

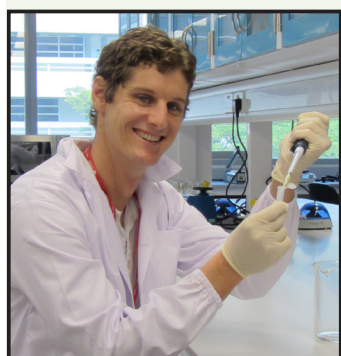
SCELSE Graduate Program

Singapore Centre on Environmental Life Sciences Engineering

Nanyang Technological University and National University of Singapore

SCELSE is offering selected post graduate students the opportunity to participate in the innovative discipline of Environmental Life Sciences Engineering.

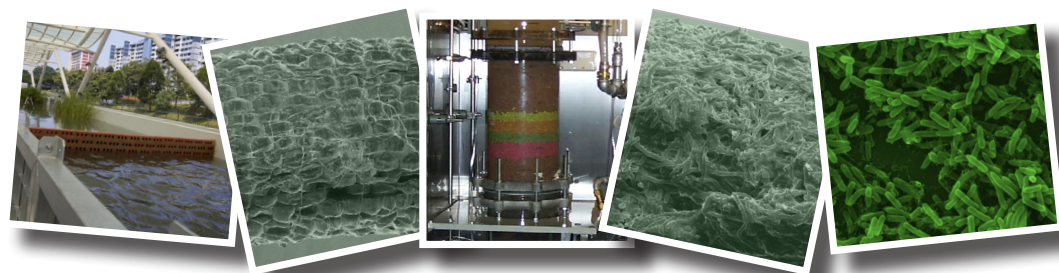
The SCELSE research environment



The Singapore Centre on Environmental Life Sciences Engineering (SCELSE) is a unique interdisciplinary Research Centre of Excellence (RCE), focusing on the biology of microbial biofilms and harnessing microbial community-driven processes for sustainable practices, e.g. degradation of harmful pollutants, recycling used water and minimising environmental health risks.

SCELSE offers a research environment focusing on scientific excellence, recognising world-class research as the platform for future innovation, research and development. We are currently building our research strength in environmental life sciences engineering and seek to nurture research talent and foster future leaders in this emerging field.

We invite you to join us!



Biofilms

The basis of SCELSE research

Complex microbial biofilms are the dominant life-form on earth, where they perform important biological processes that are critical for the functioning of our planet. SCELSE aims to link new insights from the life sciences with skills and emerging technologies in engineering and natural sciences to understand, harness and control microbial biofilm communities.

Paradigm shift

Microbes are no longer viewed as free living, single-celled organisms. Instead they reside in dynamically structured communities of multiple species embedded in a polymeric matrix which we define as "biofilms". Their communal activity is substantially different from that of the summation of individual member species. Hence, to understand the activity of biofilms, and their member species, we must use a complex system approach.

Eligibility for Graduate Program

- Open to graduates from a college, university, or technical school of acceptable international standing
- First Class Honours degree or equivalent at Bachelor's level

Coverage

- Award period: 4 years
- Full tuition fees
- Highly competitive monthly stipend
- Allowances for conferences, IT and thesis preparation
- PhD degree awarded by either – Nanyang Technological University or National University of Singapore

Application process

Details of the application process, deadlines and requirements are outlined on our website.

Course structure

Uniqueness: The SCELSE Graduate Program leverages on expertise and graduate courses from Singapore's leading universities - Nanyang Technological University (NTU) and National University of Singapore (NUS). Students enter into either NTU or NUS, undertake a course graduation program with a degree from either university and follow a common graduate program.

Participants in SCELSE's Graduate Program undertake a core component (SCELSE Summer Course) in addition to research projects associated with their elected fields of study creating opportunities for interactive and multi-disciplinary research by combining both emerging and core scientific disciplines such as:

- Microbiology
- Ecology
- Chemistry
- Genomics
- Engineering
- Materials science
- Microfluidics
- Bioimaging
- Biophysics
- Computational and systems biology



Core component

SCELSE Summer Course

The SCELSE Summer Course is an intensive and highly interactive annual program conducted in July, which provides students with knowledge of emerging technologies in engineering and natural sciences in the context of microbial biofilm-driven processes.



Fields of Study

1. Environmental Microbial Engineering

- Effect of physicochemical and operational parameters on structure and activity of microbial communities in water treatment systems.
- Enhanced electroconductivity of complex microbial communities for bioremediation
- Resilience of microbial biofilm communities for river ecosystem function.
- Functional dynamics and modelling of biofilms in used water treatment.

2. Biofilm Biology

- Gradients/functionality of biofilm extracellular matrix
- Understanding the biofilm life cycle using defined mixed species experimental systems
- High resolution sensing and imaging to explore gradients and signalling in microbial biofilm communities
- Role of phage and predators in shaping and controlling complex biofilm communities.

3. Metagenomics & Systems Biology

- Metatranscriptomics of microbial communities in environmental engineered bioprocess systems.
- Systems biology of highly diverse microbial communities in the urban water cycle.
- Metabolomics of environmental biofilm communities.
- Next generation sequencing of microbial biofilms.

4. Public Health & Biofilm Control

- Chemical biology for developing environmentally friendly biofilm control agents
- Novel *in vivo* models for prevention and dispersal of pathogenic biofilms
- Mechanism of resilience against stress and predation by the biofilm shield
- Concealed and resistant microbial pathogens in the environment

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