

NANYANG  
TECHNOLOGICAL  
UNIVERSITY  
SINGAPORE

School of Mechanical and  
Aerospace Engineering  
College of Engineering

MAY 2025

# THE MAE COLLECTIVE

SPECIAL ISSUE ON ROBOTICS





## The MAE Collective School of MAE Magazine May 2025

The MAE Collective is published semiannually by the School of Mechanical and Aerospace Engineering at Nanyang Technological University, Singapore.

INNOVATE AT MAE	EDITORIAL ADVISORY PANEL
<p><b>06 Assistive Robotics with A/Prof Ang Wei Tech</b> Enhancing mobility and recovery for patients using assistive robots</p> <p><b>10 Human-Robot Interaction with Prof Domenico Campolo</b> Collaborative robots enable blending of human intuition with robotic precision</p>	<p><b>CHAIR</b> Prof Yeong Wai Yee</p> <p><b>CONTRIBUTING WRITERS</b> Prof Domenico Campolo A/Prof Ang Wei Tech A/Prof Lyu Chen Asst Prof Lum Guo Zhan Asst Prof Mir Feroskhan Asst Prof Wang Yifan Dr Wong Choon Yue Ohnmar Kyaw NTU News</p> <p><b>CONTRIBUTING PHOTOS</b> Photos accredited from NTU News and provided by professors, students and alumni.</p> <p><b>EDITOR</b> Karen Chai and Regine Ng</p> <p><b>DESIGN</b> Ernest &amp; Kin Media</p>
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# CHAIR'S MESSAGE



Dear Colleagues and Partners,

Welcome to the Robotics edition of *The MAE Collective*. This year, we proudly celebrate the 30th Anniversary of the Robotics Research Centre (RRC), a testament to decades of innovation and impactful contributions to robotics. From advancing automation to enhancing human-robot collaboration, RRC has remained a cornerstone of progress.

As part of our commitment to preparing the next generation of engineers, we're thrilled to announce the launch of NTU's Bachelor of Engineering in Robotics. This forward-focused programme equips students with cutting-edge skills to address emerging challenges and redefine the future of robotics.

In this issue, you'll explore how MAE's interdisciplinary research is driving advancements in areas such as autonomous systems, soft robotics, and healthcare technologies. These stories reflect our dedication to shaping solutions that benefit industries and societies alike.

We invite our alumni, collaborators, and partners to join us in fostering innovation and expanding possibilities. Together, we can continue to drive progress, inspire ideas, and build a connected community of robotics leaders.

Warm regards,  
Prof Yeong Wai Yee  
Chair, School of Mechanical and Aerospace Engineering



4th 2025 QS World University Rankings by Subject



1st 2024 Shanghai Ranking Global Ranking by Subject



14th 2025 World University Rankings by Subject

# ROBOTICS RESEARCH CENTRE SNAPSHOT

## TEAM & EXPERTISE

**140+**  
PhD

**100+**  
Master's

**22**  
Active Faculty PIs

## INNOVATION & IMPACT

**140**  
IP

**33**  
Licensed IP

**S\$60 MIL**  
Licensed Income

# ROBOTICS RESEARCH CENTRE HIGHLIGHTS



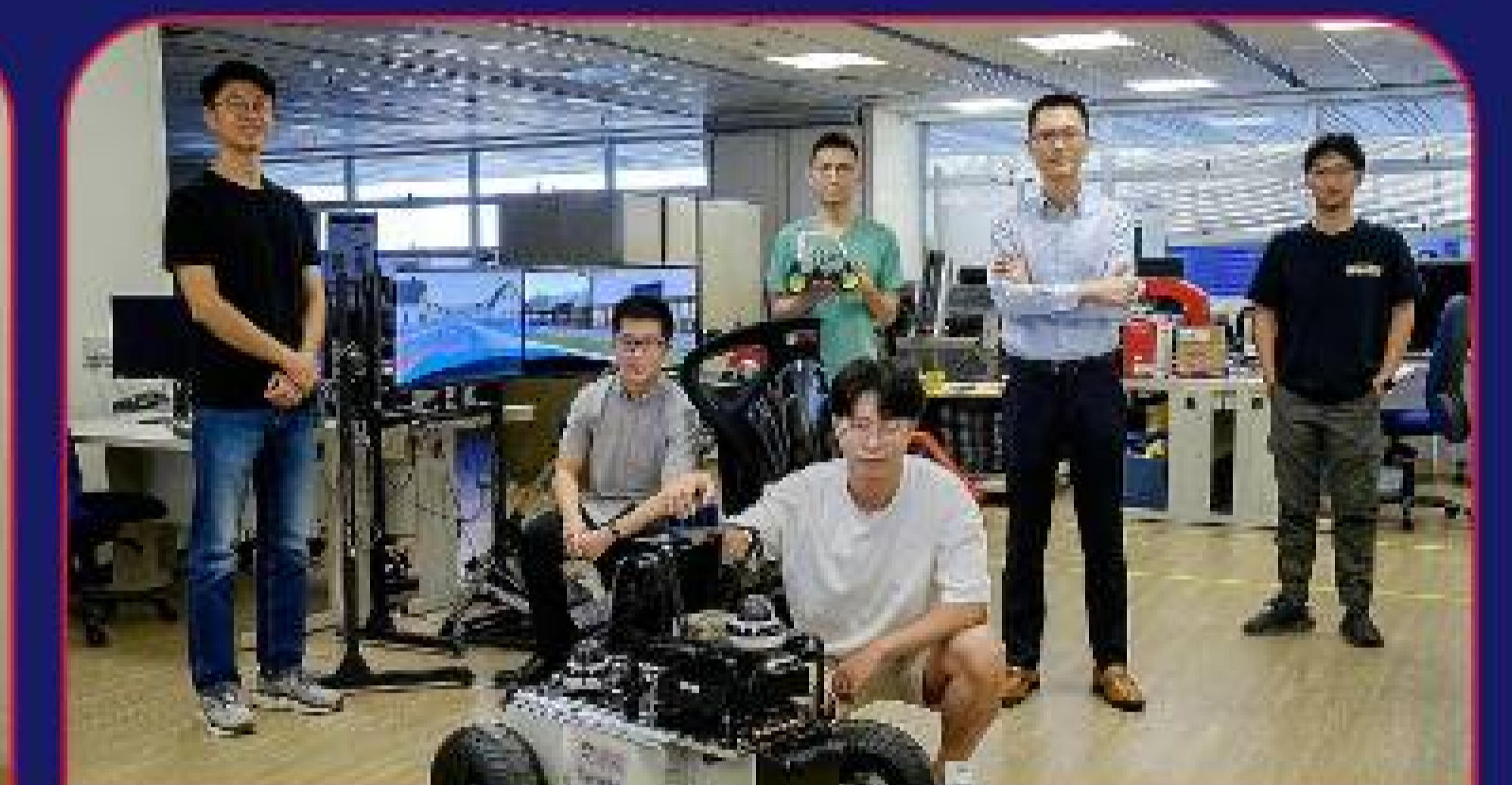
**Transforma Robotics**  
Energy Open Innovation Challenge (EOIC) and Trade and Connectivity Challenge (TCC) 2020

**Award**  
S\$25,000 in Startup SG grants



**H-Man Arm Rehabilitation Robot**  
National Healthcare Group 2021

**Award**  
Research and Innovation Award



**Team Automan**  
NEURIPS 2022

**Award**  
Most Innovative Award



**Team Automan**  
Google WAYMO CVPR 2024

**Award**  
First Place



**Asst Prof Yang Jian Fei**  
European Conference on Computer Vision 2024

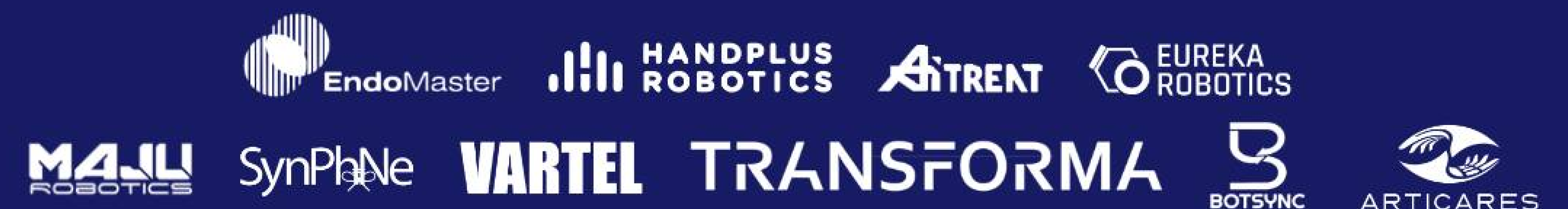
**Award**  
Best Paper Award



**Intelligent Cybernetics Group**  
Singapore Amazing Flying Machine Competition (SAFMC) 2025

**Award**  
First and second places in Autonomous Swarm category

# ROBOTICS RESEARCH CENTRE START-UPS



The figures presented are based on data from 2024.

# ROBOTICS AT NTU MAE PIONEERING INNOVATION

## ASSISTIVE ROBOTICS

Enhance human ability in balance, mobility and manipulation to improve independence and Quality of Life.  
**A/Prof Ang Wei Tech** – Bio-Mechatronics, Precision Rehabilitation and Assistive Technology.

## AUTONOMOUS ROBOTS

Independent robots performing tasks based on their environment, used in automation and rescue.  
**A/Prof Lyu Chen** – Human-AI Collaboration, Future Mobility, Intelligent Driving & EV

## AERIAL ROBOTICS

Flying robots used for surveillance, delivery, and disaster relief, navigating autonomously.  
**Asst Prof Mir Feroskhan** – UAV and Control System, Urban Air Mobility, Space Situational Awareness

## MINIATURE ROBOTS

Tiny robots enabling minimally invasive surgeries with high precision in delicate areas.  
**Asst Prof Lum Guo Zhan** – Shape-Programmable Robots, High-Flexibility Robots, Gallium Application in Robotics

## HAPTIC-ENABLED CO-BOTS

Robots that provide tactile feedback for enhanced human-robot collaboration, especially in surgery.  
**Prof Domenico Campolo** – Stroke Rehabilitation via H-Man, Biomimetic Robotics, Human-Robot Interaction

## SOFT ROBOTICS

Robots made from flexible materials, ideal for gentle interaction and tasks like rehabilitation.  
**Asst Prof Wang Yifan** – Exoskeletons and Robotic Materials, Additive Manufacturing, Smart Sensing Interfaces

## ROBOTICS AI

AI-enabled systems that empower robots to perceive, interpret, and interact with their surroundings, evolving through real-world interactions.  
**Asst Prof Yang Jianfei** – Physical AI, Multimodal Perception, AIoT Systems, and On-Device LLMs.