

I-Form, the SFI Research Centre for Advanced Manufacturing

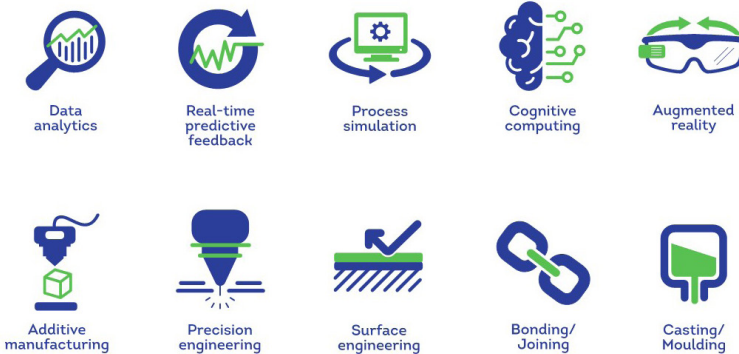
A World Leading SFI Research Centre



I-Form, the SFI Research Centre for Advanced Manufacturing, is delivering the next level of understanding and control for complex manufacturing processes. Our mission is to shape the future of manufacturing through high-impact research into the application of digital technologies to materials processing. I-Form brings together a nationwide pool of expertise in materials science, engineering, data analytics and cognitive computing. I-Form is applying exciting developments in digital technologies to materials processing, to improve understanding, modelling and control, thus increasing the competitiveness of Irish manufacturing on the world stage.

I-Form

Advanced Manufacturing Research Centre



Funded by Science Foundation Ireland, I-Form works with industry to advance the low-cost, low-risk design of new products and the manufacture of high-value components exhibiting enhanced material performance, while reducing processing times and achieving improved process reliability. I-Form is actively engaged across a range of different materials processing technologies, with a particular focus on Additive Manufacturing (3D printing).

Research Areas

- Process digitalisation, for optimisation and control
- Process simulation, for shorter development times
- Data analytics, enabling real-time process feedback
- Augmented reality, for enhanced operator decision-making
- Cognitive computing/artificial intelligence/machine learning
- Additive manufacturing (3D printing)
- Surface engineering
- Precision engineering
- Cyber physical systems
- Bonding/Joining
- Casting/Moulding

Industry Partnerships

I-Form has strong collaborative industry engagement in sectors including medical devices, aerospace, automobile and microelectronic components.

Examples of projects I-Form is working on:

- Combining large volumes of existing process data with the examination of new materials and process conditions, in order to create a predictive model for manufacturing a new component. This is aimed at reducing the development time and trial-and-error cycles by more than 50 percent.
- Adding new types of sensors to processes to collect data – this is used to generate new process control algorithms that can adjust the process in real-time to ensure quality. This will significantly reduce the volume and regularity of quality inspection on the finished part.
- Enhancing or replacing an existing manufacturing process with a digitally based equivalent to increase flexibility, reduce cost and maintain competitiveness.

Through collaborative research projects, we can:

- Develop process simulation tools to significantly reduce product development time
- Apply novel data analytics algorithms to your manufacturing process datasets to improve real-time process control
- Develop new process monitoring tools to improve process understanding
- Apply cognitive computing and augmented reality techniques to improve process decision making and control
- Increase understanding and modelling capabilities for product failure modes and mechanisms and develop product improvements
- Explore the application of Additive Manufacturing to an existing or new product for performance, cost, flexibility or individualization purposes

HOST INSTITUTION



PARTNER INSTITUTIONS



Education and Public Engagement:

As a publicly funded research centre, I-Form recognises the importance of engaging with the public about our research and the motivations behind it. Public engagement also offers an opportunity for researchers to improve their communication skills and to ensure there's an ongoing connection to the bigger societal picture. From a theoretical perspective, the ethos of public engagement for I-Form is underpinned by a move towards more participatory models, with the ultimate aim of progressing towards engaged research.

I-Form has developed three long-term goals for its public engagement activities; these tie in with the centre's vision and mission, and all our education and public engagement activities aim to align with one or more of these goals:

- Help address the skills shortage in advanced manufacturing
- Increase the diversity of the advanced manufacturing community
- Grow awareness of the revolution in manufacturing (including the decline of low-skilled jobs; increase in high-skills demand)

I-Form's education and public engagement remit is delivered through two main 'pillars':

- "Advanced manufacturing in education"
- "Diversity & community"

Our programmes include second-level teacher training in 3D printing, Transition Year student innovation challenges, primary school workshops, women in 3D printing meetups, youth group activities, and activities at festivals and other events.

I-Form will develop a range of different academic courses targeted at both undergraduate and graduate students. Online training programmes will target those currently working in manufacturing. These courses will address materials processing, Additive Manufacturing and data-driven digital manufacturing, with shared modules enabling multi-site education.



Key Contacts

Prof Denis Dowling

Director

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Prof. Denis Dowling obtained his degree and PhD through DIT and UCD respectively. He worked for over 20 years in Enterprise Ireland in technologically-important materials research. There he played a key role in the development of research activities within Irish companies. Denis took up an academic position in UCD Engineering in 2008. He has had an outstanding record of scholarship including over 165 peer reviewed journal papers and 13 book chapters. He has a demonstrated record in translating research from academia to industry. For example, he has been very active with the SME sector, as evidenced by his 8 patent awards and 6 technology licences. Denis was the recipient of UCD's prestigious Innovation Award (2012) and the Institute of Materials Finishing Gold Medal Award (2013). In the case of the latter he was only the 15th recipient of this, the Institute's highest award, in its 88-year history.

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