

# DEMONSTRATIONS

## KEY PROJECTS

### The Shorts Project

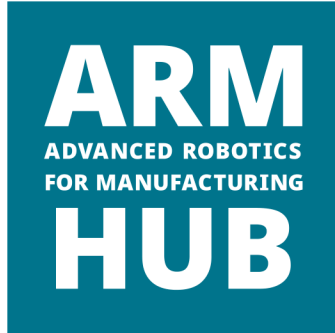
Infracuild’s production line is unique, in that they produce a wide range of steel bars with different shapes and sizes. While this makes them unique capability-wise globally, current off-the-shelf solutions for automating this detection and removal process cannot deal with the variety of bars. Hence, our researchers and engineers are aiming to develop a flexible system using a Cobot with inbuilt and external sensors that shifts away from traditional automation approaches and can adapt to the different steel bars that they manufacture – even new ones in the future – while working safely around workers.

The project team created a replica of the manufacturing environment at ARM Hub to test the solution. The next stage will be the use of a cobot to complete the task before full implementation of the solution at InfraBuild.



#### Presenters

- Fred Sukkar, Postdoctoral Research Fellow
- Dasun Gunasinghe, Lead Engineer
- Mark Christensen, Operations Leader, Infracuild



### Cobotic Welding

Robotic welding has offered all kinds of companies ranging from small fabricators to huge automobile manufacturers the ability to execute manually repetitive welding tasks with ease.

Dull and repetitive welding and additive manufacturing jobs can be replaced by robots in turn upskilling currently employed and addressing the skilled labour shortages in welding industries.

Through this project, Universal Robot’s (UR10), a 6DOF- robotic arm has been used to perform various welding tasks by providing the robot with little to no inputs. The robot has been combined with other systems such as a gaming controller to remotely manoeuvre the robotic arm as well as a Soldamatic system which is responsible for checking the quality of weld produced.



#### Presenters

- Michelle Dunn, Program co-Lead
- Will Browne, Chief Investigator
- Cornelis van Niekerk, Weld Australia



### Cobotic task sharing

This demonstration displays how a cobot and a human co-exist in an environment to carry out a shared task. The task is a classic wire loop game that requires a loop to be travelled from a starting point to a final point without touching the conductive material that the loop surrounds. It is possible for the cobot to accomplish this task on its own with the help of some sensors such as depth cameras, however, programming the cobot using such a sensor is time-consuming and non-trivial. If a human collaborator shares the task with the cobot, the cobot can learn how to complete the task, without any explicit programming in a short amount of time.

The Australian Cobotics Centre and Cook Medical aim to integrate cobots into Cook Medical’s manufacturing processes using similar concepts shown in this demonstration. Understanding the highly skilled work of Cook Medical personnel can allow us to design robotic support for the work, decreasing the repetitive workload on humans while increasing the capabilities of Cook Medical.

#### Presenters

- Stine Johansen, Postdoctoral Research Fellow
- Baris Balci, PhD Researcher
- Gareth Keen, Manufacturing Engineering Manager, Cook Medical



### Gasket Room Visualisation

The Centre’s Designing Socio-Technical Robotics Systems research program in partnership with B&R Enclosures have developed a research translation project presented using virtual reality (VR). The project highlights an experimental workflow to quickly capture workspaces for digital twin creation and human-centred research to identify opportunities and limitations for experimental cobot system design.

Immersive digital twins could be the next step in creating 3D and highly accurate representations of products and solutions that would otherwise be extremely expensive and risky to develop and test. These technologies present an exciting possibility of creating prototypes or mock-ups of technology and other systems, such as collaborative robots.

In the future, all our innovation could start with a digital twin, AI, and the extended reality landscape.

#### Presenters

- Alan Burden, Postdoctoral Research Fellow
- Eric Stocker, Manufacturing Systems Engineer, B & R Enclosures



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