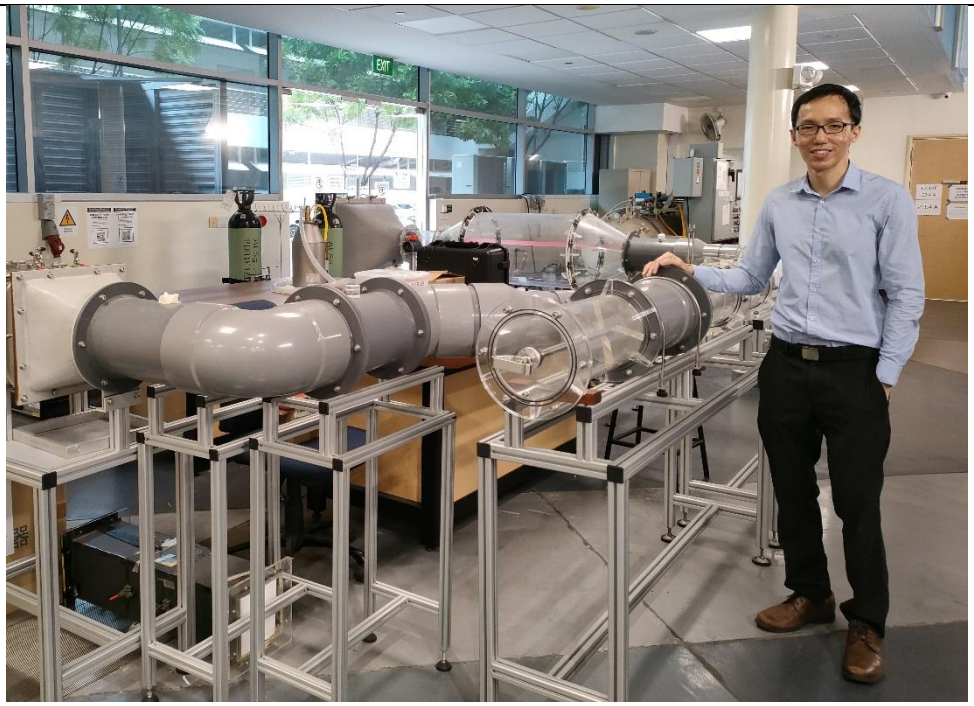
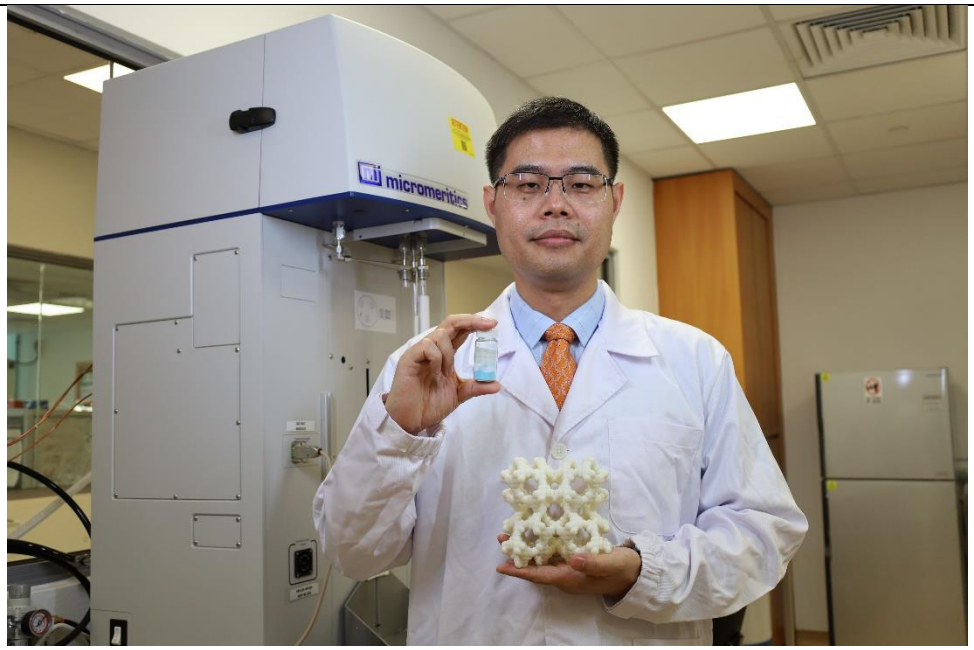
DETAILS OF AWARDED PROJECTS UNDER THE INAUGURAL SEGC (INDUSTRY AND RESEARCH COMMUNITY)

Project Title	Deriving Energy Savings from Particle Separation in Industrial Plants through Acoustics Pre-conditioning
Principal Investigator	Assistant Professor Ng Bing Feng
Co-Investigators	Associate Professor Wan Man Pun Assistant Professor Grzegorz Lisak
Host Institution	Nanyang Technological University
Industry Collaborator	JFE Engineering Corporation
Description	Removing pollutants from the waste exhaust is an essential component in most industrial operations. However, this process is challenging and energy intensive. **Project Aim:** In this project, sound waves are used to pre-condition pollutants prior to going through existing filtration systems. This will form larger agglomerates that can be removed more easily. The project will demonstrate this technology in the Waste-to-Energy Research Facility at Tuas, alongside industrial partner JFE Engineering Corporation. **Project Outcomes**: If successful, the solution will enhance particle separation and filtration capabilities in WTE plants and achieve at least 10-15% energy savings from fan power and the accompanying separation systems. Emissions of fine particles from industrial exhausts will also be reduced, lowering the environmental footprint and supporting Singapore's goals towards a more sustainable future.

Photos	 Assistant Professor Ng Bing Feng with the lab setup for acoustics agglomeration at the School of Mechanical and Aerospace Engineering, NTU Singapore. Source: NTU Singapore  The Waste-to-Energy Research Facility (WTERF) at Tuas South. Source: NTU Singapore

Project Title	Efficient Dehumidification Solution for Air-Conditioning System
Principal Investigator	Assoc Prof Zhao Dan
Co-Investigators	Associate Professor Chua Jian Jon, Ernest
Host Institution	National University of Singapore
Industry Collaborator	Mitsubishi Electric
Description	Singapore's building sector accounts for 31% of total electricity consumption, of which 60% is used on cooling. The high energy consumption is associated with high humidity as a result of the island's tropical climate. Commercial air-conditioners relying on vapour compression technology suffer from low energy efficiency under such conditions. **Project Aim:** The project will focus on a new type of sorbent, based on metal-organic frameworks (MOFs), to remove water in the air before cooling, thus reducing energy consumption. A "smart" polymer switch is embedded in the MOFs to capture or release the trapped water by changing the temperature. The switch can be operated using waste heat and thus reduce electricity consumption. **Project Outcomes**: The project team will fabricate a prototype air-conditioner based on "smart" MOFs and test its dehumidification and cooling performance. Successful prototypes are expected to show 30% or more energy savings over current "5-ticks" air-conditioners used in local households or offices.
Photos	 Associate Professor Zhao Dan holding a vial of MOF material and its 3D-printed structure model. Source: National University of Singapore