

Industry – Academic Collaborations

Why they are important and what makes them successful

Helen Francis – Research Strategy Manager
Department of Computer Science and Technology
University of Cambridge



Benefits for the Research Project

- Real world problems
 - Answers the “so what?” question
 - Gives a direct “route to impact” for the research
- Student benefits
 - See how industry works
 - Gain valuable experience of working with a company

Example – Undergraduate Project in Institute for Manufacturing, by Rob Glew and Dr Mukesh Kumar (Industrial Resilience Group) looking at the benefits of **AM Fresh’s** data driven traceability and transparency systems

<https://www.ifm.eng.cam.ac.uk/insights/global-supply-chains/do-you-really-know-what-you-are-eating/>

Benefits for Industry

- Explore problems that would be difficult to do in house
- Gain a different perspective on a problem
- Raise profile of general industry challenges
- Work with organisations outside the norm

Example – Optimising yield and reducing energy consumption in an urban farm through real-time smart monitoring – Centre for Smart Infrastructure and Construction.

“Ruchi and her team have really helped us monitor and develop the space which will enable us to eventually get the optimum growing environment.”

Richard Ballard Co-Founder of **Growing Underground**

<http://www.eng.cam.ac.uk/news/growing-underground-how-smart-monitoring-helping-urban-farm-flourish>



Collaboration



- Build a relationship with a student
 - Possible recruitment?
- Build a relationship with an academic
 - Stay in touch with cutting edge research
- Build a relationship with the Universities
 - Develop a portfolio of research programmes

Example – Longstanding collaboration with **ARM** and Computer Science has recently resulted in £190M programme to update the foundation of today's insecure digital computing infrastructure, based on the **CHERI** platform

Case Study 1: Rolls Royce

- The Whittle Laboratory has been working with RR on engine efficiency for 40 years
- The Laboratory is one of two RR University Technology Centres in Cambridge.
- RR are also a key partner in the EPSRC Centre for Doctoral Training in Future Propulsion and Power

“When you are worrying about the problems you are facing day to day as a business, researching the next generation of technology is not always a priority. Working with Cambridge helps us to think about how we can do things differently in the future. It works brilliantly.”

Malcolm Hillel, Chief Technologist in Rolls-Royce’s Central Technologies Group



Case Study 1: Rolls Royce - Significant Impacts

Changing from 2D to 3D
compressor blades

- Now industry standard, reduces fuel consumption by 1%
- Annually per aircraft this equates to:
 - reduction in CO_2 emissions of up to 765 tonnes
 - saving of up to \$240,000 a year in fuel costs

Rapid compressor test
rig and expert
knowledge to create
new machine learning
model

- Allows engineers to predict effect of blade damage on engine performance caused by bird damage without removing blade.
- Can predict how damage will affect the operation of a compressor to an accuracy of 98%.



Case Study 2: G's Growers

- Relationship with the University for many years
- Started in IfM but also worked with Plant Sciences
- Most recent collaborations have been in robotics
 - Summer projects
 - Involvement in 2 PhD studentships
 - Partner on CDT
- Working with Bio-Inspired Robotics Group on automated lettuce harvesting & peeling using computer vision and soft robotics



Conclusions

- Collaborations can start in a small way
 - MRes Projects
 - Hosting Students...but grow to bigger collaborations
- Benefits for both parties are significant
 - Allows companies to explore new areas
 - Provides experience for students and “real world problems”

