelligence in Scheduling and Network Design (CISND 2016-2018) and the 9th International Multidisciplinary Conference: Theory and Applications (MISTA2019).

Michael Galea: In the last three years, Prof. Michael Galea has published more than 50 journal articles and brought more than 10 million RMB of research projects to the University, including projects with AVIC-AEEC, Boeing China and a 3315 Innovation Team Scheme project. In 2018, he was appointed as Fellow of the Royal Aeronautical Society (RAeS). In 2020, he successfully setup the China Representative Office of the RAeS (China Branch) which is now operational.

He Zhang: Prof. He Zhang is currently the Director of the Nottingham Electrification Centre (NEC) and Deputy Director of Provincial Key Lab of More Electrical Aircraft Technology. He has been leading and participating more than 30 national, provincial, municipal projects, such as NSFC, MoST and EU “Cleansky” projects. He also worked closed with leading companies such as COMAC and AVIC for aerospace projects. As IEEE senior member, Prof. Zhang has managed to publish more than 70 SCI/EI papers in last 5 years, in which more than half are in top journals. Prof. Zhang also managed to filed more than 20 invention patent, includes 3 PCTs.

Giampaolo Buticchi: Prof. Giampaolo Buticchi joined UNNC in 2017 and he contributed to raise the profile of the power electronics research at the University, mostly related to the more electric aircraft technologies and

grid-connected applications. In the past years, he published more than 130 international conference/journal papers, received several awards from Ningbo City and Zhejiang Province. His work on aircraft has been highlighted by the Journal Nature Electronics and he has been successfully directing the Power Electronics Department of the Nottingham Electrification Center to deliver industry-grade electric drives and drone powertrains.

Jun He: For the past five years, Prof. Jun He has led and participated in over ten research projects sponsored by a variety of research councils on national, provincial and municipal levels. So far he has published around 100 SCI journal papers and 5 monographs in English, and delivered more than 50 presentations (including dozens of keynote and invited talks) in national and international conferences; his research work has gained over 1800 citations on google scholar with h-index of 27; and over 10 patents have been filed, of which 4 patents are granted. To recognise his excellence in research, Prof. He has been selected into the talent cultivation schemes “Zhejiang Provincial Young-Mid age academic leader in tertiary institute” and “Ningbo Leading Talent (Tier 2)”.

Ali Cheshmehzangi: In the last three years, Prof. Ali Cheshmehzangi has authored/co-authored over 50 journal papers/articles. He has six published books, with another two due to publication in April/May 2021. In 2019, his co-authored book won a national award. In recent years, he has secured more than 2 million RMB of research funding, and has established key industrial collaborations. In 2018 and



2020, he won the Vice Chancellor's Medal, and the UNUK's Special Award for the Pandemic Response, respectively. He mentors a group of staff and researchers who are progressing effectively.

Chengbo Wang: Dr Chengbo Wang is the leader of UNNC MRI Research Centre. In 2020, it has collaborated with local hospitals and medical equipment industry closely, co-submitted two inter-governmental grant applications, 2 patent applications and 3 journal papers. It is supported by one National MoST key research project, one Provincial key Research project and one industrial collaboration project. In the past few years at UNNC, Dr Chengbo Wang has received over 5 million RMB research grants from government and industry.

Cheng Heng Pang: Dr Cheng Heng Pang was named as one of the Ten Outstanding Young Malaysians of 2019.

Xiaoling Liu: In the past few years at UNNC, Dr Xiaoling Liu has published around 30 publications in the prestigious journals. She has been awarded a number of research grants from government and industry with the amount over 24 million RMB. Dr Xiaoling Liu has also actively established the research collaborations with the industry, including ACC Tech, Airbus, etc.

Wu Deng, Ali Cheshmehzangi: Granted the China New Development Award by Springer Nature for its exceptional contributions to the UN Sustainable Development Goal (SDG) of "sustainable cities and communities".

Haonan Li: In the past three years at UNNC, Dr Haonan Li has published over 20 publications in the prestigious journals, including International Journal of Machine Tools and Manufacture, International Journal of Advanced Manufacturing Technology, Journal of Materials Processing

Technology, etc. Dr Haonan Li has been awarded a number of research grants including NSFC, ZJNSF, etc. The total amount of the research grants he has received is over 1.1 million RMB.

Bo Li: Dr Bo Li is the recipient of Outstanding Youth Talent of Zhejiang Provincial "5246" University Leading Talent Project, Ningbo 3315 Individual Innovation Talent, and Ningbo Leading and Top Talent. He has been awarded research grants from National Natural Science Foundation of China, Zhejiang Provincial Natural Science Foundation of China, and Ningbo Science and Technology Bureau. He has published over 30 SCI papers in well-known journals in the field of civil engineering and applied for two invention patents in the past five years. He has also served as a reviewer for over 20 international journals, including Engineering Structures, Thin-Walled Structures, Journal of Constructional Steel Research, and Construction and Building Materials. He is also actively engaged with industrial partners in Research & Development collaboration.

Georgios Kapogiannis: Dr Georgios Kapogiannis was awarded with a prize for his contribution to BIM and Digital Construction to Binus University, Indonesia on October 10th 2019.

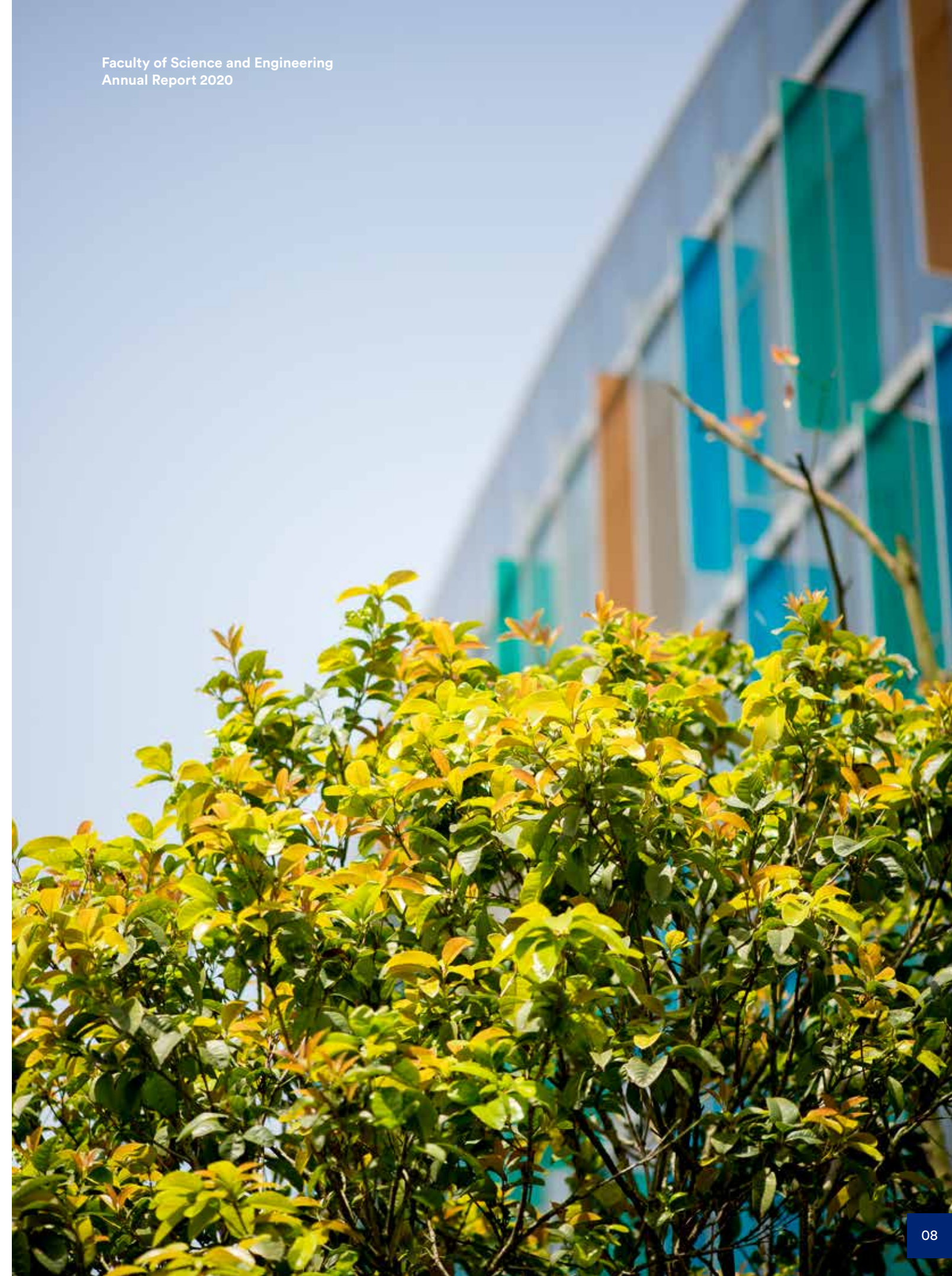
Tengwen Long: Dr Tengwen Long was awarded the 2020 Zhejiang Qianjiang Excellence Scheme.

The 2020 Lord Dearing Award: Dr Chiew-Foong Kwong, from Department of Electrical and Electronic Engineering; Dr Kien Who Kow, from Department of Chemical and Environmental Engineering; Dr Robert Pierce, from Department of Mechanical, Materials and Manufacturing Engineering; Dr Hayk Mikayelyan, from School of Mathematical Science; and Dr Edward Cooper, from Department of Architecture and Built Environment,

were awarded the 2020 Lord Dearing Award for their exceptional commitment to teaching and learning.

2020 Vice-Chancellor's Medal:

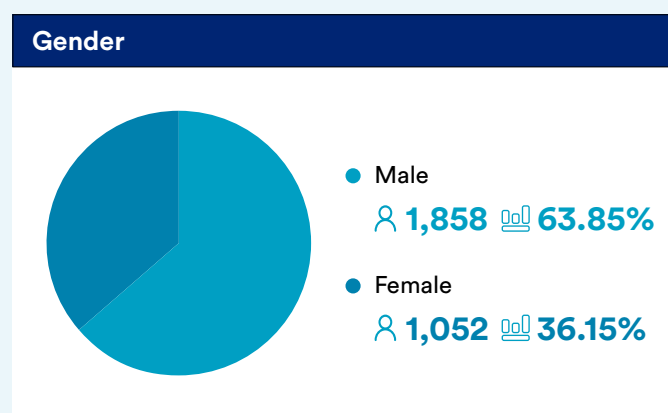
Dr Chiew-Foong Kwong, from Department of Electrical and Electronic Engineering, was awarded 2020 Vice-Chancellor's Medal in recognition of his outstanding contribution to the University community.



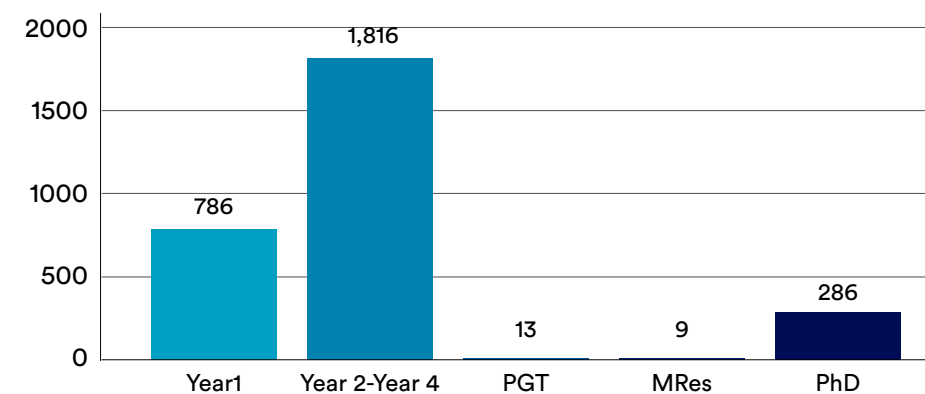
Teaching and Learning

In the academic year 2020-21, the Faculty offers 15 undergraduate programmes, 26 postgraduate programmes(including 1 Postgraduate Taught Course (PGT), 5 Master of Research Programmes (MRes) and 20 Doctoral Programmes)

There is a total of 2,910 students enrolled, including 2,602 undergraduates, 22 master students and 286 PhD students. Among them, 36.15 % are female and 232 students are from Hong Kong, Macao, Taiwan (HMT) and overseas countries.

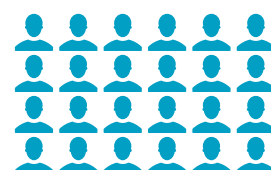


Total Number



The total number of students enrolled are

2,910



There are 10 UG programmes internationally accredited by professional institutions, which are:

Programme Title	Institution Name	
Architectural Environment Engineering	Chartered Institution of Building Services Engineers (CIBSE)	
Architecture	Royal Institute of British Architects (RIBA Part 1)	
Chemical Engineering	Institution of Chemical Engineers (IChemE)	
Civil Engineering	Joint Board of Moderators (JBM) (The Institution of Civil Engineers, the Institution of Structural Engineers, the Chartered Institution of Highways and Transportation, and the Institute of Highway Engineers)	
Computer Science	British Computer Society	
Computer Science with Artificial Intelligence	British Computer Society	
Electrical and Electronic Engineering	Institution of Engineering and Technology (IET)	
Environmental Engineering	Institute of Materials, Minerals and Mining (IoM3)	
Mechanical Engineering	Institution of Engineering and Technology (IET)	
Product Design and Manufacture	Institution of Engineering and Technology (IET)	

National-Level First Class Undergraduate Module

The Design Project module from Department of Chemical and Environmental Engineering, together alongside another module from Faculty of Business has been recognised by the Ministry of Education of the People's Republic of China as the first batch of National Level First Class Undergraduate Modules.

The Design Project module is compulsory for Chemical Engineering and Environmental Engineering students. The curriculum was designed and developed jointly by UNNC, the University of Nottingham UK and the Malaysia campus,

following the University's Quality Manual and the regulations of the UK's Quality Assurance Agency for Higher Education.

The module encourages student autonomy, innovation, and teamwork, and enhances student awareness of safety and environmental sustainability. Moreover, for students to have a better understanding of the industry, the module regularly invites industry experts to lectures to address the latest developments.

This course is taught by experts with diverse specialties, including

Professor Tao Wu, Dean of the Faculty of Science and Engineering, and Dr Philip Hall, Head of the department who has about 25 years' industrial experience, as well as professional experts like Linda Lin and Jane Briggs, both holding senior positions in multi-national companies and having abundant practical experience in China and abroad.

“

This keeps students up to date with information about the process technology development and safety practice currently taking place in the industry,” said Dr Hall.

Xinyun Wu, a UNNC graduate, said:

“

It's a challenging module and requires us to complete an entire set of engineering design procedure to achieve certain economic, environmental and productivity goals. With thorough and in-time instructions from teaching staff, we can improve our designs step by step.”

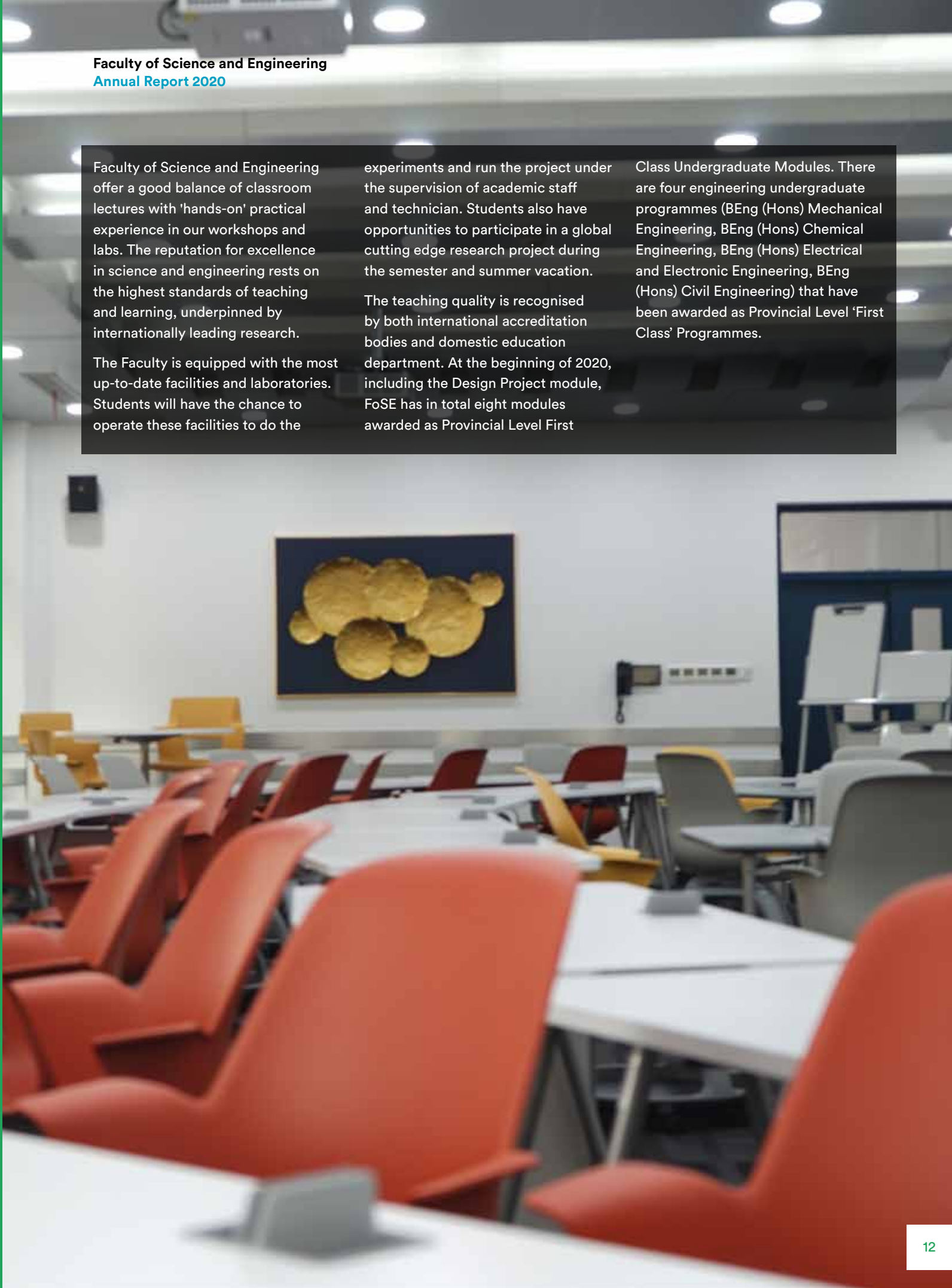
Faculty of Science and Engineering offer a good balance of classroom lectures with 'hands-on' practical experience in our workshops and labs. The reputation for excellence in science and engineering rests on the highest standards of teaching and learning, underpinned by internationally leading research.

The Faculty is equipped with the most up-to-date facilities and laboratories. Students will have the chance to operate these facilities to do the

experiments and run the project under the supervision of academic staff and technician. Students also have opportunities to participate in a global cutting edge research project during the semester and summer vacation.

The teaching quality is recognised by both international accreditation bodies and domestic education department. At the beginning of 2020, including the Design Project module, FoSE has in total eight modules awarded as Provincial Level First

Class Undergraduate Modules. There are four engineering undergraduate programmes (BEng (Hons) Mechanical Engineering, BEng (Hons) Chemical Engineering, BEng (Hons) Electrical and Electronic Engineering, BEng (Hons) Civil Engineering) that have been awarded as Provincial Level 'First Class' Programmes.





Provincial First-Class Undergraduate Modules

The Zhejiang Education Department has announced the results of 2019 Provincial First Class Undergraduate Module Scheme. The following modules offered by Faculty of Science and Engineering were awarded Provincial Level First Class Undergraduate Modules.

Design Project	Design, Manufacture and Project	Contemporary Engineering Themes	Process Engineering Project
Applied Electrical and Electronic Engineering: Construction Project	Materials and Manufacturing	Thermodynamics and Fluid Mechanics	Geotechnics 3

Our reputation for excellence in science and engineering rests on the highest standards of teaching and learning, underpinned by internationally leading research.

Faculty of Science and Engineering (FoSE) recruits top-quality students who are taught by experienced academics who are leaders in their field. Their expertise is reflected in our teaching and brings a unique advantage to our undergraduate degrees which are respected and valued by industry and commerce worldwide. Apart from industry experts, the Faculty also has guest lecturer from other leading universities across the world. In the Geotechnics 3 module for the final year Civil Engineering students, the class is conducted by three senior academics in Geotechnics, Dr Juan Wang from UNNC together with Professor Anbin Huang from National Chiao Tung University and Professor Dariusz Wanatowski from SWJTU-Leeds Joint School. The latter two professors have also been appointed as honorary professor in the Department of Civil Engineering.

Our Faculty offers a good balance of classroom lectures with ‘hands on’ practical experience in our workshops and labs. We are

equipped with the most up-to-date facilities and laboratories. Students will have the chance to operate these facilities to undertake experiments and run projects under the supervision of academic staff and technician.

All 8 modules include lab-based practice, where students have the opportunity to use the knowledge from the classroom and apply it to their projects and solve real-world problems. Through the project-based learning, students’ self-study ability, teamwork skills and project management skills are further enhanced.

We also work closely with the real world of industry so that our courses provide many opportunities for students to get involved with real engineering challenges, making things more fun for our students, and providing them with first-hand experience of what engineering is about.

For example, in the Design Project module, which is compulsory for every Chemical Engineering and Environmental Engineering students, is convened by a team of academic staff and industry experts. “Each of teaching staff for the Design Project has their

specialties to provide students with professional guidance, coach them to collaborate with each other in the group to develop their own design.” Dr Philip Hall shared with us that their department has invited guest speakers from process industry to deliver workshops with our students for years. Two of the professional experts we use are Linda Lin and Jane Briggs of Gleeds both hold senior positions in Multi-National Companies, both also practice here in China and abroad and can give up-to-date information of what is happening with the process industry. “This keeps them up to date with information about the process technology development and safety practice currently taking place in the industry.”

Therefore, our graduates leave us with the skills and knowledge that employers really want and they perform well in applications for further study and jobs.

Higher Education Academy (HEA) Fellowship

Fellowship of HEA is an international recognition of a commitment to professionalism in teaching and learning in higher education and demonstrates the practice is aligned with the UK Professional Standards Framework (UKPSF).

Currently there are 28 academic staff in the Faculty have been awarded the fellowship or senior fellowship:

Name	Department	Fellowship Level
Devinder Yadav	Aerospace	Senior Fellow
Ali Cheshmehzangi	Architecture & Built Environment	Fellow
Georgios Kapogiannis	Architecture & Built Environment	Fellow
Jun Lu	Architecture & Built Environment	Fellow
Siegfried Yeboah	Architecture & Built Environment	Fellow
Fei Chen	Chemical and Environmental Engineering	Fellow
Kien Woh Kow	Chemical and Environmental Engineering	Fellow
Mengxia Xu	Chemical and Environmental Engineering	Fellow
Yong Sun	Chemical and Environmental Engineering	Fellow
Yunming Yang	Civil Engineering	Fellow
Fangfang Zhu	Civil Engineering	Fellow
Juan Wang	Civil Engineering	Fellow
Byung Gyoo Kang	Civil Engineering	Fellow
Dave Towey	Computer Science	Fellow
Heshan Du	Computer Science	Fellow
Matthew Pike	Computer Science	Fellow
Prapa Rattadilok	Computer Science	Senior Fellow
Chiew-Foong Kwong	Electrical and Electronic Engineering	Senior Fellow
Giampaolo Buticchi	Electrical and Electronic Engineering	Senior Fellow
Nicholas Hamm	Geographical Sciences	Fellow
Meili Feng	Geographical Sciences	Fellow
Elio Eduardo Espejo Arenas	Mathematical Sciences	Fellow
Adam Rushworth	Mechanical, Materials & Manufacturing Engineering	Fellow
Amarpreet Gill	Mechanical, Materials & Manufacturing Engineering	Fellow
Gavin Lai	Mechanical, Materials & Manufacturing Engineering	Fellow
Hao Chen	Mechanical, Materials & Manufacturing Engineering	Fellow
Xinyu Zhang	Mechanical, Materials & Manufacturing Engineering	Fellow
Jian Yang	Mechanical, Materials & Manufacturing Engineering	Fellow

Faculty Education and Student Experience Board

The Faculty Education and Student Experience Board are responsible for all teaching and learning matters relating to all UG and PGT programmes, which involve:

- Ensuring and encouraging teaching quality.
- Overseeing the development and implementation of policies necessary for maintaining academic quality and standards.
- Reviewing and developing the Faculty's Teaching & Learning Strategy in accordance with the University's strategy.
- Reporting and providing advice to the Faculty Executive Board on all aspects of teaching and learning.
- Reviewing and discussing proposed teaching and learning related initiatives.
- Reviewing new proposed programmes or the existing programmes that require changes.

Teacher Development Programme

This programme aims to support FoSE staff development through a series of Teaching & Learning workshops with a STEM focus which was launched in 2018.

The following workshops have been arranged:

- Interactive teaching (e.g. effective instructions and explanations; classroom dynamics; learner strategies)
- Lecture Language (e.g. language that introduces a lecture topic and plan; language that signals a new idea or transition in a lecture; non-verbal signals that indicate when information is important)
- Presentation strategies (e.g. using posture, eye-contact and volume; creating rapport with your audience during a presentation; using effective visuals to support your delivery)
- Peer Observation for Teaching Development
- Implementation of outcome-based education
- Implementation of complex problem solving

Two following workshops will be arranged in Jan, 2021:

- Bringing impactful multi- and trans-disciplinary learning into your classroom
- Innovative approaches to learning in university

Faculty Teaching and Learning Conference Grant Scheme

The Faculty Teaching & Learning Conference Grant Scheme aims to support staff to present their works at high-quality Teaching & Learning (T&L) conferences. The Teaching and Learning (T&L) Conference Grant will only be awarded to applicants who have at least one abstract accepted by the conference and are committed to giving a presentation. In their application, applicants should illustrate why this conference is a high quality conference, how it will enhance their international profile and how it contributes to UNNC's strategy. Applicants should also illustrate how they plan to use the opportunity to engage with the international T&L community by potentially networking and collaborating on future projects

with other conference attendees. The judging panel will evaluate the conference pedigree; conferences that will add to the international reputation of the applicant and help build UNNC's T&L reputation will be considered more favourably. The judging panel will consist of the Faculty Director of Teaching and Learning and other senior academic staff. Funding will only be available for flights, transportation, reasonable accommodation costs and registration. This scheme has already supported more than 20 staff members to present their works at high-quality Teaching and Learning conference at both international and national levels.



Faculty Teaching and Learning Innovation Grant Scheme

The Faculty of Science and Engineering (FoSE) Teaching and Learning Innovation grant is available to academics and instructional teams for the course and curriculum development, to explore new directions and support priorities expressed by programmes, departments, schools and the Faculty. The grant aims to assist in proposed projects with a financial support. Proposals will be judged based on the broad categories of innovation, impact, and alignment with the

priorities of departments, schools and the Faculty under the UNNC strategy. The Teaching and Learning Innovation Grant aims to encourage inter-departmental innovation in teaching and learning within the Faculty of Science and Engineering. Therefore, grants will be assessed against the following criteria:

- The proposal has team members from at least 2 departments/schools in FoSE.

- The proposal has a clear benefit to staff or students to improve teaching and learning in FoSE.
- The proposal has clear potential to be applied within multiple departments/schools in FoSE.
- The ideas within the proposal have the potential to be implemented within 1 year of the project ending. The proposal should show a clear timeline for the project and the implementation of the project outputs.

- The proposal and outputs from the proposed project must be linked to UNNC Strategy KPIs. The proposal must give evidence of how the work in the proposal will contribute to UNNC Strategy.

For AY in the 2019-2020 round, three projects were supported by this scheme:

- Students as Mentors Programme: Training and Empowering Senior Students to Scaffold Juniors' UNNC Experience

- Improving Student Learning across FoSE through an Automated Feedback System (AFS) for Programming Tasks

- On enhancing student learning experience: an experiential study to find the impact of readers on engineering students' comprehension and reading behaviour

For AY 2020-2021 round, a project by Maycon Sedrez, Amarpreet Gill and Xinwei Wang on "Greenicity: a

creative sustainable design game" has received support from the Innovation Grant Scheme.

Student Satisfaction

One of the ways of measuring how well we're progressing towards the goals set is by listening to the students.

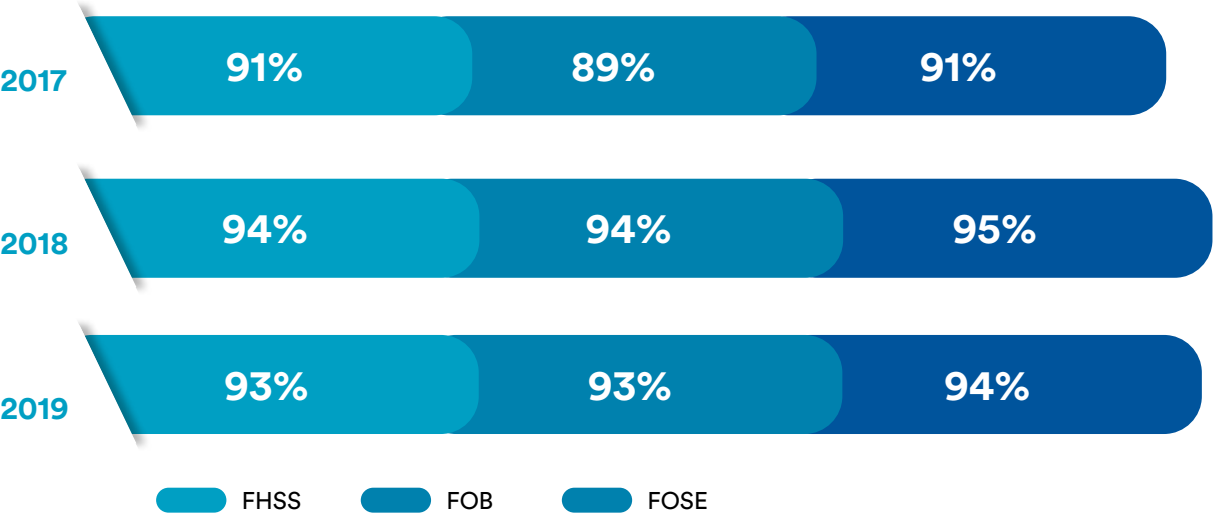
UNNC has been participating in the Nottingham Student Experience Survey (NSES) previously known as the Barometer Survey since 2012. It gives us an important insight into what

our students think of UNNC, tacks the decision-making, perceptions, expectations and experiences of our students, and enables us to identify the key drivers of student satisfaction and establish the relative importance of each.

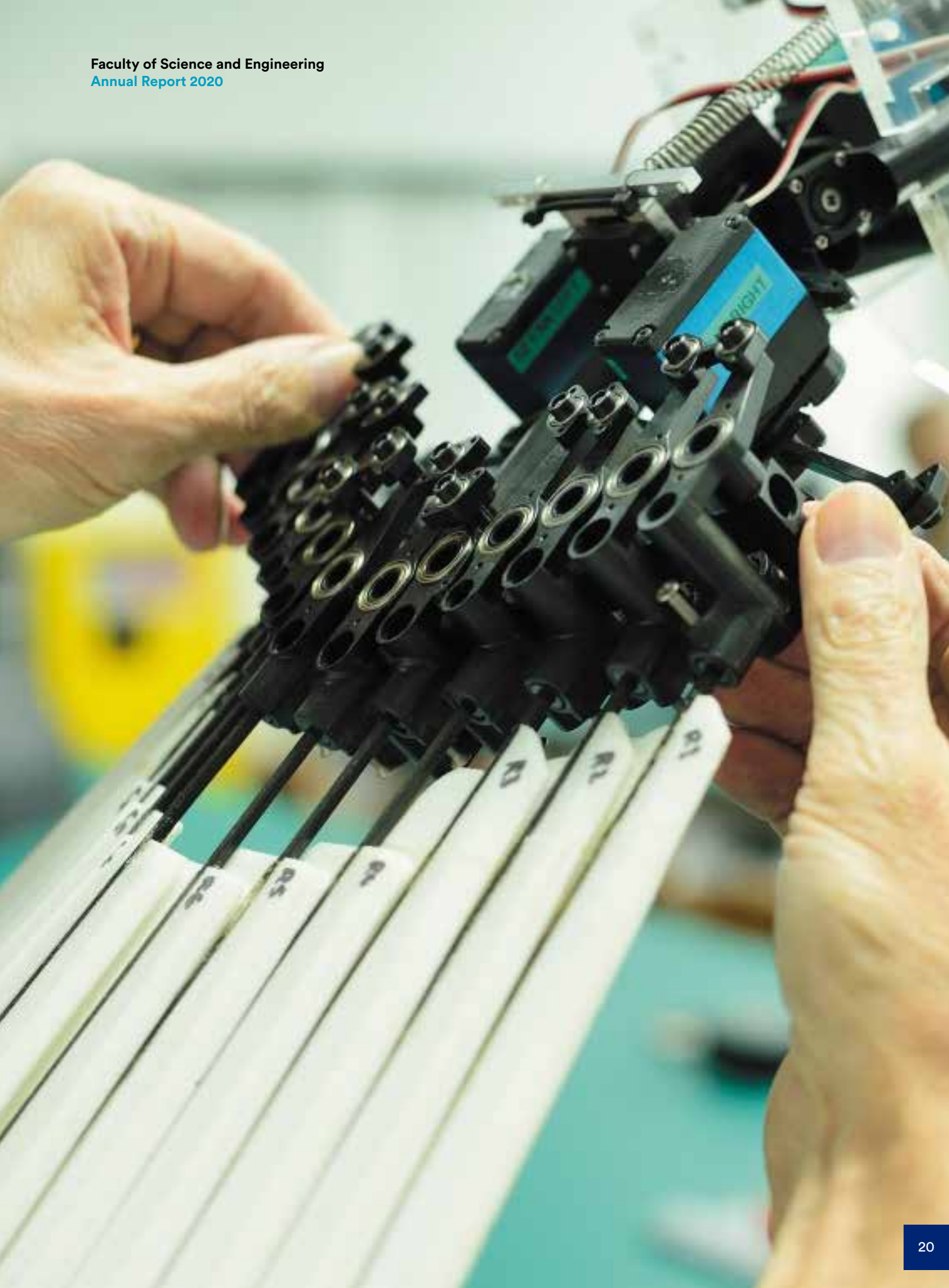
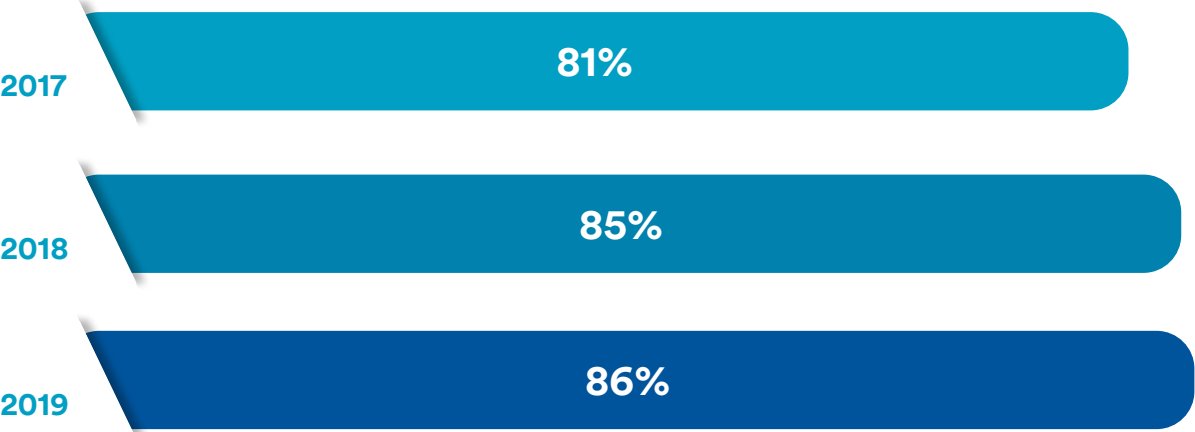
The Faculty's continuing efforts to provide high-quality teaching and

learning and experience to its students is reflected back by increasing satisfaction rate from students in NSES over the past three years.

Nottingham Student Experience Survey (NSES) Overall Satisfaction Rate_Faculty Comparison



Nottingham Student Experience Survey (NSES)_FOSE Learning Overall Satisfaction Rate



Research

The Faculty Research Committee (FRC) manages and supports research activities within the Faculty. The FRC consists of seven academics and is chaired by the Faculty Director of RKE. The members of FRC are split to three sub-groups, including Research Groups, Research KPIs and PGR eco-system.



Research Groups

Research Groups are the basic units in the Faculty to manage the research activities, and Research Groups are the backbone of the Faculty's research structure. Currently the Faculty has 11 Research Groups, covering a wide range of research areas in Engineering and Science, including:

- Advanced Energy and Environmental Materials & Technologies Research Group
- Advanced Intelligent Manufacturing Research Group
- Artificial Intelligence and Optimisation Research Group
- Composites Research Group
- Fluids and Thermal Engineering Research Group
- Geospatial and Geo-hazards Research Group
- Natural Resources and Environment Research Group
- Partial Differential Equations Research Group
- Power Electronics, Machines and Control Research Group
- Sensor, Sensor Networks, and Instrumentation Research Group
- Sustainable Built Environment Research Group

New Researchers Grant Scheme

The New Researchers Grant (NRG) is a faculty-level research grant which aims to improve the research potential of new colleagues and enhance their ability to successfully obtain external funding. The length of a NRG project is one or two years. In 2020, the Faculty received 10 applications, and 9 of the applications were approved by the FRC.

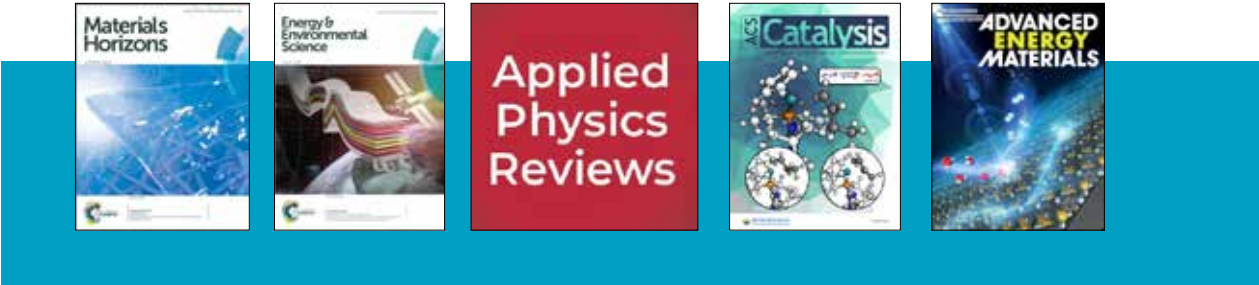
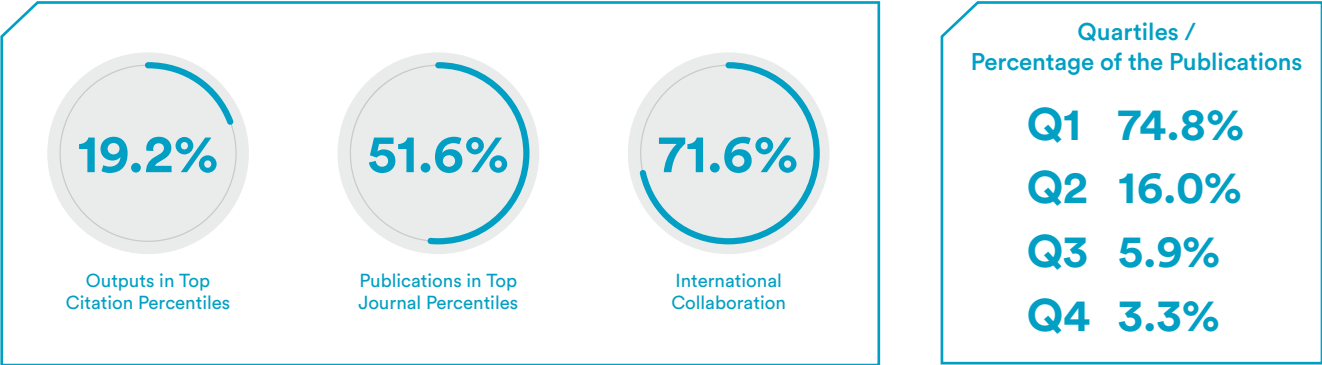
Research Conference Grant Scheme

The Faculty Conference Grant (FCG) is a faculty-level research grant that aims to support academic and research staff in the Faculty to attend the high quality research conferences, in which colleagues can have opportunities to present their research work among the fellow researchers and communicate with them about the cutting-edge research in the research areas. In 2019-2020, the Faculty received 22 applications, and 15 of the applications were approved by the FRC.

Publication

In the year of 2020, colleagues from Faculty of Science and Engineering have published 334 publications, with a Field-Weighted Citation Impact (FWCI) reaching to 2.00, which is comparable to prestigious universities worldwide.

Among the publications, 74.8% of them are published in the Q1 journals, and 51.6% are published in the top 10% journals. 19.2% of the publications are listed in top 10% most cited worldwide and 71.6% of the publications are in collaboration with institutes in other countries/regions.



* Data Source: SciVal/Scopus

Selected publications in high-quality journals in 2020

Publication title	Journal title	UNNC Author(s)
Device physics of back-contact perovskite solar cells	ENERGY & ENVIRONMENTAL SCIENCE	Zhenhai Yang (F), Jim Greer (C)
Foldable Semitransparent Organic Solar Cells for Photovoltaic and Photosynthesis	ADVANCED ENERGY MATERIALS	Billy Fanady, Tao Wu
Brain-inspired computing with memristors: Challenges in devices, circuits, and systems	APPLIED PHYSICS REVIEWS	Menglin Cui
MoO ₃ -adjusted delta-MnO ₂ nanosheet for catalytic oxidation of Hg ⁰ to Hg ²⁺	APPLIED CATALYSIS B-ENVIRONMENTAL	Haitao Zhao (F), Collins I. Ezech, Shufan Yin, Cheng Heng Pang, Tao Wu (C)
Stretchable shape-adaptive liquid-solid interface nanogenerator enabled by in-situ charged nanocomposite membrane	NANO ENERGY	Huayang Li, Jinwei Cao, Guang Zhu (C)
Electricity-free electroluminescence excited by droplet impact driven triboelectric field on Solid-Liquid interface	NANO ENERGY	Guang Zhu (C)
Polymer Materials for High-Performance Triboelectric Nanogenerators	ADVANCED SCIENCE	Guang Zhu (C)
Ultracomfortable Hierarchical Nanonetwork for Highly Sensitive Pressure Sensor	ACS NANO	Huayang Li, Jinwei Cao, Guang Zhu (C)
Reliability-Oriented Design of Electrical Machines: The Design Process for Machines' Insulation Systems MUST Evolve	IEEE INDUSTRIAL ELECTRONICS MAGAZINE	Michael Galea (F/C), Giampaolo Buticchi
In Situ Monitoring of Heterogeneous Catalytic Hydrogenation via Xe-129 NMR Spectroscopy and Proton MRI	ACS CATALYSIS	Xinpei Wang, Chengbo Wang, Thomas Meersmann (C)
Electret-induced electric field assisted luminescence modulation for interactive visualized sensing in a non-contact mode	MATERIALS HORIZONS	Huayang Li, Guang Zhu (C)

Selected highly-cited publications in 2020

Publication title	Journal title	UNNC Author(s)	Note
The First 75 Days of Novel Coronavirus (SARS-CoV-2) Outbreak: Recent Advances, Prevention, and Treatment	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	Yuxin Yan (F), Yoong Xin Pang, Yang Meng, Jianchen Lai, Tao Wu, Cheng Heng Pang (C)	ESI Hot Paper
Generation of textured diamond abrasive tools by continuous-wave CO ₂ laser: Laser parameter effects and optimisation	JOURNAL OF MATERIALS PROCESSING TECHNOLOGY	Haonan Li (F/C), Kege Xie, Weiqiang Zhu	Highly Cited Paper
Damage behaviors of unidirectional CFRP in orthogonal cutting: A comparison between single- and multiple-pass strategies	COMPOSITES PART B-ENGINEERING	Haonan Li (C), Xiaoling Liu, Weiqiang Zhu	Top 1%
Investigation on particle motions and resultant impact erosion on quartz crystals by the micro-particle laden waterjet and airjet	POWDER TECHNOLOGY	Haonan Li (C)	Highly Cited Paper

*F - First author; C - Corresponding author
* Data Source: Web of Science, InCites

Research Income/Funding

In 2020 Faculty researchers worked with an amazing number of industry and government partners on a wide variety of research projects, including three NSFC projects (two as PIs and one as Co-I), three Zhejiang NSF projects (including a Zhejiang Provincial Key R&D Project), three Ningbo NSF projects, three CM2025 projects, one 3315 Individual Talent Plan project, etc.

Selected research projects in 2020

PI	Project title	Programme	Amount (RMB)
Tao Wu	R&D on Solid Waste Green Processing Technology and Equipment-harmless and resource disposal technology and equipment for pharmaceutical sludge based on microwave pyrolysis - catalytic reforming	Zhejiang Key R&D Programme	4,300,000
Xiaochen Zhang	Research and application of key technologies for lightweight and highly reliable airborne servo motors and controllers	3315 Individual Talent Plan	1,000,000
Xiaosu Yi	Study on carbon-based lightweight and non-metallic lightning strike protection material for commercial airplane	CM2025 Programme	3,000,000
Bencan Tang	Development of Muc-001 as an innovative drug targeting tumor stem cells	CM2025 Programme	2,000,000
Jun He	Technology and control system development for gasoline powered vehicles to meet emission standard China 6	CM2025 Programme	1,350,000



National Natural Science Foundation of China (NSFC) Funded Projects (2019-2020)

Year funded	PI	Project Title	Programme	Amount (RMB)
2020	Ruibin Bai	Model and Data Driven Hyper-Heuristics for Combinatorial Optimization and Their Applications in Port Operation Integrated Scheduling	NSFC General Scheme	566,000
2020	Ayotunde Dawodu	An Alternative Pathway for the Sustainable Development: The development of Campus-based Sustainability Assessment Tool (CSAT) for Chinese Cities	NSFC Research Fund for International Young Scientists	238,000
2019	Yong Ren	Bilateral Workshop on Fundamental Study and Applications of Micro/nano Scale Multiphase Thermal and Mass Transport	NSFC-JSPS (Japan) Joint Research Programme	70,000
2019	Ping Fu	Reconstructions of ice thickness distribution and volume during the Maximum Glaciation and LGM in eastern Hengduan Mountain: from Shaluli Shan to Min Shan	NSFC General Scheme	731,100
2019	Hao Chen	Investigation of failure behaviour induced by the high temperature creep of thermal barrier coatings via small punch testing method	NSFC Young Scientist Scheme	312,000
2019	Meili Feng	Environmental flows study for small green hydropower plants: integrated hydro-thermal regimes analysis	NSFC Young Scientist Scheme	287,900
2019	Dragos Axinte	Temporal and spatial based coupled fluid dynamics and tribology multi-scale mechanism and modelling for optimised cutting fluid application	NSFC General Scheme	704,100
2019	James Greer	Impact of surface chemistry and deposited layers on the properties of electronic surface states in sub 10 nanometer bismuth films	NSFC General Scheme	756,000
2019	Ali Cheshmehzangi	Integrated City Information Modelling (iCIM): Innovating an advanced multiple urban modelling platform	NSFC International (Regional) Cooperation and Exchange Programme	360,000

Zhejiang Natural Science Foundation (ZJNSF) Funded Projects (2019-2020)

Year funded	PI	Project Title	Programme	Amount (RMB)
2020	Shu Liu	Study on the shear behaviors of asphalt mixtures in a mesoscopic level and shakedown analysis for asphaltic pavements under high temperatures	Zhejiang Natural Science Foundation	100,000
2020	Boon Giin Lee	Research on Smart AI for Firefighters Safety Assessment	Zhejiang Natural Science Foundation	100,000
2019	Haonan Li	Hybrid machining of fir-tree blade root structures by coupling textured-grinding wheel-based grinding and loose abrasive polishing	Zhejiang Natural Science Foundation	99,500
2019	Guang Li	Turbulence characteristics and ultrasonic intensification mechanism of transfer processes of impinging jet flow	Zhejiang Natural Science Foundation	100,000
2019	Liang Huang	Research on Variable Structure Compensation Networks of Capacitive Power Transfer Systems	Zhejiang Natural Science Foundation	100,000



Provincial/Municipal Key Laboratories

Two provincial key laboratories were officially awarded in 2019 and 2020 respectively, which marks a breakthrough at UNNC.

- Zhejiang Key Laboratory of More Electric Aircraft Technology
- Zhejiang Key Laboratory of Carbonaceous Wastes Processing and Process Intensification

Three municipal key laboratories:

- Ningbo Key Laboratory of Energy Material and Technology
- Ningbo Key Laboratory of Clean Energy Conversion Technologies
- Ningbo Key Laboratory of Product Green Manufacturing Evaluation and Reconfigurable Manufacturing Technologies



Student Experience and Awards

Student Awards

Since its establishment in 2009, the Faculty of Science and Engineering has grown from 342 students to over 1,800 students. Up to today, there are 3,846 students graduated from this Faculty. Each year, there more than 84% of graduates further their studies overseas. More than 40% of them entered QS World Top 10 universities in the world, and more than 60% of students entered QS World Top 50 universities.

Some of our graduates entered top universities with high reputation in various professional fields.

For example, in 2018, 7 out of 36 students in the Product Design and Manufacture received offers from the Royal College of Art (RCA). In 2020, the RCA was ranked as the number one Art and Design university in the world – for the sixth consecutive year – by the QS World University Subject Rankings.

Most of them who had completed all their studies, are currently building their successful career around the world. They are also doing their part to contribute back to the global community.

Yu Fu, a UNNC graduate of Architectural Environment Engineering, won the Chartered Institution of Building Services Engineers (CIBSE) President's Prize with his thesis entitled "A machine learning approach to predicting window openings in naturally ventilated buildings".

CIBSE is the prime source of expertise in the Building Services industry, and the President's Prize recognises work that displays a distinguished understanding and knowledge of the field, as well as excellent visual information. Yu is the first Chinese winner of the prize. A trophy was also awarded to UNNC as acknowledgement of its achievement.



Yu Fu



Jiayi Qiu

Jiayi Qiu, who studied Architectural Environment Engineering and graduated in 2014, was honoured by Phoenix TV, a Hong Kong-based TV network, at their annual You Bring Charm to the World awards. Jiayi as one of the youngest winners has been named among 11 Chinese people who are inspiring the world in fields as diverse as sinology, science, dance and charity.

Jiayi was given his award in recognition of being the first student from outside the UK or Ireland to be recognised by a President's Award from the Chartered Institution of Building Services Engineers (CIBSE).

After graduating from UNNC, he received his master's degree at Hong Kong University of Science and Technology. Currently, he works as an Engineer at WSP in Asia.



Jiani Zeng

Jiani Zeng, a UNNC graduate of Product Design and Manufacture, has been honoured with various top international design awards including 2020 Graduate Student Merit Award by Industrial Designers Society of America, 2020 Red Dot Award: Best of the Best, Core77 Design Award and Platinum A'Design Award. She has just obtained an M.S. in Engineering and Management from MIT.

"Thanks to my study at UNNC, I have a solid foundation in traditional design process and a decent understanding of User-Centred Design. Then in MIT I learned to explore beyond the logic of design thinking and traditional manufacturing methods," said Jiani.

"The latest digital fabrication and manufacturing technologies are transforming the traditional industrial design," said Jiani. Her work "Optical Textiles" was selected out of 4170 pieces of work from 52 countries and was awarded the Red Dot: Best of the Best.

International awards that our students have won

- Red Dot Award: 2
- A' Design Award: 2 Gold, 3 Silver and 2 Bronze
- The IDA International Design Award: 20 Gold, 15 Silver and 22 Bronze
- European Product Design Award: 1 Gold, 1 Silver
- International Association of Lighting Designers: 2
- Industrial Designers Society of America: 1 Silver

Linjun Xie, a 2019 PhD graduate, has already secured a postdoctoral research associate position at Durham University. She won the "Green Talents" award among other young scientists in Germany while conducting her research on Governance and Urban Sustainable Development at UNNC, which was to contribute to the international collaborative project titled "Smart Eco-cities for a Green Economy" in 2017.

Her reflection on the research journey made her feel grateful for the broad opportunities of working with leading experts from around the globe. Linjun touched on the openness and inclusiveness of UNNC, as two appreciable qualities the University holds, "which are also the reasons why I would recommend it to many others who would like to pursue an academic career. Here you can get support for studying abroad, conducting fieldworks, and participating in international conferences. Most importantly, you can enjoy the freedom of thoughts and the space to develop your own intellectual curiosity."



Linjun Xie



UNNC alumnus Yejiang Yu is a member of the Oxford rapid viral RNA test team, which was recently awarded the Royal Academy of Engineering's President's Special Awards for Pandemic Service for exceptional achievements in the fight against COVID-19.

Yejiang is a graduate of Environmental Engineering programme in 2016. After the graduation, he entered Oxford University to pursue his PhD degree with a full scholarship, under the supervision of Professor Zhanfeng Cui FREng.

"The study experience at UNNC equipped me with cutting-edge knowledge as well as transferable skills," he said. "More importantly, I had numerous opportunities to explore my interests. I soon figured out my passion and applied early for a PhD programme."



The paper, entitled "Controlling of compliant grinding for low-rigidity components" and written by UNNC PhD student Yue (Yolanda) Yang, was published in one of the world's top journals on manufacturing - International Journal of Machine Tools and Manufacture. In her paper, she proposes a solution to address the accuracy challenge in machining, when both the workpiece and tool are compliant in grinding. This is the fifth paper that Yolanda has published since her admission to UNNC as a PhD student two years ago. All her five papers are devoted to advanced manufacturing and published in highly ranked journals categorised as JCR Q1, which denotes the top 25% of journals according to Journal Citation Reports.

"It is UNNC that gives me a world of possibilities and allows me to be the best I can be." She said. As part of her PhD programme, Yolanda is now at the University of Nottingham UK campus, sponsored by China Scholarship Council (CSC) for two years, to further her research on advanced and intelligent manufacturing.



Yue Yang



Tianning Shao, a graduate of Architectural Environment Engineering in 2020, received first prize with a paper that he selected and co-wrote in the global authoritative academic conference of SDEWES (Sustainable Development of Energy, Water and Environment Systems). His excellent research collaboration has won him offers to study at Cambridge, Imperial College and University College London.

During the four years, Tianning stayed among the top 1-2% of his class and won various scholarships. He was soon clear that his interest lay in scientific research and actively sought research opportunities on and off-campus. In his third year, he participated in a summer research project at the University of Nottingham, where he used CFD (Computational Fluid Dynamics) to research the impact of vegetation barriers on indoor air quality and ventilation.

Tianning and his fellow students wrote the research results into a paper "Impacts of Urban Vegetation Barriers on Outdoor-Indoor Traffic Pollution Dispersion in Naturally Ventilated Spaces Along Street Canyons", which won the prize at SDEWES.

Tianning Shao

Samuel D. Widiyatmoko, one of our PhD students, received the "Best Presentation" award from the Institution of Chemical Engineers in the 30th Symposium of Malaysian Chemical Engineers in December 2017.

Samuel studied BEng Chemical Engineering in the UNNC and graduated with the First Class honorary degree. After the graduation, he choose to pursue his doctoral degree here with a joint supervision team from UNUK and UNNC. In 2020, he successfully obtained his PhD degree from University of Nottingham Ningbo China in the research area of 'Recovery of Positive Electrode Active Materials from Spent Lithium-ion Battery'.

Currently, Samuel has secured a post-doctoral research offer in the Wuhan University, one of the leading research universities in China.



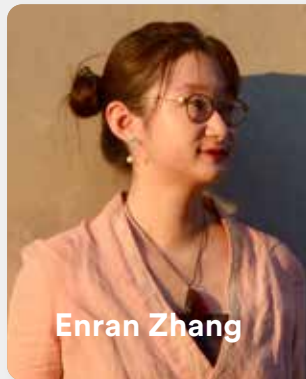
Samuel D. Widiyatmoko



Zhenhai Yang, one of our PhD students, published in the journal Energy & Environmental Science (IF 30.289) as the first author. Energy & Environmental Science is a prestigious international journal published by the Royal Society of Chemistry in the United Kingdom. According to Journal Citation Reports, it is the No. 1 journal in the world for Environmental Science and 2nd in the world for Energy & Fuels.

Zhenhai is a PhD candidate in the Joint Doctoral Training Programme between UNNC and NIMTE, CAS. He is co-supervised by Professor of New Energy Technology Jichun Ye and Li Dak Sum Chair Professor in Advanced Electronic Materials and Devices Jim Greer. The full paper is the result of research collaboration between two parties and they are striving to improve power conversion efficiency (PCE) beyond 25% for back-contact perovskite solar cells to provide clean energy.

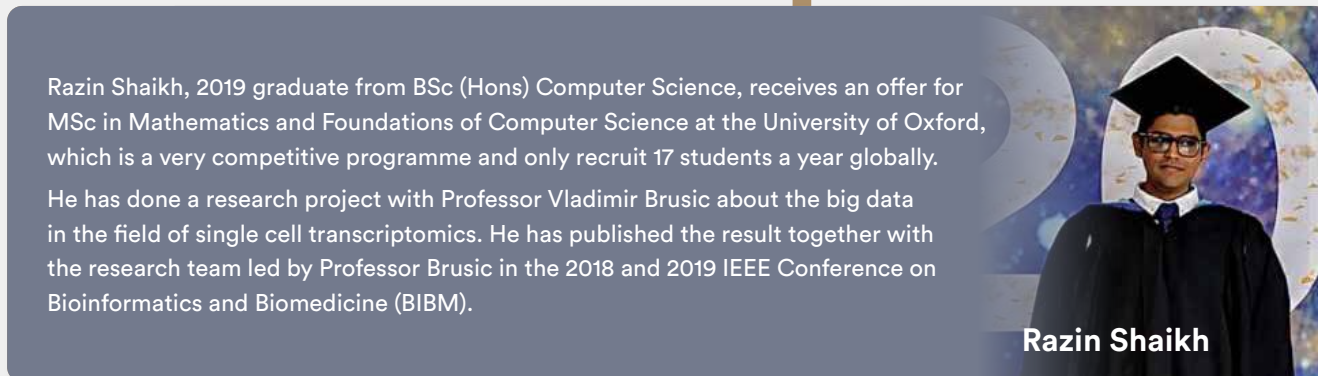
Zhenhai Yang



Enran Zhang


Enran Zhang was the first batch of Architecture graduate in the UNNC. She entered the University of Manchester for the Master of Architecture degree study. Now, she works as an architect in the Chapman Taylor. She is the Project Manager of Chongqing Future Hotel Project, which will be part of the main venue of Chongqing Smart Expo.

Enran also takes an honorary secretary role at Royal Institute of British Architects China Chapter. Recently, she was invited to participate in a roundtable with British Ambassador to China Dame Barbara Woodward.



Razin Shaikh


Razin Shaikh, 2019 graduate from BSc (Hons) Computer Science, receives an offer for MSc in Mathematics and Foundations of Computer Science at the University of Oxford, which is a very competitive programme and only recruit 17 students a year globally. He has done a research project with Professor Vladimir Brusic about the big data in the field of single cell transcriptomics. He has published the result together with the research team led by Professor Brusic in the 2018 and 2019 IEEE Conference on Bioinformatics and Biomedicine (BIBM).



Deepesh Jayasekara

Deepesh Jayasekara, a PhD student from FoSE, got the runner-up in the U21/PwC Innovation Challenge competition 2019/20. Deepesh, the DTP scholarship holder (DTP student at UNNC and Ningbo Institute of Materials Technology & Engineering, CAS), joined the UNNC PhD programme in 2019. He brought up a solution from the perspective of design and sustainable manufacturing, a circular system to free the environment and society from the toxic pollutants.

"I believe that the university as a change maker can play a significant role in changing the linear system to a circular one. University has the power not only to influence the student but also to influence the industry and local government."



Tianlun Yang

Tianlun Yang, a PhD student in ABE, with his supervisors (Dr. Georgios Kapogiannis, Dr. Byung-Gyoo Kang, and Dr. Robin Wilson), won the best paper award in the 7th BIM International Conference on Intelligence Construction and AEC Industrialization Innovative Development, in September 2020. He also won the award in AEC Hackathon 2020 Shanghai Station New Geek Prize, with Dr. Georgios Kapogiannis and Mr. Wei Hua in November 2020.

Student Experience Programme

To allow students to experience, explore and refine their skills outside the regular classroom setup, Faculty of Science and Engineering has launched a six-week programme in 2020 summer, which include four main sub-programmes below. There are 1051 students in FoSE who has benefited from all varieties of the programme in 2020.

The programme has received lots of positive feedback and comments from students, appraising that apart from technical knowledge, they have the opportunity to experience team working, conduct research projects and learn cross-discipline subjects.

“

I think the best thing is I have the resource to start my own project. I am trying to learn how to select a topic, how to design and carry out research ”

“

I got some insights of how the research is conducted, which for sure gave me the research skill that I might need for my future career and education. ”

“

Benefited a lot from the understanding of professional knowledge and the writing of academic papers. ”

Since the start of the new academic year 2020-21, Faculty will further expand the programme to year-long activities and provide more opportunities for students to enhance their hands-on experience through various extra-curricular activities.

- Student-Centred Projects – FoSE Innovation lab
- FoSE Summer Research Placement Programme
- Essential Skills Training Programme
- Voluntary and Cultural Appreciation Work



Feature:

Faculty's Responses to COVID-19

The COVID-19 pandemic has affected the education and research in campuses across the globe. After UNNC shifted to the virtual teaching and learning for the spring semester in 2020, all our staff and students have quickly adapted to the new approaches and also developed new initiatives to ensure that the teaching quality is not compromised and all learning outcomes can be achieved.

The extraordinary work of our staff and students are also shown in their contributions to the community in supporting the control and prevention of COVID-19 pandemic, where their courage, compassion and resilience are widely recognised.

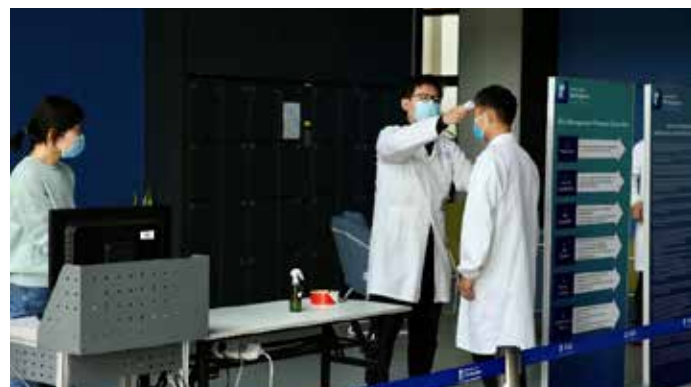


Health and safety enhancement against COVID-19

As COVID-19 spread quickly around the world in March 2020, how to ensure the health and safety of our 2+2 students and exchange students became Faculty's top priority. A "FoSE love parcel" project proposed by FoSE student advisory team and technical service teams was immediately put into action. The Faculty had been sending more than 1,000 masks to the University of Nottingham UK where locates the most of our students. Our staff are also working day and night, trying their best to ease staff and students' anxiety and give all the support we have. Following the first batch, the Faculty has sent more parcels to the exchange students in the United States and Malaysia, although the international delivery service became extremely difficult during the period.

To ensure the safety and health of all staff and students after the teaching and learning activities being resumed in the campus, an anti COVID-19 drill was organised by the Faculty, which invited all technicians, Heads and representatives from each department/school attend. Through the drill, staff got familiar on how to handle the spotted fever or suspected COVID-19 case on campus or during the class in a more straightforward way.

The Faculty has also upgraded the epidemic prevention level of all three buildings of Faculty of Science and Engineering—PMB, IAMET and CSET, where locates the design studio and laboratories. All three buildings are equipped with hand sanitisers in each floor. FoSE Technical Services Team help to procure UV lamp, exhaust fan and disinfectant for the lab disinfection and ventilation.



Teaching

Since UNNC has decided to start the Spring semester teaching online in 2020, **Dr C.F. Kwong** of the Department of Electrical and Electronic Engineering (EEE), as one of the core members in the Faculty of Science and Engineering (FoSE) e-learning support group, together with **Dr Zheng Wang**, **Dr Adam Rushworth** and **Dr Georgios Kapogiannis**, have produced about 20 series videos sharing their practice of online teaching with both faculty academic staff and others. Their sharing provides a detailed introduction and useful tips on how

to optimise the use of Moodle, Microsoft Teams, Zoom and VDI and how to make a good video at home with simple tools.

With all the great support from faculty technical services team, **Dr Zheng Wang** has also been leading the department online teaching to successfully conduct the first remote lab course for the international students. The lab session is part of the module "Thermodynamic and Heat Transfer", which is co-convened by Dr Kow Kien Woh, Dr Binjie Hu and Dr Mengxia Xu.

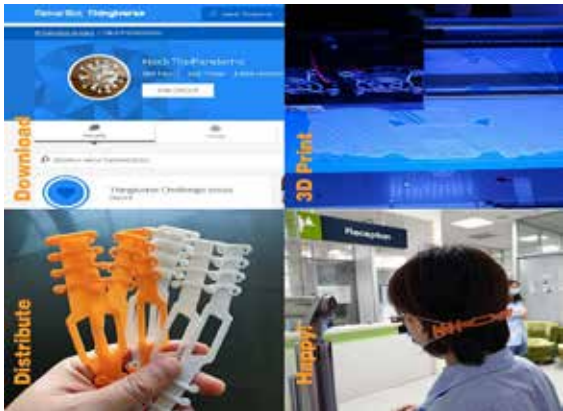
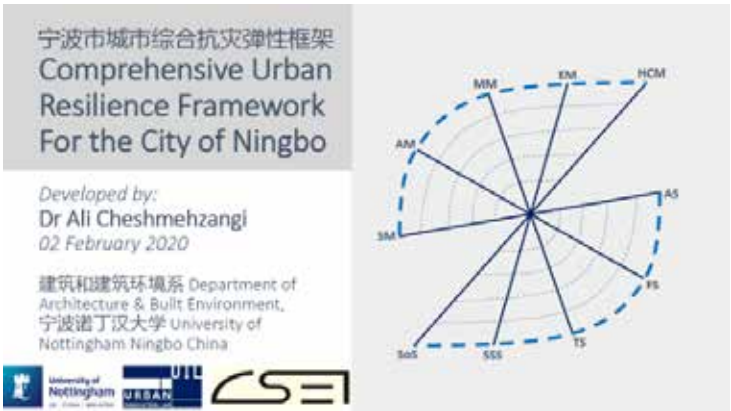


Dr Martijn ten Bhömer of the Department of Mechanical, Materials and Manufacturing Engineering (M3), did active research on MOOC, Massive Open Online Courses, and how these online platforms and tools could effectively assist design teaching for the course of product design and manufacture. He also successfully held a virtual exhibition online to showcase students' design project in the module "Industrial Design Professional Practice 1", where 40 posters were exhibited to show students' initial research and ideas. His teaching practice has received a lot of positive feedback from students.



“I think the online lab via Zoom went really great. Our GTA was very kind and helpful. He helped us with the readings of the meters very attentively, by zooming in and out. Although we are not in the lab in person, it made me feel like I was, by getting to experience the same as my peers in the campus. It, surprisingly, had no problems while we were doing the experiment. It was really fantastic! Thank you and other staffs for making this run smooth!”

said Pan Thi Khine, a year 2 Chemical Engineering student from Myanmar.



Research

Prof. Ali Cheshmehzangi of the Department of Architecture and Built Environment (ABE), proposed and drafted a “Comprehensive Urban Resilience Framework” to the municipal government of Ningbo to ensure and improve Ningbo’s virus resilience in the start of the outbreak of COVID-19.

This framework is intended to aid the city administration with sound decision-making by performing self-evaluation on two key indicators - management and provision - with the former looking at institutional and operational aspects, and the latter at service and supply.

Prof. Cheshmehzangi hopes that together with municipal authorities, the framework can inform policy-making and make the city better prepared against future adversities.

Dr Maycon Sedrez of the Department of Architecture and Built Environment, presented a number of “face mask extenders” to the UNNC Clinic and local medical institutions to reduce pain behind the ears caused by wearing masks over long periods in April 2020. The extenders were created using 3D printing facilities on campus and digital innovation in Centre for Sustainable Energy Technologies.

Dr Sedrez explained that the original design was not his own - it had already been shared online by numerous researchers. “I believe this situation presents a lot about the future of architecture and design,” said Dr Sedrez. “Sharing and collaboration are key concepts of digital design and fabrication.”

“It felt really good to be able to do something for the people on frontlines and apply my knowledge on fabrication. I think this is a good example of how to engage with our community,” he says.

Students and alumni

Our students are giving back and serving their communities in truly exceptional ways. **Jintao Lu**, a Year 2 Environmental Sciences student devoted himself in the local epidemic prevention and control group. His county was locked down after found one confirmed cases of novel coronavirus. Even though, he still registered as a volunteer without any hesitation. People once asked him if he was afraid. Jintao said “I was very scared especially at the beginning. But I see people make their own contribution and strive for ZERO infection and I know that I should do my bit.”



Jintao Lu was recording the passenger's information



Jasmine Chong on the campus

Jasmine Chong, an exchange student from University of Nottingham Malaysia writes a song to send her best wishes to encourage people in Wuhan and China in the face of COVID-19. Jasmine studied Chemical Engineering at UNNC in 2019. “I decided to write this song to thank Chinese doctors, nurses and all the medical staff. I hope this song could positively support them,” said Jasmine.

Jinyu Dai, a Year 2 Mathematics with Applied Mathematics student has formed a working group and successfully developed the UNNC Health Code mini programme after being given a 30-hour deadline, which greatly supported UNNC epidemic prevention of COVID-19 during the challenging period.

Yejiang Yu, a graduate of Environmental Engineering programme in 2016, was a member of the Oxford rapid viral RNA test team, which was awarded the Royal Academy of Engineering's President's Special Awards for Pandemic Service for exceptional achievements in the fight against COVID-19 in August 2020.

At the early stages of the pandemic, Yejiang and his research team members began working on a speedy test to identify carriers of COVID-19 (SARS-CoV-2). Yejiang’s doctoral research has focused on storing and transporting biological products at room temperature or even higher, within a short period, they developed a test kit that can be stored and supplied without being refrigerated, and can provide a result within 30 minutes. The first product, Oxsed RaViD Direct, has received CE certification and is now commercially available. Yejiang was also invited to serve as a technical consultant to the manufacturer and participate in rolling out the product to meet the massive need around the globe.



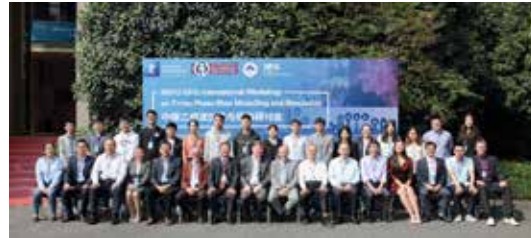
Jinyu Dai and his team members



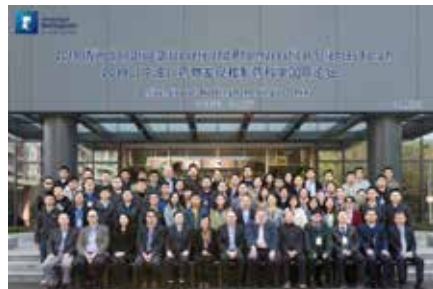
Yejiang Yu (the right) and the research team from Oxford University

1

The International Workshop on Three-Phase Flow Modelling and Simulation was successfully held at the International Conference Center of the University of Nottingham Ningbo China (UNNC) during 23rd-25th October 2019. The symposium was jointly organized by the University of Nottingham Ningbo China and the Otto-von-Guericke Universität Magdeburg and strongly supported by the Faculty of Science and Engineering of UNNC. The project was jointly sponsored by National Natural Science Foundation of China (NSFC) and German Research Foundation (DFG). More than 40 researchers mainly from 10 institutes and 3 countries attended the workshop.



2



On 19th November, 2019 (Ningbo) Drug Discovery and Pharmaceutical Sciences Forum: Future Opportunities for Collaboration in Research and Training was held at the International Conference Centre of the University of Nottingham Ningbo China campus. This forum was chaired by Professor Kevin Shakesheff, Pro-Vice-Chancellor of the University of Nottingham UK, Professor Mike George, Li Dak Sum Chair Professor at the University of Nottingham Ningbo China, and Professor Tao Wu, the Dean of Faculty of Science of Engineering at the University of Nottingham Ningbo China, and sponsored by the University of Nottingham and Ningbo Municipal government. More than 100 participants in chemistry and pharmacy related field from Universities and enterprises have attended this forum.

3



2019 (Ningbo) International Forum on New Energy and Green Chemicals was jointly chaired by Prof. Tao Wu (Dean of Faculty of Science and Engineering at the University of Nottingham, Ningbo, China (UNNC)), Prof.

Michael George (Professor of Chemistry, School of Chemistry at the University of Nottingham, and the Li Dak Sum Chair Professor in Chemistry at UNNC), Prof. Xiang Gao (Dean of College of Energy Engineering at the Zhejiang University) and Prof. Liang Chen (Director of Institute of New Energy Technology at the Ningbo Institute of Industrial Technology of the Chinese Academy of Sciences (CNITECH)). This conference was sponsored by the University of Nottingham, CNITECH, the Committee of Utilisation of Environmental and Thermal Energies, Chinese Society for Environmental Sciences, and the Ningbo Association for Science and Technology.

4



On 13th December 2019, the 9th Multidisciplinary International Scheduling Conference: Theory and Applications was successfully unveiled in the University of Nottingham Ningbo China (UNNC). The conference, initiated by the University of Nottingham, has run every two years since 2003. It is the 9th in its conference series and it is the first time the conference hold in China.

Local and Global Engagement

International Conferences

Faculty of Science and Engineering has organised more than 20 high level international conferences since 2016, covering the areas in Advanced Manufacturing, BIM, Solid Mechanics, New Energy and Green Chemicals, Fluids and Thermal Engineering, Computing Intelligence and Scheduling, Sustainable Urbanization and etc. Every year, there are around 300 experts from leading universities and industries in China and around the world attending the international conferences organized by the Faculty. The scale and impact of the international conferences have been expanded year by year in both local and international context.

5



On 13th December, 2020 International Conference on Resource Sustainability – “Sustainable Urbanisation” in the BRI Era (icRS Urbanisation 2020) was unveiled in the University of Nottingham Ningbo China (UNNC). The conference lasted for 3 days from 13th-15th December, 2020. There are 133 scholars and experts from 64 leading universities at home and abroad registered and participated in this conference onsite and also online. 66 speeches were given in the conference.

7



On 12th December, the 2020 (Ningbo) International Forum on New Energy and Green Chemical Engineering, hosted by UNNC, was grandly held at the International Conference Center at

UNNC. Nearly a hundred academicians, experts and scholars both from home and abroad gathered together to discuss the latest scientific research progress and the future development trend of green chemicals.

The distinguished guests included Buxing Han, Academician of the Institute of Chemistry of the Chinese Academy of Sciences, Dr Jingxu Zhu, a Fellow of the Canadian Academy of Engineering, Professor of the University of Western Ontario, Professor Xiang Gao from Zhejiang University, Professor Fangming Jin from Shanghai Jiaotong University, Researcher Huaiying Yao from Ningbo Urban Environmental Observation and Research Station, Chinese Academy of Sciences, Zhejiang Tailai Environmental Protection Experts Haiming Bao, Professor Xiaolei Fan from the University of Manchester, and Professor Chuang Peng from Wuhan University.

6



The International Symposium on Numerical Methods in Heat and Mass Transfer 2020 (ISNMHMT2020) was jointly organised by Youth Committee on Heat and Mass

Transfer of the Chinese Society of Engineering Thermo-physics, University of Nottingham Ningbo China (UNNC), Ningbo Key Laboratory on Energy Material and Technology, as well as Ningbo Innovation Team of Frontier Technologies on Thermal Management in Low-carbon Vehicles. ISNMHMT2020 was held successfully in UNNC on 11-13th December, 2020.

The conference combined online presentations with 80 participants together with offline presentations with nearly 100 participants, coming from China, Japan, Korea, Singapore, UK and US, including Zhejiang University, Shanghai Jiaotong University, Southeast University, South China University of Technology, Tsinghua University, Xi'an Jiaotong University, University of Hong Kong, Hong Kong University of Science and Technology, Brunel University London, Iowa State University, Purdue University, Kyushu University and Nanyang Technological University.

Science and Technology Open Day



The first Science and Technology Open Day in Advanced Manufacturing was successfully held on 25th September 2020. More than 30 companies in manufacturing, new materials, semiconductor joined the open day and have a profound communication with the staff at UNNC.



The public lecture by Professor Xiangwan Du, Academician of Chinese Academy of Engineering was successfully held on 28th October 2020, with the topic of "Story, Study and Life". There were around 80 UNNC staff and students participated this lecture and had discussion with him.



On 17th November 2020, the second Science and Technology Open Day in New Materials was held. Around 80 people from local industry, high education institutions and research institutions joined the open day. Two Li Dak Sum Chair Professors, Prof Xiaosu Yi and Prof Guang Zhu have given the speech for the audience. The Open Day has further strengthens the communication between UNNC, enterprises and partners from universities and research institutions.

Youth Talent Scheme

Academic staff in the Faculty of Science and Engineering have been actively participated in the "Youth Talent Scheme" organised by Ningbo Association for Science and Engineering since year 2016. There are

total 8 academic staff supervised total 82 high school students from key high schools in Ningbo. In 2018, 6 students from Yinzhou High School supervised by Dr Chenghen Pang have published an essay and awarded the patent. In

2020, 3 students from Huizhen High School and 3 students from UNNC Affiliated Higher School, supervised by Dr Chengheng Pang, submitted a journal paper and filed the patent.



External Engagement

Contribution to the Global Sponge City Construction

Dr Ka Shun (Faith) Chan, Associate Professor in Environmental Sciences delivered a webinar on the Aguas Urbanas (means “Urban Water” in Spanish) and shared his research in urban water management and the Sponge City Program (SCP) in Chinese cities to Guatemala officials.

Dr Faith Chan specialises in sustainable flood risk management, climate adaptations and urban resilience on Asian coastal megacities, funded nationally and internationally. He is involved in two international research projects as a researcher in the Blue-Green Cities Consortium (funded by ESPRC and British Academy from

the UK research council) and co-investigating in the flood risk and commercial properties (funded by RICS) project. He is also a principal investigator on three municipal-funded projects to investigate the surface water quality, typhoon-enhanced flood risk, and the development of a “Sponge City” pilot study in Ningbo.



The webinar was successful and drew the attention to Guatemala officials of their understanding of SCP development. It also provided a good platform for understanding the current challenges that the city of Guatemala is facing.



Laboratories and Facilities

Our state-of-the-art multidisciplinary facilities help provide staff and students the best collaborative and supported environment to learn and conduct novel and world leading research.



Laboratory and Facilities Highlights



IAMET-Composite Materials Laboratory

The Composites Research Group was founded in 2015 and currently has two laboratories, the NMI lab and the IAMET lab. The research group is mainly engaged in the research of green and sustainable composite materials, functional composite materials and composite automation. The research group has 30 full-time researchers and Ph.D. students, with ongoing and completed research projects worth over ten million RMB. Meantime, nearly tens of millions of manufacturing and testing equipment/instrument are applied on composite field research.

Besides, The research group has also established joint laboratories in cooperation with companies such as AVIC Composites, Airbus, Liancheng, Zhuzhou and etc.



IAMET 117-Provincial Key Laboratory of More Electric Aircraft Technology

The PEMC group is an integrated research group with active collaboration between UNUK and UNNC. As one of the largest and most recognised groups in its field worldwide, the Power Electronics, Machines and Control (PEMC) Research Group undertakes research in Power Electronics and Electrical Machines/Drives that are fundamental to our technological advancement. These technologies underpin the electrification of transport and all renewable energy strategies and are vital for a sustainable future. Research in the group ranges from basic technology investigation to fully engineered advanced concept demonstrators, carried out in world class experimental facilities that allow realistic practical validation of novel components and systems.





📍 IAMET 201-Flight Simulation Laboratory

IAMET201 is a flight simulation laboratory established in 2018. It can serve 40 students for teaching and experiment. The flight simulation experiment devices include 5 fixed flight simulators, some desks and chairs, projector, model plane for demonstration and flying related posters. It is mainly used for aerospace engineering teaching, including AERO1004 Professional Engineering and Project 1 and AERO2003 Dynamics and Flight Mechanics.

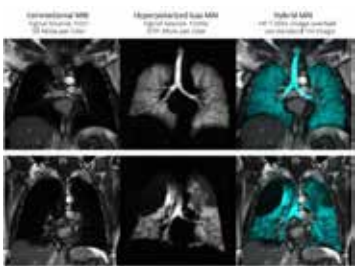
The simulator is a customized simulator based on X-Plane11 software. It simulates Cessna172 basic trainer. Simulator system contains hardware and software. The hardware includes a flight control system, instrument

panel and button switches, 3-screen view system and computer. Software system includes X-Plane11 flight simulation software and instructor control station software.

The simulator mainly simulates the following subjects: small aircraft system familiarisation teaching, perform preflight check, engine start and ground taxi training in accordance with specific checklist, aircraft taking off and cruise parameters control training, verifying the aircraft performances at different gross weight, and aircraft flight stability experiment.

View system of simulator is surrounded screens for displaying 3D motion from pilot view. And the view

could be changed to others interior and external views as well. The control system is basically a copy of aircraft controls, including control stick, buttons and switches. It could realize the cockpit ergonomics by configuring the right seat related simulator. The flight data could be exported from X-Plane11 for data analysis.



📍 PMB 119 Sir Peter Mansfield Imaging Centre (MRI Center)

The Magnetic Resonance Imaging (MRI) Centre in the UNNC was founded in 2016 and is an integral part of the Sir Peter Mansfield Imaging Centre in the University of Nottingham, UK. The MRI Centre develops and applies magnetic resonance imaging techniques in a broad range of areas, including research on both hardware and software of MRI techniques. It has

been collaborating with a local MRI manufacturer: Ningbo XinGaoYi Medical Equipment Co. Ltd.

It is equipped with a clinical XGY MagicScan-1.5 scanner. The system is equipped with a superconducting magnet (IGC) with a bore diameter of 60cm, 20kW RF transmitter Analogic AN8119T and a gradient system with 30mT/m power and 0.3ms rise time.

Project 1: Development of new methods of lungs imaging using MRI for express diagnosis of viral pathologies of the respiratory system and their sequelae for COVID-19 survivals.

Project 2: A method, device, system and storage medium for detecting fruit sweetness.

Project 3: Silent MRI for Newborn Infants.



📍 PMB 433 Artificial Intelligence Laboratory (CSAI)

FoSE Artificial Intelligence Lab is equipped with the cutting-edge facilities to support the new programme in the School of Computer Science, namely Computer Science with Artificial Intelligence (CSAI). It focuses to provide fast and latest technology not only for the

CSAI modules but also to support interdisciplinary student-led projects, student internships and student society activities.

The lab houses 10 DELL Precision7920 workstations, and each workstation is carried with 2 Intel Xeon Silver 4108

and 2 Nvidia 2080Ti. In addition, in collaborating with UNNC IT Services and HUAWEI CHINA, 6 HUAWEI 2288H_v5 rack servers in UNNC HPC platform have been implemented, each carried with 2 Intel Xeon Gold 5120 and 4 Nvidia Tesla v100 32GB.



📍 IAMET 226 Intelligent Simulation and Digital Port Laboratory (ISDP)

The Intelligent Simulation and Digital Port Lab (ISDP) was established in December 2019. The aim of the lab is to develop the cutting-edge technologies and systems for the next generation intelligent port. This includes, but not limited to, the innovative use of the latest technologies in 5G, IoT, big data analytics, simulation, computational

intelligence, reinforcement learning, deep learning, edge computing, operations research, and large-scale optimization.

One of our major projects "Container ToS System Key Technology Innovations and Pilot Applications" has been funded by both NSFC General Grant and Ningbo Science and Technology Innovation

2025 Programme with a total funding of 2,550,000 RMB. In collaboration with Ningbo Zhoushan Port, the patented dynamic truck dispatching system has been deployed in Ningbo No.2 Port terminal and improves overall intra-terminal transportation efficiency between 7-12%, which leads to millions of annual saving in costs.



FoSE Virtual 360° Lab Tour

New situations bring new solutions in the higher education sector. Due to the impact of COVID-19 pandemic across the globe, an increasing number of universities have been facing lockdown and online teaching and learning technologies are implemented worldwide. The Faculty is also seeking for solutions to provide an interactive and immersive tour experience for prospective students, parents, visitors from partner institutions even though

they are not allowed to enter the campus temporarily.

After months of continuous efforts, Faculty of Science and Engineering has officially launched the online 360° VR Lab Tour in the end of 2020. The project aims to provide the off-campus audience a way to visit FoSE—Sir Peter Mansfield Building and Sir David and Lady Susan Greenaway Building and the cutting-edge

research laboratories and facilities through deploying 360° Virtual Reality Panorama technology. This project covers the most of the Faculty teaching and research laboratories in the science and engineering disciplines, such as chemistry analysis lab, civil engineering lab and computer science artificial intelligence lab.



Virtual 360° Lab tour

<https://www.nottingham.edu.cn/en/science-engineering/vr.aspx>





nottingham.edu.cn/go/fose

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