

IET National Travel Award-Final Report



The IET National Travel Award has funded my recent attendance and presentation at the 19th International Conference in Manufacturing Research ICMR 2022 between 6th and 8th of September 2022 in Derby, UK. This conference is initiated by the Consortium of UK University Manufacturing and Engineering and organized by the University of Derby this year. It aims to bringing researchers, academics and industrialists together to share their vision, innovation, knowledge and experience, and discuss emerging trends and new challenges in the field of advanced manufacturing.

The conference was an prestigious opportunity for me to discover pioneering research development on the field of advanced manufacturing technology with world leading researchers in digital manufacturing, machining, robotics, metrology and wider disciplines. During the conference, I presented my latest research entitled 'Understanding chip formation in orthogonal cutting of aeronautical thermoplastic CF/PEKK composites based on finite element method'. This work focuses on revealing the material removal and damage formation behaviour of novel sustainable CF/PEKK composite during machining process. The finite element model we developed can help to effectively elucidate and predict the cutting force and subsurface damage induced by orthogonal cutting. The research finding can help to provide important methodological and parametrical guidance on the low damage manufacturing of CF/PEKK composite structures to guarantee its performance and reliability. This oral presentation was well disseminated and received by the audience, and several questions regarding future work were raised (e.g. consideration of high machining temperature, the effect of cutting speed on the final result and cryogenic machining), which were very constructive to further improve and expand this work.

In addition to showcasing my research, I also had the opportunity to gain more insight into the recent development of intelligent manufacturing, manufacturing with advanced robotics and digital technology. For example, the keynote presentation by Prof. Yan Jin introduced the advanced manufacturing empowered by parallel kinematic machines, which emphasized the advantage of minimizing propagation of errors. This demonstrated an important knowledge gap in knowledge-based approach in future sustainable manufacturing for aerospace and

automotive industry. Another keynote presentation by Prof. Mozafar Saadat gave an comprehensive review of recent studies on disassembly process by robotics, which is very impressive and inspired my future research. It is also a great experience to attend the social event and industry visit organized by the committee including a formal gala dinner and visit to Alstom and Rolls Royce. This has provided the opportunity to network and establish some connections with attendees from both academia and industry.

Overall, the attendance to ICMR 2022 is a very impressive experience which provide excellent presentations, fantastic networking platform and valuable feedbacks from wide engineering community. I would like to thank IET for the IET National Travel Award in support of the attendance to this conference. This award gives me the prestigious opportunity to disseminate my research work in this event and have valuable discussions and networking with peer students and researchers, which is of great importance for my future career development as an independent researcher. The contribution of IET has been well acknowledged in the presentation.

Sincerely,

Jia Ge

PhD student in Aerospace Engineering, Queen's University Belfast



Jia Ge presenting his paper



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