Report on Manchester Polymer Group's First Student and Early Career Poster Showcase and Networking Event

MPG were pleased to host their first SEC Poster Event on 21st February 2ist, 2024 at the Henry Royce Institute, University of Manchester, primarily arranged through the MPG Vice Chair, Dr Christina Picken who is a PDRA at the Henry Royce.

Seven students from the three Universities in Greater Manchester presented their Posters covering the following various topics -Mixed Plastic Waste, Plastic Pollution, Alternatives to transition metal catalysts, Alternatives to FRP's, An alternative to thermoresponsive polymer for drug delivery, Improving the quality of post-consumer recyclate and improving the design and production of underwater connectors to compete for a First Prize of £100, a Second Prize of £50 and a Third Prize of £25 as decided by two judges, Dr Gary Ogden. Technical Manager, Wells Plastics and MPG Chair and Pravin S Mistry, CEO of PREA, an International Polymer Manufacturing Consultancy and a member of the MPG Committee. The Peoples Prize, donated by PREA, was also available and which was voted on by the 25 persons who were present checking out all the posters.

As judging commenced Dr Christina Picken commented *'it's fabulous to bring together representatives across the Manchester area who, across a variety of different applications, were passionate and excited for the future of polymeric materials'*

The winner was **Eloise Billington**, University of Manchester with **Circular Polyester Composites**. Eloise was also awarded the **Peoples Prize**.

Eloise Billington with Gary Ogden (l) and Pravin Mistry (r)

Abstract: Fibre reinforced polymer composites (FRPs) are used for a wide variety of applications, including wind turbine blades, boats and automobiles. However, the vast majority are synthesised using non-renewable feedstocks, and due to a lack of recycling technologies, large quantities of waste are created at their end-of-life. Alternatives that offer greater value at end-of-life are thermosets containing dynamic cross-links, which undergo reversible exchange reactions or are chemically depolymerisable.

Second was **Arpan Patel**, University of Manchester with **Controlled polymer degradation through gas-mediated simulated recycling**

Arpan Patel

Abstract: Controlled polymer degradation through gas-mediated simulated recycling. This project builds a diagnostic tool to quantify the quality of post-consumer recyclate as well as use gas mixtures to limit degradation.

Third prize was awarded to **Danny Guana**, University of Manchester with **Electrical Characterisation of PEEK Insulation used in Subsea Cable Connections.**

Danny Guana

Abstract: Electrical Characterisation of PEEK Insulation used in Subsea Cable Connections. Typically, these connectors employ a solid insulator in conjunction with mineral oil (MO). Despite the extensive research dedicated to exploring the compatibility of liquid and solid insulation materials, there is lack of literature addressing the electrical and solid insulation materials. Therefore, it is essential to investigate the breakdown phenomena of a PEEK/MO composite insulation system under AC stress, which could lead to a better reference for the design and production of underwater connectors

All Other Posters were also highly commended

- **Studies on the Effects of Mixed-Plastic Pyrolysis Char on the Mechanical Properties of Virgin and Recycled Polypropylene** which investigated the use of mixed-plastic pyrolysis char (MPWC) to reinforce virgin and recycled polypropylene.
  Notably, specific compositions exhibited superior impact strength, highlighting MPWC's potential for sustainable plastic waste valorization. **Jerome Anokwu, University of Salford**

- **Plastic pollution** is an ever-growing environmental problem, which is now verging on becoming a planetary boundary threat. In this project, a methodology is being developed for the sampling and characterisation of plastics and their additives using thermal desorption gas chromatography mass spectrometry (TD-GC-MS).
  Preliminary results indicate an ability to differentiate plastics by polymer, and in some cases by item type or manufacturing location. **David Jones, Manchester Metropolitan University**

- **Frustrated Lewis Pairs (FLPs) pose as sustainable alternatives to transition metal catalysts in a host of chemical processes such as reversible H2 cleavage to facilitate metal-free hydrogenation of various substrates.**
  Activation of other small molecules has enabled catalytic transformation into useful chemical feedstock. Polymeric FLPs sit at the intersection of functional polymer science and main group catalysis. Their unique chemistry paired with a polymer scaffold creates recyclable catalysts and stimuli-responsive gel networks. **Jordan Holland**, **University of Manchester**

- Poly(N-isopropylacrylamide (PNIPAM) is one of the most widely researched **thermoresponsive polymers**. We have previously shown that the PNIPAM nanogels can be used to produce in situ forming implants which provided long-acting drug delivery. An alternative to the PNIPAM, that has been proposed to offer fewer safety concerns is poly(oligoethylene glycol methyl ether methacrylate) (POEGMA), a methacrylate-based polymer. **Mazrina Mazlan, University of Manchester**

In a final wrap-up Dr Gary Ogden said *'this event was such a success that it will be repeated in the future, maybe running in tandem with an industry focussed event where more networking would be possible'*

Author: Stuart Patrick 6th March 2024