SCELSE

Singapore Centre for Environmental Life Sciences Engineering

Microbial Marvels:
The Hidden World of Microbes

OPEN HOUSE

29 AUG 2024

11.30 am - 6 pm @ SCELSE-NTU

SCELSE - a multidisciplinary biofilm & microbiome research centre
NTU, 60 Nanyang Drive, SBS-01N-27, Singapore 637551 (Near Quad Café)
Email : SCELSE-Events@ntu.edu.sg | Website: www.scelse.sg

Discover the hidden wonders of microbes through our groundbreaking research. Check out these booths for more!

BOOTH 1: Registration

Register at SCELSE Level 1. All pre-registered guests will receive a redemption card to collect a free goodie bag at B2 redemption counter.

BOOTH 2: About SCELSE

Find out what biofilms and microbiomes are, how they impact every aspect of modern life and discover the real-world applications of our discoveries.

BOOTH 3: "Snacks" & Ladders

Try your hand at SCELSE's variation of this classic board game where players race to the finish, climbing ladders and avoiding snakes.

BOOTH 4: Career Fortune Teller

Dr Yvonne Hii
SCELSE-NTU
Research Fellow

Ever imagined being an academic? Or a researcher in the corporate world?

Meet SCELSE's Career Fortune Teller who can advise you on the many options a career in biofilm and microbiome research can offer.

BOOTH 5: Wastewater surveillance - Pathogen monitoring for public health

Dr Ng Wei Jie
SCELSE-NTU
Research Fellow

Dr Omar Bin Khalilur Rahman
SCELSE-NTU
Research Fellow

Dr Desmond Chua
SCELSE-NTU
Research Fellow

During the COVID-19 pandemic, our team helped with the NEA's island-wide wastewater-based surveillance by performing one for our university campus, helping to identify trends and areas at risk of spreading the disease. We also developed assays to track different variants of concern of SARS-CoV-2.

Currently, we are exploring and developing new assays to detect other viral threats, such as Dengue and Zika virus which are spread by mosquitoes, in mosquito and wastewater samples.

BOOTH 6: Microbial biofilm - A visit to the house of Bacteria

Dr Wong Lan Li
SCELSE-NTU
Research Fellow

Dr James Ho
IDMxS
Senior Research Fellow

Sudarsan Mugunthan
SCELSE
Research Associate

A microbial biofilm matrix is like a sticky, slimy layer made by microorganisms to protect themselves. Imagine a group of tiny organisms, like bacteria, creating a mixture of gooey substance including proteins, polysaccharides or nucleic acids that acts like glue to hold them together.

This sticky layer, which they make themselves, helps them stick to surfaces and shields them from being easily washed away. It's similar to how plaque forms on your teeth or how a slimy coating can appear inside a water bottle if it's not cleaned regularly.

Visit us to learn more about how we study the composition of these matrices, combining knowledge from biology, chemistry, and biophysics.

BOOTH 7: Marine biofilms & microbiomes

Dr Joao Pereyra
SCELSE-NTU
Research Fellow

Prasha Maithani
SCELSE-NTU
Research Assistant

Hannah Luk Hau Ching
SCELSE-NTU
PhD student

Microbes abound in marine settings, with marine biofilms:
- Playing pivotal roles in biogeochemical cycles,
- Developing and maintaining ecosystems, and
- Supporting marine life.

Understanding the role of marine microbiomes (including bacteria, archaea, viruses, fungi and algae) in the formation of complex ecological networks is a focal point in marine biology, environmental microbiology, and industries that operate in marine environments.

SCELSE investigates these microorganisms and interactions, such as:
- Factors affecting seagrass function & health,
- Production of coral probiotics to enhance resilience to stressors, and
- Molecule discovery in bacterial-algal interactions.

Other highlights include studies in seawall eco-engineering and microbial communities colonising plastic surfaces in the ocean.

BOOTH 8: Science-based solutions for restoring carbon-rich tropical peatlands

Sourav Mukhopadhyay
NUS PhD student

Dr Abhishek Gupta
SCELSE-NUS
Research Fellow

Dr Soheil Neshat
SCELSE-NTU
Research Fellow

Project team: Sourav Mukhopadhyay, Abhishek Gupta, Soheil Neshat, Ooi Qi En, Raktim Bhattacharya, Stefan Wuertz, Aditya Bandla, Sanjay Swarup

Unlock the power of the microbiome to combat climate change with our groundbreaking research on tropical peatlands. These carbon-rich ecosystems are vital for the planet, but land use is turning them into significant carbon emitters. Our innovative study, using a cutting-edge mesocosm setup, delves into the microbial processes that drive carbon cycling in peatlands. By understanding these mechanisms, we're developing impactful restoration strategies that enhance peatlands' ability to act as powerful carbon sinks. This research is not just about understanding; it's about taking action to restore these crucial ecosystems and mitigate climate change.

Scan for more information

BOOTH 9: Microbial synthesis for sustainable aquaculture and the circular bioeconomy


Dr Anika Cokro
SCELSE-NTU
Research Fellow


Dr Anisa Cokro
SCELSE-NTU
Research Fellow


Sara Swa Thi
SCELSE-NTU
Research Scientist


Ng Chia Chee
SCELSE-NTU
Research Assistant


Dr Woo Yissue
SCELSE-NTU
Research Fellow


Dr Soheil Neshat
SCELSE-NTU
Research Fellow

Revolutionise aquaculture with our innovative approach using microbial community-based protein to replace traditional fishmeal. Our research showcases the pivotal role of microbes in creating a sustainable, circular bioeconomy. By transforming food processing wastewater into high-quality single-cell protein (SCP), we're turning waste into valuable resources, enhancing the efficiency of food production systems, and addressing critical challenges in protein sustainability and food security.

BOOTH 10: The dynamics of airborne microbes


Dr Elena Gusareva
SCELSE-NTU
Snr Research Fellow


Dr Anton Sadovoy
SCELSE-NTU
Snr Research Fellow


Dr Sam Spence
SCELSE-NTU
Research Fellow

Scan for more on Air Microbiome


Cassie Heinle
SCELSE-NTU
Research Fellow


Vineeth Kodengil
SCELSE-NTU
Research Scientist


Santhi Puramadathil Sasi
SCELSE-NTU
Research Associate


Ngu War Aung
SCELSE-NTU
Research Associate

Airborne microbes affect our health and the environment in ways we are only beginning to understand. Traditional methods cannot capture the full picture of these invisible communities, leaving us vulnerable to unknown risks and missing potential benefits. Innovative solutions are needed.

SCELSE's air microbiome team pioneers novel air sampling and analysis strategies. Using next-generation sequencing and high-performance computing, they developed a robust workflow to process and analyse ultra-low biomass air samples.

SCELSE's advanced techniques have led to groundbreaking insights, including:

- Responding to COVID-19 by researching airborne virus behaviour to inform public health strategies
- Studying the diel cycle of tropical air (microbial changes over 24 hours)
- Analysing the vertical variation of the air microbiome
- Conducting extensive indoor and outdoor environmental surveillance

SCELSE sets new standards in understanding airborne microbial dynamics.

BOOTH 11: SCELSE's translational impact

L'Oréal-SCELSE Joint Laboratory


Sreelakshmi Cheruvalli
L'Oréal-SCELSE joint lab
Research Associate


Hashmath Fatimah
L'Oréal-SCELSE joint lab
Research Assistant

Join us to explore the exciting research at the L'Oréal-SCELSE joint lab, where we delve into the fascinating world of the skin microbiome.

We utilise:

- State-of-the-art laboratory-scale microbiome models,
- Cutting-edge microscopy, and
- Multi-omics methods.

These tools help us understand the skin microbiome's role in skin health and create innovative, microbiome-targeted solutions for treating skin conditions.

Whether you're interested in PhD or FYP opportunities, you'll be at the heart of groundbreaking research, contributing to vital advancements in skin microbiome studies.

Innovative functional fish feeds for 30-by-30 success


Li Wenrui
SCELSE-NTU
Visiting Research Fellow


Tran The Thien
SCELSE-NTU
Visiting Research Fellow

Help Singapore achieve its "30-by-30" vision with our innovative functional fish feeds! As Singapore strives to produce 30% of its food locally by 2030, our cutting-edge project supports this goal by boosting the growth and disease resistance of Asian seabass fingerlings. Using advanced encapsulation technology, we deliver probiotics and nutrients directly to where they are most effective in the fish's digestive system. Our feeds have shown impressive results, increasing fish growth by almost 25% and enhancing their resistance to pathogens. By adopting our functional feeds, local farms can significantly contribute to Singapore's food security future.

Functional foods for gut health modulation


Edric Sim
SCELSE-NTU
PhD student


Lim Ye Joon
SCELSE-NTU
PhD student

The gut microbiome is a complex microbial ecosystem containing trillions of beneficial and harmful microorganisms. Alterations in the gut microbiome have been associated with several chronic diseases such as irritable bowel syndrome (IBS).

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Functional foods, such as probiotics, offer health benefits beyond their basic nutritional value. These foods typically contain bioactive compounds that can have a positive impact on various physiological functions in the body. Our group has developed several novel functional foods, including fermented oats beverages and black soldier fly larvae hydrolysate protein, with the aid of microorganisms. These foods have been demonstrated to have the potential to modulate the gut microbiome for the improvement of gastrointestinal health and well-being.

Find out how we collaborate with Singapore National Biofilm Consortium (SNBC) and industry partners such as Protenga, Adisseo, and Haleon to develop and investigate functional foods that can modulate the microbiome for improved gut health.

SCELSE Business Development & Partnerships (BDP)


Michel Birnbaum
Director, Entrepreneurship & Research Translation


Dr Maria Yung
Assistant Director, Business Development & Partnerships

Bridging the gap between academia and industry is critical to ensure that cutting-edge biofilm and microbiome research is translated into market facing products.

BDP facilitates academic-industry connections, offering expertise through:

- Consultancies | Joint research initiatives | Collaborative agreements.

Partner with SCELSE for unparalleled access to knowledge and technical skills.

Contact:

- Michel Birnbaum, Dir, Entrepreneurship & Research Translation: michel.birnbaum@ntu.edu.sg
- Dr Maria Yung, Assistant Dir, BDP: maria.yung@ntu.edu.sg

BOOTH 12: Microbiology and public health


Dr Kay To
SCELSE-NTU
Research Fellow


Peggy Yap
SCELSE-NTU
Research Assistant


Ho Jia Yee
SCELSE-NUS
PhD student

Discover the secrets of biofilms at our booth! Biofilms are clusters of microbes that attach to surfaces and are shielded by an extracellular polymeric substance (EPS) matrix, composed of various macromolecules.

This extracellular matrix acts as a protective layer against stressors like antimicrobials and environmental hazards, posing significant public health challenges. Biofilm formation is multifaceted and makes it difficult to prevent. Explore the impact of biofilms on health and learn about technologies and innovations that will help to tackle these issues.

BOOTH 13: Information & goodie bag redemption