Science Foundation Ireland For what's next

I-Form: Centre for Advanced Manufacturing

I-Form Advanced Manufacturing Research Centre

The I-Form Advanced Manufacturing Research Centre addresses materials processing research within a manufacturing environment. A particular focus of the Centre is on Additive Manufacturing (AM), allowing the production of highly customised 3-D printed components with superior quality and performance. This is achieved by applying a range of advanced digital technologies, with the most fundamental scientific/technological aspects of AM. In addition to advanced process diagnostics, a further objective is the development of advanced process simulation, control and feedback systems.

Conceived to deliver a step change in Irish manufacturing competitiveness and to be a world-leading centre of expertise in advanced manufacturing

I-Form's aim is to facilitate the manufacture of high-value added components along with higher process reliability, while reducing processing times and manufacturing waste. Industry partners within the I-Form Centre are involved in a range of industry sectors, including the manufacture of medical devices, aerospace, automobile, microelectronic components, as well as materials manufacturers and suppliers. In addition to companies applying and developing advanced digital and process feedback technologies for use in manufacturing. The Centre brings together a multi-disciplinary team of over 80 PhD and Post-Doc researchers supported by over 25 leading academics in manufacturing engineering, materials and data science.

Research Areas

- Materials Processing
- Additive Manufacturing
- Process-Structure-Property Modelling
- In-process Monitoring and Data Analytics
- Predictive Process Feedback
- Cognitive Computing
- Augmented & Virtual Reality
- Operator-Machine Interactions

Research programmes

- Platform 1: Digitisation of Additive Manufacturing
- Platform 2: Additive Manufacturing Process-Structure-Property Modelling and Simulation
- Platform 3: Advanced Analytics and Engineer Feedback

Associated with the Platform activities are Spoke projects which are dedicated to both individual companies and company groups.

Facilities

- Additive Manufacturing equipment (large range of metal and polymer systems)
- Advance machining capabilities including a sensorised 5 Axis machining centre
- An extensive range of materials characterisation equipment
- Digital Technology capability, including manufacturing demonstrators incorporating data analytics, cognitive computing, augmented and virtual reality.

Industry and commercialisation

The I-Form team has well established collaborations with industry, which will be further strengthened through active collaborations on industrial projects in one of the I-Form demonstrators based in Irish Manufacturing Research Technology Centre in Mullingar. Furthermore, 40% of I-Form researchers will be based at industry partners facilities.

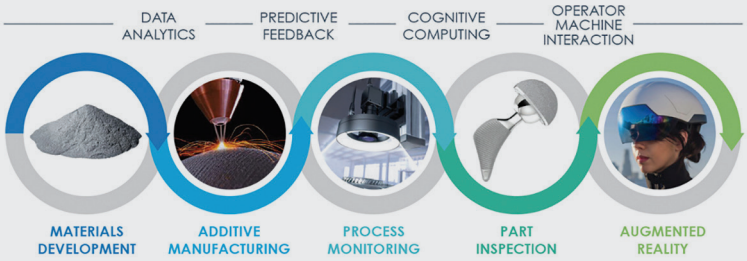
I-Form is dedicated to creating new knowledge, technology and intellectual property, and to transferring these to industry via demonstrators, practical courses, workshops, staff exchanges, licences and spin-outs.

Education and Public Engagement:

I-Form will engage with primary, secondary and third level students through initiatives, such as those supported under the SFI Discoverer programme in Science, Technology, Engineering and Maths (STEM). The centre plans to actively support SFI's Science Week, BT Young Scientist Award, Regional Science Festival and Manufacturing Open Days hosted by industrial partners. I-Form is currently preparing a manufacturing-dedicated booklet for inclusion in the Science Apprentice series. This is aimed at children and adults of all ages, and is designed at encouraging them to explore the science, technology, engineering and mathematics of the world around them.

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, AM and data-driven digital manufacturing, with shared modules enabling multi-site education.

A Unique Integration of Physical and Cyber System Technologies



Key Contacts

Prof Denis Dowling
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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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