Mohammadnabi **NESABI**

Technology Gateway:	Applied Polymer Technologies (APT)
Academic Mentor:	Dr. Ian Major
Company Partner:	Polymer Alloy Technology Teo. (PALTECH)
Company Mentor:	Adrian Doyle

Mohammadnabi (Hadi) Hesabi graduated from high calibre universities in Iran in his BSc and MSc degrees. He gained more than 8 years extensive industry experiments in foamed PVC extrusion and thermosetting composites before he received his PhD in Polymer Engineering from Iran Polymer and Petrochemical Institute (IPPI) in 2018. Hadi joined AIT in 2019 to work on an industry based post-doctoral research on the degradation behaviour of polymer composites in the accelerated weathering conditions. He has a keen interest in technology commercialization and industry driven collaborations towards development of innovative systems.

Dr. Ian Major

Dr. Ian Major is Research Programme Leader for Composites and Upscaling at the Materials Research Institute. He is also a Principal Investigator at the Applied Polymer Technologies Technology Gateway. Ian's research experience has been centred on materials science and engineering. He has secured €4.33m from different sources of International and National funding, including a H2020 EU-China in Bio Innovation of a Circular Economy for Plastics (BioICEP) and an ESA-funded project on the development of a PEEK 3D printer for space (IMPERIAL).

Adrian Doyle

Adrian is a co-founder and director of PALTECH. He graduated with a BE in Mechanical Engineering from NUI Galway in 2000. Adrian worked at ÉireComposites since 2001 and became Engineering Manager in 2010 leading a team of 20 Engineers and Technicians. He was responsible for leading the team supporting aerospace manufacturing of carbon fibre parts and also R&D projects in aerospace, space and renewable energy. Adrian worked on the development of state-of-the-art automated processes for manufacturing polymer composites for European Space Agency projects in collaboration with Airbus France and other major contributors in the industry.

Applied Polymer Technologies (APT)

The APT TG was established in 2012 as a designated polymer processing center within the Materials Research Institute. The APT Gateway is central to AIT's strategic plan to scale its applied research capabilities in polymer technology. APT has a core focus on three applied technology areas it aims to transfer to industry: biomedical polymers, polymer recycling and composites.

Polymer Alloy Technology Teo. (PALTECH)

PALTECH is an innovative technology company setup in 2017 to develop process technology to recycle plastics into high value end products. PALTECH has a strong innovation ethos – it is a high-tech company with experienced board members that have consistently identified market opportunities to create new polymer processing methods for high-performance products. Within the polymer manufacturing industry they have consistently demonstrated technology leadership, securing IP and creating a strong portfolio of capabilities that has created over 160 jobs for Ireland and ability to export products and services globally.

Hadi's project

Recycling of plastic bottles began almost two decades ago. Nevertheless, other plastics, such as dark plastic ready meal trays, yogurt pots, shampoo containers and protective films have proved a challenge for recycling. On the one hand, the effective separation of the plastics based on the specific thermoplastic material present is often impractical from both a technical and economic standpoint. On the other hand, the processing of mixtures of thermoplastic waste via conventional processes that require melting of the polymer to a molten state is limited by the inability of different plastics to stick together to form a solid component. This project will tackle the mixed plastic waste by manufacturing high-value durable functionally graded sandwich structures through a pressure based system to overcome these challenges. This system will be used to produce thermoplastic composites with engineered structure, called functionally graded sandwich composites that can be customized and tailored for a specific task. Functionally graded sandwich composites developed from mixed plastic waste could be light and strong enough to be used in applications that are weight sensitive and require high mechanical strength such as energy, transportation and construction sectors. Converting plastic waste to high-performance durable product can reduce the burden of plastic waste in the environment and ensure a sustainable route for a circular economy for plastic.