Cranfield University

Manufacturing and materials week

The green recovery

30 November-3 December 2020

Report

Careers in manufacturing and materials

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Foreword

Professor Mark Jolly
Director of Manufacturing,
Cranfield University

Manufacturing and materials week included a mix of live debates, lectures, workshops and pre-recorded videos, looking at the challenges the industry faces right now, as well as how we must adapt and innovate to support future global challenges such as achieve a Net Zero manufacturing sector by 2050.

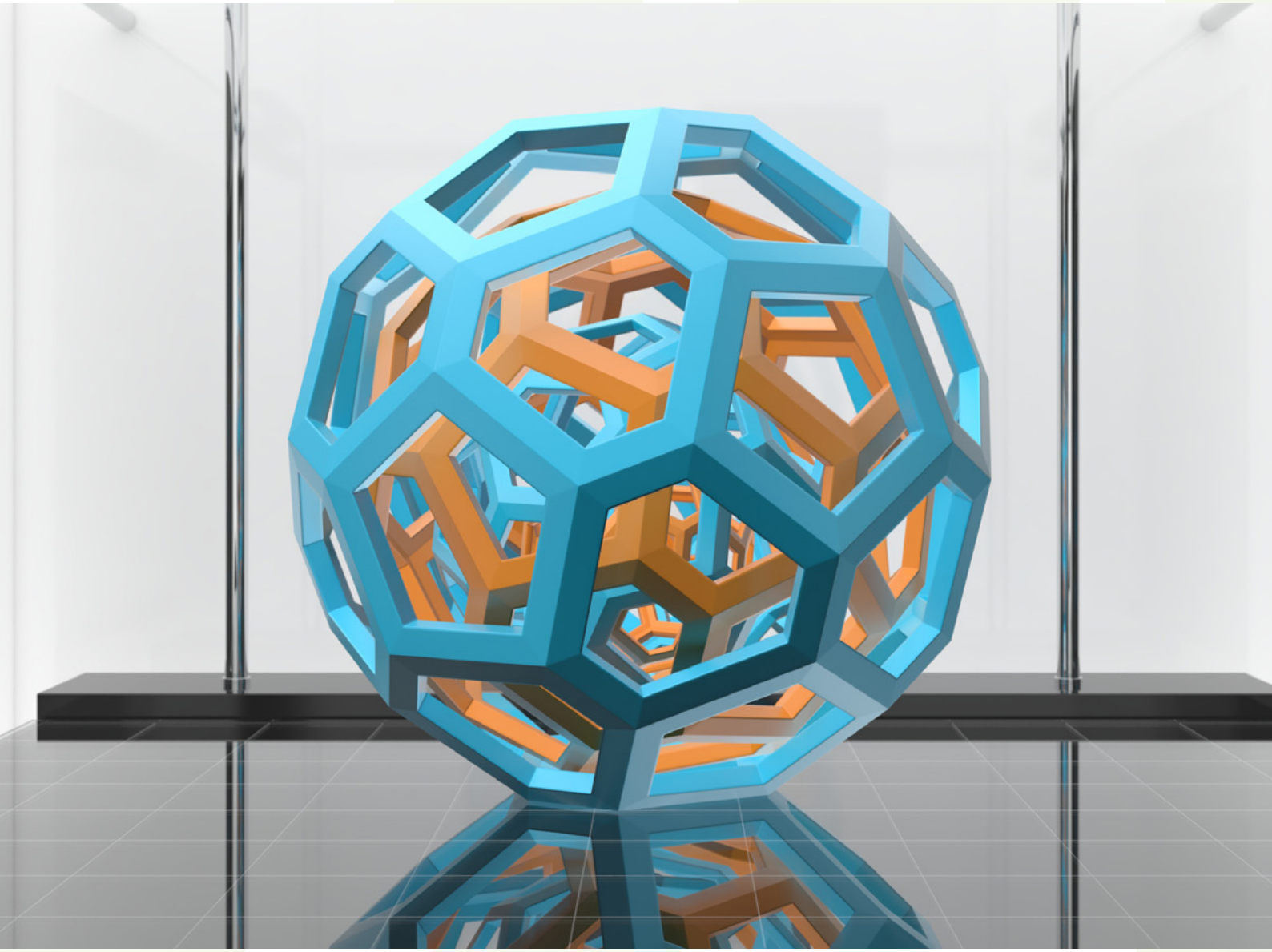
The inaugural week-long event that built upon long standing events such as the Manufacturing alumni awards, the National Manufacturing Debate and Manufacturing 2075 gave the opportunity explore the pivotal role of manufacturing in everyday life. Taking these events to the next level, the week showcased that society needs to accept manufacturing as part of our lives and how it can support our future. Our digital devices, tables and chairs, right down to our pots and pans – all part of manufacturing! But they use resources, materials and energy, and so as a population, we must be responsible custodians of our planet for the sake of future generations.

Through research and teaching, Cranfield University, alongside industry is working to solve problems of the future. Post Covid-19, manufacturing has the potential to address important psychological and social challenges.

Careers in manufacturing and materials

Careers in manufacturing

Career Development Manager Katrina Armstrong met with and spoke to industry professionals from Airbus, Avieco and WAAM3D. She was also joined by Professor Helen Atkinson CBE FREng Pro-Vice Chancellor of Aerospace, Transport Systems and Manufacturing.



During these sessions, the interviewees discussed their different manufacturing job roles, career paths, development opportunities, and their experience in the industry. To find out more about what support our careers team can provide please contact: cranfieldcareers@cranfield.ac.uk

Katrina Armstrong
Career Development Manager,
Cranfield University

Professor Helen Atkinson CBE, FREng
Pro-Vice-Chancellor - School of Aerospace, Transport and Manufacturing, Cranfield University

Manufacturing and materials week is a great opportunity for students to get a broader perspective of what is going on in the industry, to hear the views of industrialists and to look at the way manufacturing is developing and the future.

This is a really interesting time to be in manufacturing. The Covid pandemic has led everyone to review how they do things, what can be done better and more productively. It really focuses us on a green recovery and truly making things better.

Cranfield is heavily involved in a wide variety of fascinating work; everything from productivity-enhancing digital engineering and manufacturing, through to producing 3D printed surgical gloves in the Enhanced Composite Centre. Manufacturing can make a real difference and these are crucial areas where Cranfield can propagate outwards into industry.

Secret of her success

Helen has always said yes to opportunities. At university she discovered metallurgy and material sciences. Looking down a microscope and see the stunning structures inside the material fostered her love of metallurgy. On graduation, Helen went into a material engineering role, and then continued to complete a PhD - one that stretched her far beyond her comfort zone. Helen explains:

"Go for the things that you aren't absolutely sure you can do, and as you do them, constantly look at how to do it better."

A real turning point in her career, Helen chaired the rebuilding of the student union at her university. Not the usual role for a metallurgist, but Helen led this complex construction project, and it helped her to understand how a university operates, setting her on the course that would bring her to Cranfield.

While Helen manages the School of Aerospace, Transport and Manufacturing, she still sees metallurgy as her discipline. One of the things she has always felt about the materials side of manufacturing is what a huge impact it has on our lives; if things break unexpectedly it can have a disastrous effect on people's lives and the economic health of society.

On the question of her inspiration, Helen has always looked to learn from those who have been ahead of and around her. She is always open to insight into how to do things best. One example she cites is an overseas student Helen was tutoring at a previous university. His fees were being paid by his family back in Sri Lanka. Their family business was destroyed by the Boxing Day tsunami of 2004 and against this devastation, the student had to find a way of continuing his course. Helen was concerned about the amount of part-time work he was doing as well as his studies; his response: "I am training my body for hard work." Helen found his determination incredibly moving. He came out with a first class degree and ever since then things get tough, Helen remembers this young man. His absolute determination; and inspiration. He went on to become a teacher, taking his engineering learning into a secondary school, to help inspire the next generation.

Helen reflected on her initial interview when she joined Cranfield three years ago and offered advice on the recruitment process. Be yourself, but think hard about how you answer the questions. Preparation, practice and research are the key. On what to consider when seeking a career in the materials and manufacturing sector, it is important to not just look at what that company needs, but also to be aware that part of the reason they are recruiting is to obtain the new insights that you can bring. Project your knowledge and capacity to bring new thinking to the organisation, while also listening to their needs.

It will undoubtedly be a challenging recruitment market next year, yet Cranfield students should draw confidence from the insight they get into how industry works. We are very close to industry and there are real opportunities to draw on that can be taken to the job market.

When Helen graduated in 1981 in the midst of a massive recession, she went for a job where there were 700 other applicants - Helen got that job. If you prepare, research the role and the company you are interviewing with, believe in yourself and what you have to offer, you will be well equipped to do it

Take the opportunities you are offered. Use the industrialists we work with. Make the most of your time at Cranfield to grow, to step up to that next stage in your career.

Cynthia Adu
Sustainability Consultant, Avieco

Cynthia is a Sustainability Consultant, helping different companies, from finance to beverage manufacturers, to improve their environmental sustainability. They all face different challenges, in terms of climate change, and resource scarcity. At Avieco she helps them to reduce their impact on the environment and set targets to meet future carbon reduction goals.

Starting out as a mechanical engineer, Cynthia completed a course on Sustainable Manufacturing in the last year of her graduate degree, which was a defining moment for her career. This led her to apply to Cranfield to do an Engineering and Management of Manufacturing Systems MSc. Cynthia wanted to understand more about manufacturing, not just about making products and engines, but also seeing the full supply chain from a business perspective. Her group project focused on sustainability and improving recycling, as well as a project with Coca Cola to help set goals to reduce their environmental impact.

Cynthia went on to complete a four-year doctorate in Sustainable Materials and Manufacturing. This offered hands-on experience and the ability to implement research in a business context. Her doctorate was focused on helping companies reduce waste, as well as creating value out of waste - known as the circular economy. She applied different models and design thinking to create new materials from waste products.

Having been at Avieco for a year, Cynthia explains that learning how to be a consultant is very different to being a researcher at Cranfield. The business skills she has gained complements the research and scientific thinking that Cranfield nurtured.

Sustainability consultants come from a range of backgrounds, from physics, chemistry, manufacturing, business, and architects. The key is to be quick thinking and to have great interpersonal skills. Businesses come to consultants to get something bespoke for their own needs, to help solve specific challenges and, as consultants, they need to embed themselves in those challenges, making them their own.

From uranium manufacturers to a global tech company, the clients Cynthia works with are broad and diverse. They have huge targets in terms of reducing their environmental impact - the challenge is to blend the appetite for innovation at the same time as reducing their environmental impact, to help them to understand where they are currently, and identify ways to accelerate and progress innovation in a less harmful way.

Erika Ramos Da Silva Teixeira
Research and Development Engineer, Airbus

Erika is an R&D engineer at Airbus, working in the Manufacturing Engineering team. She works at Airbus Broughton, which is the site responsible for manufacture of wings for single aisle and long range planes (A320, A330, A350). Erika is responsible for looking for technologies that can be implemented on the shop floor to improve processes and efficiency. She works closely with the Research and Technology, and Innovation departments as well as with other Airbus sites in Spain and in France. She also looks at what can be learnt from other businesses, car assembly for example, to see how their innovations can be applied to wing manufacturing.

The role combines technical expertise with an ability to communicate across multiple teams. Erika joined Airbus in February 2020, and while she is still learning, she is keen to take a leadership position in the future. Airbus is very proactive in enabling their employees to take their career wherever they want in terms of location and also sector - from satellites and space, to aviation and defence.

Airbus has a whole programme, Wings of Tomorrow, dedicated to improving wing design and materials. As well as investing in electric-powered aircraft, they have recently launched a programme using hydrogen propulsion, seeking to launch the first zero emission commercial aircraft, Zero E.

On advice for people starting out in their career, Erika advises patience and not to give up, especially in the current climate. Cranfield has a lifelong career service for their alumni and for Erika this was crucial.

During her Aerospace Materials MSc, 40% of Erika's time was dedicated to projects with Rolls-Royce and Airbus. This presented a huge opportunity to show these industrial partners what she could do. Networking is crucial - some vacancies are created for the person because the company sees your potential. When Erika arrived at Cranfield, she was very shy, however with the support of Cranfield Careers Service, visits to various career fairs and making the most of the opportunities presented to her, Erika has built up her confidence to share her passion and to get her to the role she is in today.

Dr Filomeno Martina,
CEO and Co-Founder, WAAM3D

WAAM3D is a spinout company from Cranfield University that is commercialising the Wire + Arc Additive Manufacturing process. At the moment Filo is building the entire backend infrastructure (HR, operations, finance and accounting) to ensure they are ready to commercialise the product over the next few months.

A former senior lecturer at Cranfield, Filo was exposed to managerial responsibilities, however in moving to industry and building a company from the ground up, particularly in the midst of a pandemic, it has been interesting to say the least!

Filo's current focus is to create the best and most dedicated team, in order to get the WAAM technology out in the market. They want to change the face of manufacturing, and he recognises that this will take time and focus.

When Filo started developing the WAAM process, large scale metal additive manufacturing and 3D printing in general, he saw it as a substitute technology to established processes such as forging and casting. Some of these processes are costly, with long lead times, generating a lot of waste, contributing to CO_2 emissions in general. From the outset WAAM has focused on demonstrating benefits across the lifecycle. The use of WAAM has already shown that we can reduce waste and energy consumption, and therefore reduce CO_2 emissions, not only making the manufacturing more efficient, but also having a positive impact on the environment.

Filo's career in additive manufacturing was actually a bit of a coincidence. Fascinated by new technology, he came across the WAAM concept during his MSc at Cranfield. At that point he had the choice of continuing to do a PhD or applying for jobs. He chose to stay at Cranfield, to forge a career in additive manufacturing.

Cranfield enjoys a close relationship with a lot of well-established manufacturing powerhouses. That's something that not many universities are able to claim and it brings incredible benefits to students in terms of exposure to live industrial challenges. Spinout companies such as WAAM really benefit from having these relationships already in place, taking ideas out of the lab and turning them into a commercial success. Filo is grateful to Cranfield for developing his career at such a pace, enabling them to take some of that excellence and translate it into WAAM. It is hopefully another great showcase for the providence of Cranfield in the academic world.

In considering advice that Filo would give future Cranfield students, the most important thing is to find something you really love, that you want to make into your career. Develop and focus on your long-term goals - think of yourself as your own company, define your own strategy and consider where you want to be in 10 to 15 years. As an academic he advises to never stop learning from the people around you. It is important for even the most technically-focused engineers to develop soft skills in terms of people, communication and emotional intelligence. Finally, a good work/life balance is crucial - ambition and determination can see work expanding to take over our whole lives but it's important to have downtime in order to deliver in the workplace.

For more information on WAAM3D please visit their website: waam3d.com

Manufacturing and Materials Week closing remarks

Professor Mark Jolly
Director of Manufacturing,
Cranfield University

No one could have envisaged that in postponing our National Manufacturing Debate we would still be in lockdown in December 2020. A concept that grew out of a forced hand has opened up tremendous possibilities and led to a week of events with international speakers and audience that has benefited from the online format.

Twice this event, we heard reference to Industry 5, first by Dr Ayotunde Coker, winner of our Distinguished Manufacturing Alumni 2020, and during Manufacturing 2075 by Dr Abigail Hird of KTN. The reality is that 2075 will come around very quickly - some of you in this week's audience will be around to see and be part of it we hope! It really is up to you!

Save the dates

Manufacturing and materials week 2021
29 November–2 December 2021

National Manufacturing Debate
1 December 2021

Manufacturing 2075
2 December 2021

www.cranfield.ac.uk/manufacturingweek

Graphene commercialisation conference
15 March 2022

www.cranfield.ac.uk/grapheneconference

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