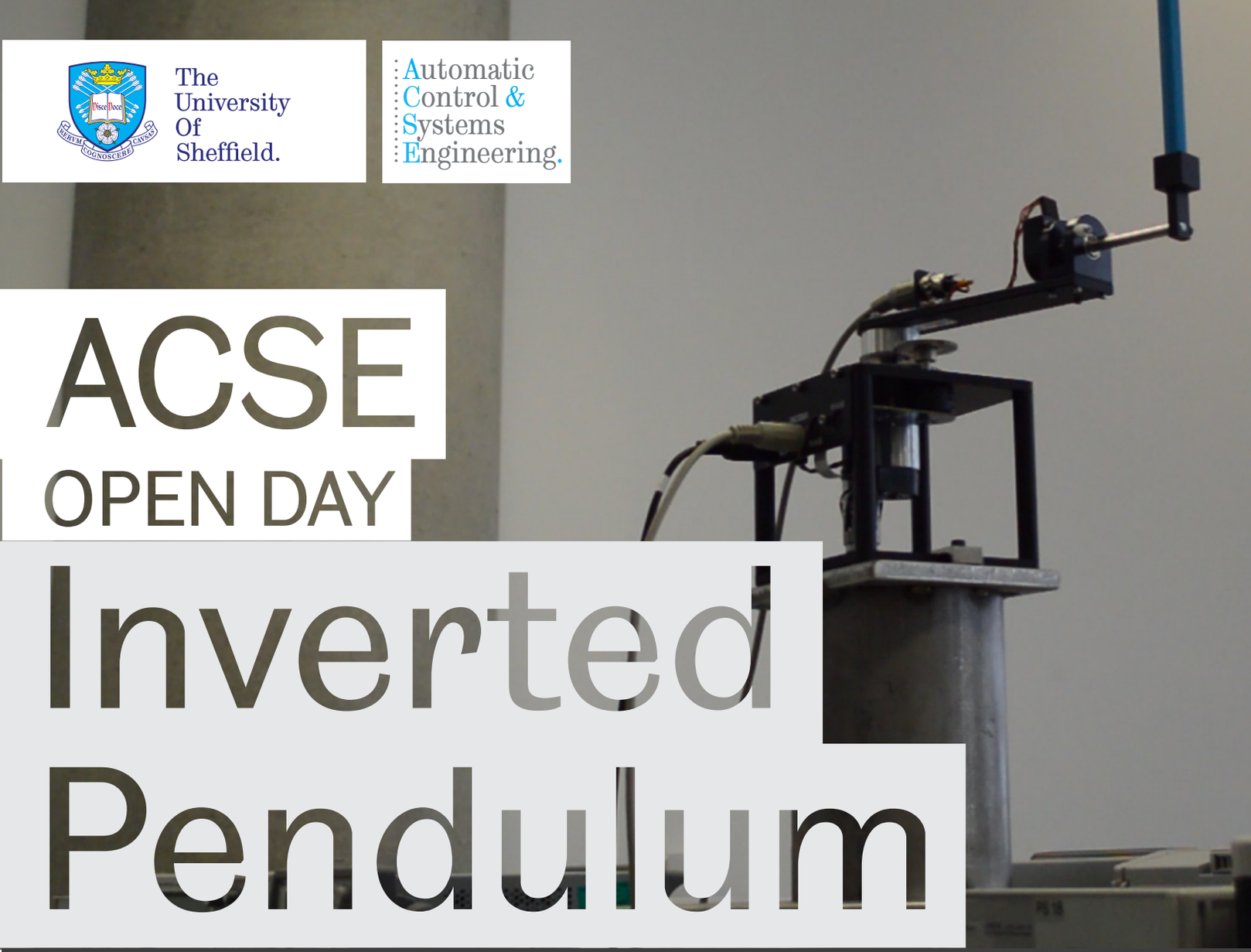
The University Of Sheffield.

Automatic Control & Systems Engineering.



ACSE OPEN DAY

Inverted Pendulum

Launching a rocket into space takes a number of systems working together. One of the lesser known, but hugely important, systems are closed loop systems that keep the rocket vertical during launch and maintain stability during flight.

The **inverted pendulum** is a prime example of this sort of unstable system. The robot uses a number of sensors and actuators to keep the pendulum vertical and continually adjusts itself to complete this task. The robot uses two Closed Loop controllers: one to maintain its balance and another which allows it to swing out. It swaps between these two controls to ensure the pendulum is consistently in the correct position. If the pendulum is knocked by another object and falls off its axis, the robot will compensate and adapt to return the pendulum to its original position.

Ben Taylor, Technician at the Diamond, said:
"The Pendulum shows students how this can work in a very basic demonstration, however, the programming is an essential part of control and systems engineering. As technology develops, there will be more need for robots to monitor their stability, especially as designers and researchers are looking to build more complex robots which will need to be mobile."