

Case Study: DeMANS

Design and manufacture of sustainable materials for additive manufacturing technologies

Prof. Larisa Florea

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DeMANS Coordination

➤ *Develop materials and methods for AM in order to fabricate advanced components from sustainable polymers.*



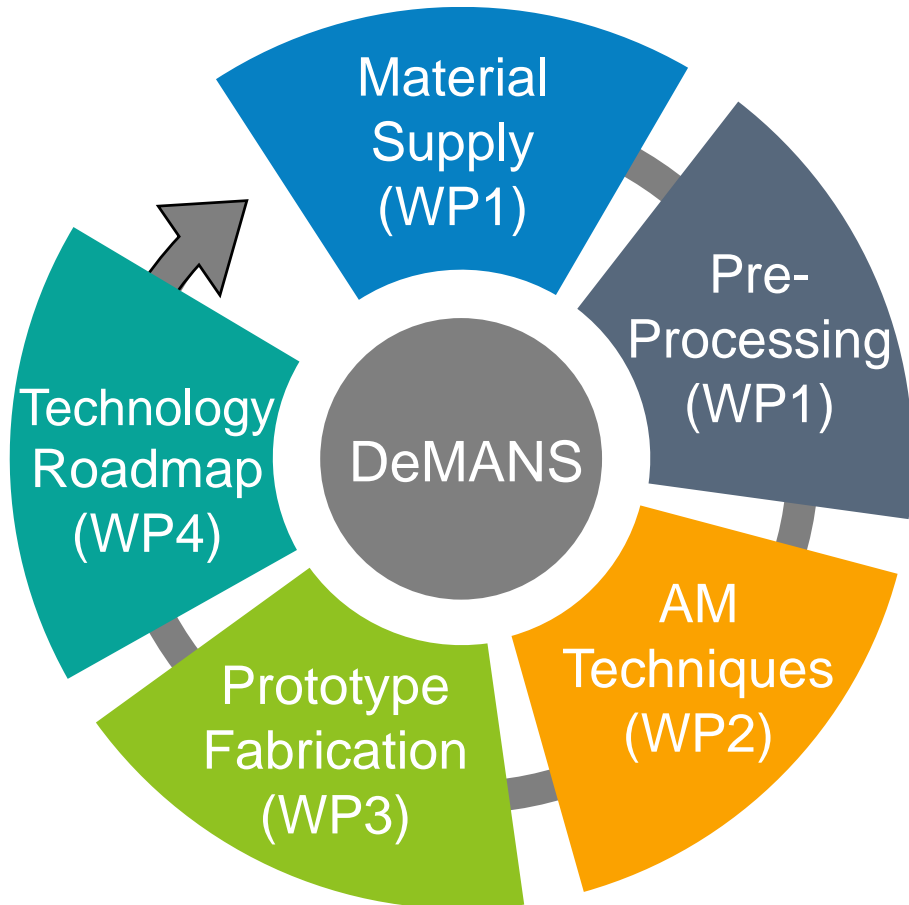
Prof. Michael Morris
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Prof. Larisa Florea
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DeMANS Network: 7 partners, 5 countries, 2 continents

DeMANS Goal: To develop an ecosystem that facilitates the materials and methods to enable AM of customer specific components from sustainable biopolymers.



Bio-economy and sustainability research centre focusing on development of (bio-)products



Crown Research Centre focusing on circular bio-economy activities and bio-derived materials



Research hospital with focus on AM of biocompatible polymers and 3D printing technique development



Research intensive university with expertise in advance materials and bioengineering



Research intensive university with long-standing experience in developing 3D printers for R+D



3D printing professionals with expertise in digital supply chain solutions



Computer peripherals manufacturer with global footprint

The DeMANS Approach

Four technical and scientific Work Packages ...

Material Selection and Pre-Processing

... delineate appropriate materials and pre-processing techniques that allow bio-polymers to have product performances conforming to current application requirements

AM Fabrication Technique Development

... integrate sustainable materials into the AM ecosystem and define practical methods for printing of durable biopolymers

Prototype Product Fabrication

... AM of suitable prototypes and demonstrations of performance, consistent with non-sustainable analogues

Development of Technical Roadmap

... delivery of detailed roadmaps, outlining challenges, milestones and achievements in developing sustainable bio-polymer approaches for AM of component parts

... underpinned by three management and network-wide activities Work Packages ...

Network and Training Activities

Communication and Dissemination Activities

Management Activities

Lessons learned

- Start early!
- Contact potential partners for the network
- Engage with European funding institutional support
- Get your message across early in the proposal
- First proposal page text should already clearly state the objectives
- State-of-the-art – ensure you offer a clear overview
- Appropriate consideration of inter/multidisciplinarity
- Appropriate consideration of intersectoral aspects
- Be very ambitious but credible
- Risk mitigation measures
- Update proposal to answer reviewers' comments and try again



DeMANS at a glance



Design and manufacture of sustainable materials for additive manufacturing technologies



The original work plan of 48 months (May 2021 – April 2025) was extended to 60 months (May 2021 – April 2026)



A total of **47 secondments**, across **75 person-months**; of these, **41 secondments** and **66 person-months** are funded by the **EU**



€345k overall budget, with €303k from EU and €42k from Science Foundation Ireland

Network wide activities

Secondments

Publications and Conference

May 2022:

As COVID restrictions were easing in the EU, **Marie-Joo Le Guen** (SCION) visited TCD and presented on on-going work in SCION. TCD researchers also presented work and plans for secondments were set out.

June 2022:

As a result of the visit by Marie-Joo Le Guen, TCD welcomed **Bernadette Casey** from **Usefully** (New Zealand). Initial talks started then have led to renewed collaborative talks in 2023.

May 2023:

A second visit (as part of a broader SCION research visit to Europe) allowed **Hillary Corkran** to visit TCD. Hillary works on the **Bark BioRefinery Project** at SCION. Her visit was a perfect opportunity strengthen links between DeMANS and the Irish-government funded **NXTGENWOOD** project.

Workshops

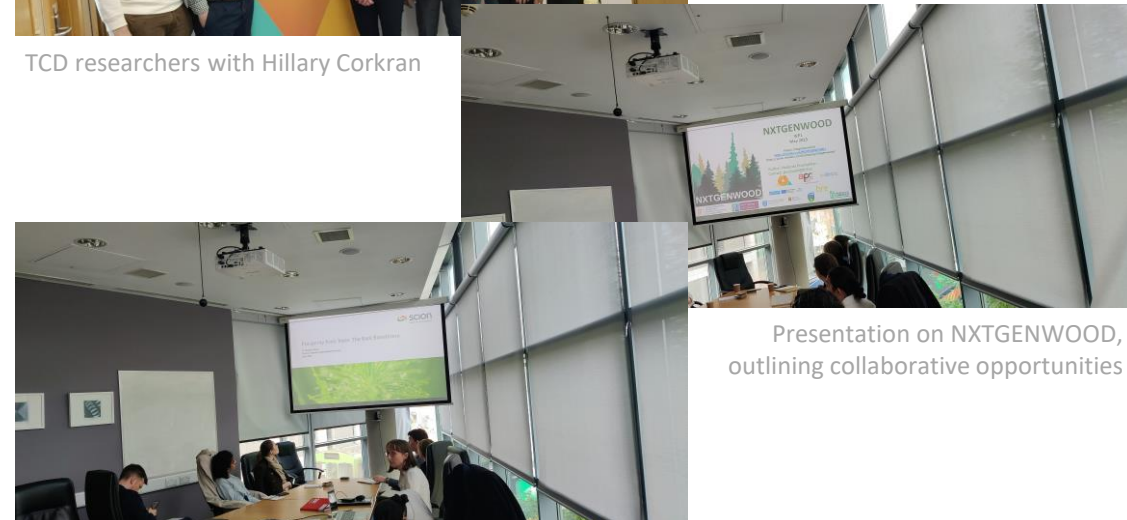
Seminars and Research Visits



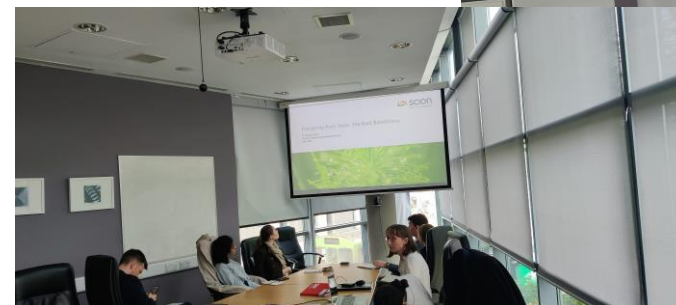
Larisa Florea, Marie-Joo Le Guen and Mick Morris



TCD researchers with Hillary Corkran



Presentation on NXTGENWOOD, outlining collaborative opportunities



Presentation on the Bark BioRefinery Project, outlining collaborative opportunities

Network wide activities

Secondments

Publications and Conference

September - December 2022:

Between September and December 2022, TCD PhD candidate **Annaël Sort-Montenegro** took part in a DeMANS secondment to the **UoW**. During her time at UOW she learned to use the 3D REDI printer developed by TRICEP and brought one back to TCD!

October 2022:

As part of her secondment to SCION, PhD student **Alexa Ennis** from TCD and AMBER, supported one of the **SCION's** exhibitions at the **Tauranga STEM Festival**.

June 2023:

In June, senior **UoW** researcher **Prof. David Officer** spent a month at TCD. During his secondment, David visited the two DeMANS commercial partners (**WAZP** in Tralee and **Logitech** in Cork) to better understand their commercial need for sustainable materials and additive manufacturing as well as share the UoW capabilities in these areas.

Workshops

Seminars and Research Visits



Prof. David Officer, PhD student Annaël Sort-Montenegro, Dr Stephen Beirne, Prof. Gordon Wallace



David Officer, Shane Hassett and Edward Casey outside WAZP in Tralee



DeMANS at Tauranga STEM Festival 2022



Impact

World class research/ infrastructure	Providing a framework for delivering high impact world class research
	Access to world class research infrastructure
	Development of new funding opportunities
	Familiarity with new AM / material processing techniques
	Access to academic research/emerging technologies for exploitation
	Upskilling in emerging techniques
Networking	Intersectoral mobility opportunities
	Generation of visiting professorships and secondments
	Network of support / shared experience
	Developing career opportunities
	Researcher/employee recruitment opportunities
Skills develop- ment	Availability of training
	Familiarisation with language and local structure and development of resilience when moving to a new environment
	Increased range of technical expertise



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