

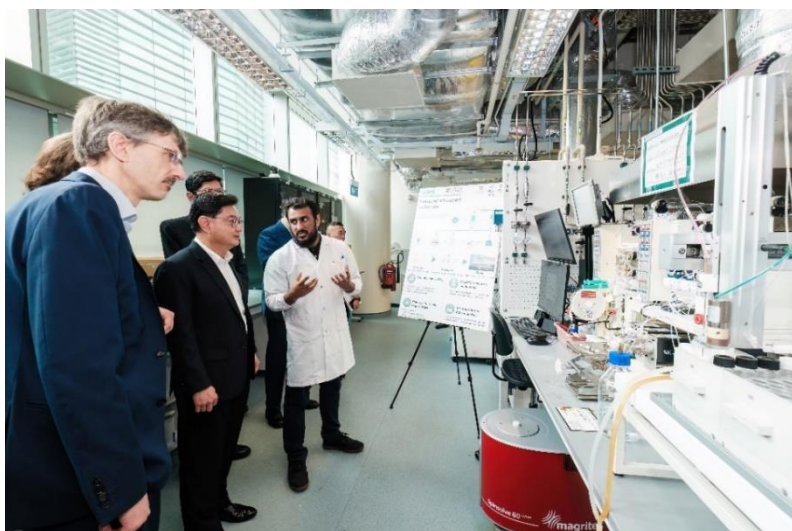
## Cambridge CARES continues decade-long collaboration with Singapore universities with two decarbonisation projects

- The University of Cambridge's first overseas research centre (CARES) hosted Mr Heng Swee Keat, Deputy Prime Minister and Chairman of the National Research Foundation (NRF) to view the centre's technical capabilities for decarbonisation research.
- Local and international partners will advance research on non-fossil fuel-based pathways for Singapore industries.

The Cambridge Centre for Advanced Research and Education in Singapore (CARES) is hosting two projects under the newly launched CREATE Thematic Programme in Decarbonisation supported by the National Research Foundation (NRF). The two projects will investigate non-fossil fuel-based pathways for Singapore's chemical manufacturing industry and energy systems. The projects will advance new technology and ideas from existing work at CARES and aid in Singapore's business transition away from petrochemicals towards a net-zero emissions target by 2050.

Deputy Prime Minister and Chairman of the NRF, Mr Heng Swee Keat toured the first of three laboratories for the programme to view the technical capabilities required for the various project teams, including CARES' projects on the Sustainable Manufacture of Molecules and Materials in Singapore (SM<sub>3</sub>), and Hydrogen and Ammonia Combustion in Singapore (HYCOMBS).

As part of the lab demonstrations on decarbonisation, CARES showcased an additional ongoing activity with City Energy investigating hydrogen-rich town gas for residential and commercial cooking stoves.



*Deputy Prime Minister and Chairman of the NRF, Mr Heng Swee Keat, viewing decarbonisation activities at Cambridge CARES. Credits: Cambridge CARES/Back Button Media*

**Prof. Alexei Lapkin (CARES), Prof. Chiba Shunsuke (NTU Singapore), Prof. Ning Yan (NUS), Assoc Prof. Ming Joo Koh (NUS), Dr. Philippe Schwaller (Swiss Federal Institute of Technology Lausanne, EPFL), and Prof. Matthew Gaunt (University of Cambridge), Principal Investigators for SM<sub>3</sub>, share a joint statement:**

SM<sub>3</sub> will provide a path to a net-zero, high-value chemical manufacturing industry in Singapore. Its core goal is to address the dependency of the producers of performance chemicals on starting materials that typically come from fossil-based carbon sources. The SM<sub>3</sub> team will develop effective synthetic methods that best convert cheap and abundant fossil-free raw materials into high-value molecules. SM<sub>3</sub> will transform the production of functional molecules, such as medicines and agrochemicals, creating a new value chain for the sustainable chemical industry.

**Prof. Epaminondas Mastorakos (CARES), Prof. Fei Duan (NTU Singapore), Prof. Kaoru Maruta (Tohoku University), Dr Nabiha Chaumeix (CNRS France), Asst Prof Zhang Huangwei (NUS), Principal Investigators for HYCOMBS, share a joint statement:**

In the near future, Singapore may adopt hydrogen or ammonia as a possible carbon-free fuel for decarbonisation; however, this requires the development of new gas turbines and internal combustion engines. In project HYCOMBS, universities from Singapore, UK, Japan, France and Norway will work together to investigate the underlying combustion process of hydrogen and ammonia to minimise pollutants and accelerate industry innovation. We are grateful for the opportunity to work on this project that can transform how these zero-carbon fuels are utilised, benefiting Singaporeans and global environmental advancement.

Since 2013, CARES has been involved in research programmes with NTU and NUS as the University of Cambridge's first overseas centre. One of its early flagship programmes, the Centre for Carbon Reduction in Chemical Technologies (C4T), has investigated areas from sustainable reaction engineering, electrochemistry, and maritime decarbonisation, to digitalisation.

By building on this foundation and leveraging the local talent pool, CARES has attracted new partners from international universities and institutes for SM<sub>3</sub> and HYCOMBS. This includes EPFL, the Swiss Federal Institute of Technology Lausanne, which will provide skills in the domain AI for chemistry. CNRS, the French National Centre for Scientific Research, from France, the Norwegian University of Science and Technology, and Tohoku University from Japan will contribute technical equipment and key talent in hydrogen and ammonia combustion. The connection with CNRS will be further strengthened through the presence in Singapore of CNRS@CREATE - its only subsidiary abroad - which is part of the same CREATE research programme that CARES participates in.

Singapore's compact, interconnected infrastructure, along with strong governmental support and initiatives such as the "Singapore Green Plan 2030" will provide an ideal base for rapid testing and knowledge transfer to industry. The international scope of SM<sub>3</sub> and HYCOMBS positions Singapore as a central hub for sustainable technology development for the global economy.

- END -

View the media release by NRF on the [launch of the SGD\\$90m Decarbonisation programme](#) for more information on the nine projects under CREATE's Decarbonisation Programme.

**Annex A: Full list of PIs and their affiliated universities and/or institutions**

## Media Contact

### Mrs Olivia Lee

Communications & External Affairs Manager

CAMBRIDGE CENTRE FOR ADVANCED RESEARCH AND EDUCATION IN SINGAPORE

Email: [olivia.lee@cares.cam.ac.uk](mailto:olivia.lee@cares.cam.ac.uk)

## About CARES

The Cambridge Centre for Advanced Research and Education (CARES) was established in 2013 as the University of Cambridge's first overseas research centre, bringing together researchers from Cambridge, Nanyang Technological University, and the National University of Singapore as part of the CREATE (Campus for Research Excellence and Technological Enterprise) programme. The flagship programme at CARES is the Centre for Carbon Reduction in Chemical Technology (C4T) programme which focused on decarbonising Singapore's chemical industry and expanded in recent years to include additional themes such as digital transformation, and sectors such as the maritime industry.

A further large programme began in October 2020 called the Centre for Lifelong Learning and Individualised Cognition (CLIC). CLIC brings together researchers from the University of Cambridge and NTU to focus on the science of learning. CARES is also a research partner in the Pharmaceutical Innovation Programme Singapore (PIPS), a public-private consortium that aims to develop full process automation in a laboratory to support R&D and manufacturing.

[www.cares.cam.ac.uk](http://www.cares.cam.ac.uk)    LinkedIn: [Cambridge CARES](#)

## About CREATE (Campus for Research Excellence and Technological Enterprise)

CREATE is an international collaboratory housing research centres set up by top universities. At CREATE, researchers from diverse disciplines and backgrounds work closely together to perform cutting-edge research in strategic areas of interest, for translation into practical applications leading to positive economic and societal outcomes for Singapore. The interdisciplinary research centres at CREATE focus on four areas of interdisciplinary thematic areas of research, namely human systems, energy systems, environmental systems and urban systems.

More information on the CREATE programme can be obtained from [www.create.edu.sg](http://www.create.edu.sg)."

## **Annex A: Full list of PIs and their affiliated universities and/or institutions**

### **Sustainable Manufacture of Molecules and Materials in Singapore (SM<sub>3</sub>)**

Prof. Alexei LAPKIN (University of Cambridge), Prof. Shunsuke CHIBA (Nanyang Technological University, Singapore), Prof. Ning YAN (National University of Singapore), and Assoc Prof. Ming Joo KOH (National University of Singapore) are the Programme Leads.

All other Principal Investigators are listed in alphabetical order with their universities and/or institutions:

- Asst Prof. Tej Salil CHOKSI (Nanyang Technological University)
- Prof. Matthew GAUNT (University of Cambridge)
- Prof. Saif KHAN (National University of Singapore)
- Prof Markus KRAFT (University of Cambridge)
- Dr. Ewa MAREK (University of Cambridge)
- Asst Prof. Philippe SCHWALLER (Swiss Federal Institute of Technology Lausanne)

Webpage: <https://www.cares.cam.ac.uk/research/sm3/>

### **Hydrogen and Ammonia Combustion in Singapore (HYCOMBS)**

Prof. Epaminondas MASTORAKOS (University of Cambridge), Assoc Prof. Fei DUAN (Nanyang Technological University, Singapore), and Prof. Kaoru MARUTA (Tohoku University) are the Programme Leads.

All other Principal Investigators are listed in alphabetical order with their universities and/or institutions:

- Prof. Siew Hwa CHAN (Nanyang Technological University)
- Dr. Nabiha CHAUMEIX (Centre Nationale de la Recherche Scientifique)
- Dr. Sebastian DUCRUIX (Centre Nationale de la Recherche Scientifique)
- Assoc Prof. Akihiro HAYAKAWA (Tohoku University)
- Prof Markus KRAFT (University of Cambridge)
- Prof. Nicholas MINESI (Centre Nationale de la Recherche Scientifique)
- Asst Prof. Youhi MORII (Tohoku University)
- Prof. Hisashi NAKAMURA (Tohoku University)
- Prof. Christine ROUSSELLE (Centre Nationale de la Recherche Scientifique)
- Prof. Nedunchezian SWAMINATHAN (University of Cambridge)
- Prof. Nicholas WORTH (Norwegian University of Science and Technology)
- Asst Prof. Huangwei ZHANG (National University of Singapore)

Webpage: <https://www.cares.cam.ac.uk/research/hycombs/>