## Report on The Global Engagement 2024 Initiatives

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Through this initiative, we built greater connectivity between the student societies of the Lancaster (UK) and LU-Leipzig (Germany) campuses' computing and robotics student societies and enabled the following tangible indicators:

- 1. Design, development, and testing of a software-driven 3D-printed autonomous robotic arm prototype that automatically identified and collected recyclable waste products.
  - These outcomes were achieved during the first event at LU-Leipzig.
  - The software- and hardware-based outcomes were implemented using a small robotic arm prototype built by students from both campuses.



Figure 1. Completed Arm



Figure 2. Students with completed arm

- 2. Upgrade of the existing solution from a 3D prototype print to two industrial-purpose manufacturing robots. The team was able to demonstrate the same outcome of autonomous identification and collection of recyclable waste products, however, with the use of industrial robots housed in the Engineering 2 workshops at Lancaster University.
  - The students developed a technical solution that enables communication with a legacy operating system and controls the robots through an interface.
    - The proposed solution has had a positive impact in assisting UG and PGT Engineering students to use the robots for Mechatronic Engineering projects.



Figure 3. Industrial Robots



Figure 4. Students with Industrial Robots

- 3. Both societies demonstrated effective skill development as well as technical knowledge: teamwork, effective communication, collaboration, and problem-solving.
  - Members of the teams demonstrated the technical knowledge and applied it to solve problems in computer networking, machine learning, 3D design and prototype development, legacy support for industrial robots, and health safety and hazard awareness in the engineering workshop.
  - Group leaders demonstrated excellent leadership skills to organise and run both the technical and society-based social events. Other aspects that stood out were the handling of travel logistics and accommodation in both Leipzig and Lancaster.
- 4. From the outset, one of the aims was to demonstrate a commitment to the university's sustainability commitment, including travel to and from both campuses. Further, the two events aimed to meet the United Nations' sustainability goals: <u>https://sdgs.un.org/goals</u>. Specifically, the two events focused on goals 4 (quality education), 8 (decent work and economic growth), and 9 (industry, innovation, and infrastructure).
  - <u>Quality Education</u>: The two events highlighted the technical achievements possible through quality education. The products from the two events will continue to be used for students unrelated to the event to further their quality education.
  - <u>Decent work and economic growth:</u> The products of the two events are in high industrial demand in mechatronics and automation.
  - Industry, Innovation, and Infrastructure: Research will also be done by the robot owner to explore possibilities of the newly automated robots being deployed in hazardous environments, reducing risks and cutting industry costs.



Figure 5. Attaching a custom-designed and printed end effecter to the industrial robot

Figure 6. Each team member presenting their finding to ~30 academics