Technology Gateways | Enterprise Ireland

TUS | CISD Centre for Industrial Services & Design | PRISM Polymer, Recycling, Industrial, Sustainability and Manufacturing Research Institute

APT

Applied Polymer Technologies

Your Industry Partner Since 2013

Kenny O'Brien, Centre Manager

www.prism.tus.ie/apt-gateway

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The Applied Polymer Technologies Gateway (APT) is co-funded by the Government of Ireland and the European Union through the ERDF Southern, Eastern & Midland Regional Programme 2021-27

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What We Can Do For You?

R&D Processing, Design and Analytical Testing Hub

Polymer Materials Processing & Research

- Polymer Materials Processing & Research
- Multilayer Cast film extrusion line.
- Range of Injection moulding scales and technologies.
- Extrusion, compounding and reactive extrusion.
- 3D printing, additive manufacturing tooling.
- Fibre Spinning & Blow Moulding services available.

Polymer Materials Testing, Investigation & Development

- Polymer Materials Testing, Investigation & Development
- Variety of mechanical, thermal and chemical analysis testing to assist the development of innovative products and applications
- Material composition identification
- Thermal & mechanical properties determination
- Failure analysis
- Quality assurance testing

Product Design & Prototyping

- Product Design and Prototyping
- Product/part design.
- Prototyping.
- Design for manufacture.
- Scale-up.

Strengths

Talent | Testing & Investigation | Product Design | Polymer Processing | Grant writing

Presentation Overview

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Talent. 01.

Testing & Investigation. 02.

Product Design. 03.

Polymer Processing. 04.

Grant Writing. 05.

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Talent

01.

Meet the Team

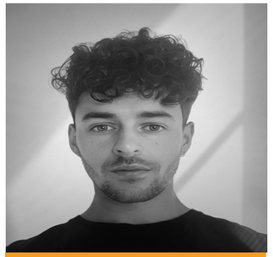
Industry Focused Team of Engineers and Researchers
With over 100 years experience in Industry

Kenny O'Brien
Centre Manager

Romina Pezzoli
Research Fellow

Alan Murphy
Analytical Services Manager

Steven Rowe
Senior Engineer



Gavin Keane
Lead Design Engineer

Austin Maguire
Business Development Lead Engineer

Louise Burns
Administrator

Leonardo Galli Engler
Research Scientist

Vlasta Chyzna
Research Scientist

Niamh Lennon
Research Assistant

Daniel Fitzpatrick
Research Assistant

Shane Connolly
Research Engineer

Chris Doran
Research Assistant

Trevor Howard
Research Engineer

Jamie Finnerty
Electro-Mechanical Officer

Declan Devine
Academic Director

Our hugely experienced multidisciplinary team embrace creativity and innovation. We are recognised for our flexible, proactive, solution-oriented approach and are here to support you with your next polymer related challenge.

Contact us at apt@tus.ie with your enquiry and an expert will get back to you!

Strengths

- Talent
- Testing & Investigation
- Product Design
- Polymer Processing
- Grant writing

World class research underpinned by QS 5* rated provision at:

Level 7

BSc Polymer Technologist (Modern apprenticeship)

BSc Polymer & Mechanical Engineering

Level 8

B.Eng (honours) Polymer and Mechanical Eng

Level 9

MSc Advanced Polymer Materials

MSc Packaging Technology

MSc/MEng Polymer Engineering (By Research)

Level 10

PhD by research in Polymer Engineering

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Testing & Investigation

02.

Testing & Investigation

CLIENT WITH MATERIAL/ PRODUCT ISSUE

e.g. Failure Investigation
Contamination Investigation
Quality Assurance Issue

01 CONSULTATION

02 EXPERIMENTAL PLAN

03 APT PERFORM TESTS

CONFIDENTIAL TECHNICAL REPORT

CONSULTANCY WITH CLIENT ON OUTCOME

or

FURTHER FUNDING OPPORTUNITIES

BULK PROPERTY ASSESSMENT – BASE CHARACTERISTICS
FTIR / FTIR-mic SEM/EDX DSC TGA DMTA

MFI Mechanical (Tensile / Creep / Flexural / Impact Properties)

FINE PROPERTY ASSESSMENT
GCMS / pyGCMS GPC (trip-det) XRD Contact Angle Goniometry

Capillary / Parallel Plate Rheology Viscosity Nano-TA / CTE LCMS

FUNCTIONAL PROPERTY ASSESSMENT
Bespoke Product Test Setup | Accelerated Weathering Shelf-Life | Ageing Studies

Followed by metric agreed prior to the study (Mechanical Properties Colourimetry Other Product Performance-Related)

Testing & Investigation

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Case Study

01.

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Issue:

Client was having cracking issues with parts post-assembly and there was a production hold and also a high risk of a product recall.

Testing

- FTIR / DSC to investigate chemistry of the polymer and the processing history.
- SEM/EDX to investigate the crack propagation and to look for potential contamination in the cracking region.
- GCMS to investigate the affected parts for volatile/semi-volatile contamination.
- Pyrolysis GCMS to investigate the affected parts for non-volatile contamination.

Testing Outcome

- FTIR and DSC did not indicate any significant differences in chemistry/processing history.
- SEM/EDX demonstrated a visually unusual material flow-pattern going in towards the cracking region
- GCMS demonstrated that there were extra peaks when good parts were compared to failing parts. These peaks indicated the presence of a different Polyamide material.
- Pyrolysis GCMS detected the presence of the expected polyamide (Polyamide 6,6) base material AND evidence of significant polyamide 12, which was localised in and around the failing area.

Results for Clients

Affected Batches were Identified and affected Products Recalled.

Production resumed within 5-7 Working Days from issue recognition. €,000s saved

Wastage minimised as not ALL batches affected.

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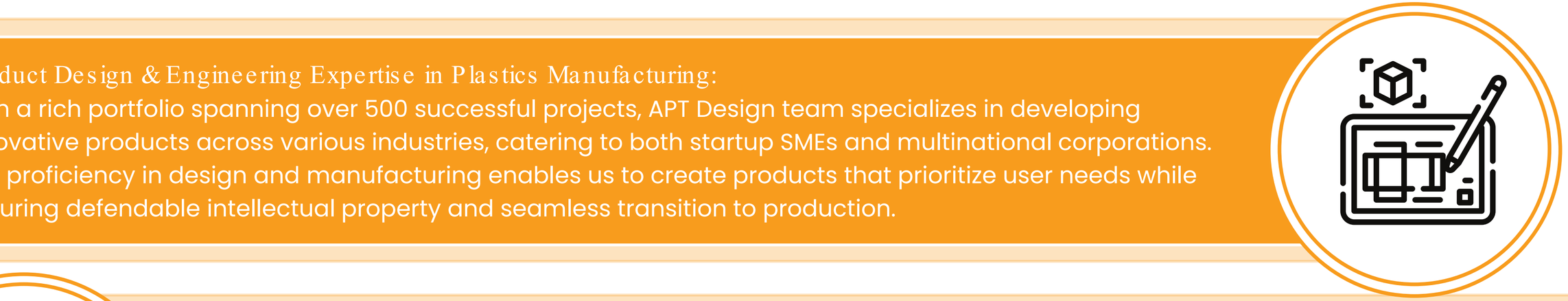
Product Design

03.

Product Design

Product Design & Engineering Expertise in Plastics Manufacturing:

With a rich portfolio spanning over 500 successful projects, APT Design team specializes in developing innovative products across various industries, catering to both startup SMEs and multinational corporations. Our proficiency in design and manufacturing enables us to create products that prioritize user needs while ensuring defendable intellectual property and seamless transition to production.



Our Approach:

We employ cutting-edge technology and extensive experience to streamline the product development process. Our state-of-the-art facilities facilitate rapid prototyping and iteration, allowing us to swiftly produce fully functional prototypes for feedback and testing.

SURMODICS intel Johnson & Johnson RedZinc Nelipak® healthcare packaging Teleflex® stripe RENEW Healthcare Health | Hope | Happiness ROSS UCCELLO Abbott Kingspan

Prototyping Capabilities:

Versatile Materials:
Utilizing Formlabs 2&3, we can print with the latest engineering and medical-grade photopolymers, ensuring compatibility with diverse project requirements.

Composite Printing:
Our Markforged composite printers are ideal for crafting robust functional prototypes, ensuring durability and reliability.

High-Quality Printing:
Our Project 6000 boasts the highest print resolution available, ensuring precise and detailed prototypes.

Advanced Scanning:
Our Gom Atos Core 3D Scanner provides optical metrology tailored for the plastics industry, ensuring accurate and detailed scans for prototype development.

Cost-Effective Solutions:
Leveraging various FDM printing options, including large, small, and high-temp capabilities, we offer cost-effective solutions without compromising quality.

Small Batch Production:
Our MJF and SLS machines, including the upcoming HP 5210 series and Lisa Sinterit, are ideal for small-batch production, enabling efficient scaling from prototyping to production.

Innovative Technology:
With the Arburg Freeformer, we can utilize production-grade injection moldable polymers in prototypes, offering unparalleled versatility.

Product Design

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Case Study

03.

CMC Hygea

Design of Antimicrobial Face Mask

Problem to be Solved:

The primary focus of the project centred on enhancing the seal and front gate design of a novel antimicrobial face mask. Achieving a delicate balance between materials and flexibility, the seal ensures a universal fit while maintaining an airtight seal, ensuring ease of removal for all users, particularly for those with reduced dexterity or elderly individuals, allowing for seamless filter replacement without mask removal.

Project deliverables for review:

- Research on selected areas for refinement
- Concept development in 2D sketches to identify solutions
- 3D CAD on selected solutions
- 2D drawings for production and IP purposes.
- Renders of the final product.
- Functional scale model SLA prototypes for usability trials

> "Our mission is to develop and deliver unique, hygienic, and safe products which make a significant contribution to infection control and prevention throughout the global healthcare system."
>
> -Michael Malone, CEO explains

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Polymer Processing

04.

Polymer Processing

Injection Moulding

Sumitomo Demag 130T, Arburg 60 T, Wittmann Battenfeld Micromoulder, Fanuc LSR, Babyplast Micromoulder

Compounding

Twin screw (50 g – 25 kg/h), planetary extrusion, high temperature, in line monitoring

Extrusion

Multilayer (5) cast and blown film lines, Profile extrusion, melt spinning, filament extrusion, melt coating extrusion

Misc.

Compression moulding, Computed tomography, thermoforming, granulation, accelerated aging

Scale Up

Arburg All-Rounder 370-A

Sumitomo-Demag 130-450

Eur.Ex.Ma Multilayer Cast film

Fanuc Roboshot LSR

Arburg Freeformer

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Case Study

04.

2018	Initial discussion with Ostoform to Applied Polymer Technologies.
2018	2018 fully funded research Innovation Voucher (EI 5K) with Ostoform assessed the production method and identified potential improvements.
2019	2019 APT written – fully funded IP Feasibility Study (EI 9K) illustrated potential of one step manufacturing of ostomy pouch adapter.
2022-2025	2022-2025 DTIF Project to support the development of a completely unique material processing technology, along with the commercialisation of range of novel medical products, designed to improve the lives of ostomy pouch users – PhD training/upskilling staff.

OSTOFORM | APT Applied Polymer Technologies | ROSS

Total DTIF Award = €2.7million | Industry allocation = ca €1.5m

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Grant Writing

05.

Grant Writing

Expert knowledge of Irish and International funding schemes

We take ownership of writing the application with a team of dedicated experts.

Tailored applications to meet industry need.

Help navigating funding system.

Range of options including fully funded small awards, up to 80% leveraged funded large awards and full cost model depending on industry requirements

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Southern Regional Assembly

Enterprise Ireland

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Case Study

05.

Utilising funding pathways

New company (SME) comes to TUS with a challenge and a vague idea of how to solve it.

Due to experimental nature of the project and new working relationship an Innovation partnership (IPF) is recommended - Enterprise Ireland fully funded €9,000

IPF identifies a clear pathway for new product development (NPD) and a full IPP application is submitted. Total value €200,000. Company contribution €40,000.

Two-year research programme with an experienced post-doctoral researcher and research assistant (typically with MSc) hired and managed by APT staff to deliver the project.

EU funding opportunity Identified with Company and APT as partners. Company receives €300,000 from the EU

Summary:
Company contribution = €40,000; Company income from EU ca €300,000
Net gain of €260,000

Knowledge transfer

Bespoke IP agreement: Company contribution entitled company to NERF licence

Company option to invest in exclusive licence – fee payable ca €28,000/yr. for 10 years (1.5 x state investment)

Licences/Assignments agreed at favourable terms – national requirements compliant

Industry Engagement

Enquiry

Contact us online

Sector

SR
Polymer Processing

AM
Testing & Investigation

GK
Product Design & Prototyping

Consultation

Identify

- What We Can Do For You
- Funding Stream

Quote

Follow-Up

01 Purchase Order

02 Commencement

03 Completion & Reporting

Strengths

Talent | Testing & Investigation | Product Design | Polymer Processing | Grant writing

Processing Facility

- APT Phase 3 Technology Gateway Programme 2023-2027.
- Q1 2024, facility renovations complete and fully operational - 14,316 sq. ft facility.
- Installation complete of ca €6Million of state-of-the-art, industry relevant equipment.
- Currently 19 staff and continue grow.

Come see what we can do for you

Book your appointment today and meet the team to discuss your enquiry.

apt@tus.ie

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A Great Place To Work

Thank You.

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