

IET International Travel Award-Final Report



The IET International Travel Award has funded my recent attendance and presentation at the 6th CIRP Conference on Surface Integrity (CIRP CSI 2022) between 8<sup>th</sup> and 10<sup>th</sup> of June 2022 in Lyon, France. This conference is organized by CIRP, the world leading organization in production engineering research. Its vision is to promote research and development in academia and industry to contribute to the global economic growth and well-being of society, and is a forum for sharing knowledge between academics, industrial researchers and engineers in the field of workpiece surface integrity and its impact on the performance/ behaviour of manufactured parts.

The conference was a prestigious opportunity for me to discover pioneering research development on the field of surface integrity and have close interaction with world leading researchers in materials failure analysis, metrology and wider disciplines. During the conference, I presented my latest research entitled ‘Open hole surface integrity and its impact on fatigue performance of Al 2024-T3/Ti-6Al- 4V stacks’. This work focuses on comprehensive investigation of hole making performance of different techniques and established a correlation between part hole surface integrity and its fatigue performance by means of advanced material characterization techniques such as scanning electronic microscope (SEM) and Confocal Laser Scanning Microscopy. The research finding can help to provide important methodological and parametrical guidance on the manufacturing of aerostructures consisting Al/Ti stacks 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. more advanced material characterization techniques such as EBSD to reveal material grain change, utilization of different stacking sequence), 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 new experimental/ numerical methods developed for the characterization/ prediction of surface integrity evolution induced by a wide range of manufacturing processes. For example, the keynote presentation by Prof. Bernhard Karpuschewski introduced the novel concept of ‘process signature’, which emphasized the importance of correlation and mapping between

material's internal load and its functional properties. This demonstrated an important knowledge gap in knowledge-based approach in future sustainable manufacturing. Another keynote presentation by Prof. Guillaume Kermouche gave an comprehensive review of recent studies on the use of nanomechanical testing techniques for the characterization of surface integrity, which inspires the utilization of advanced material characterization methods to improve the quality of our current study. It is also a great experience to attend the social event organized by the committee including a formal gala dinner and award ceremony. This has provided the opportunity to network and establish some connections with attendees from both academia and industry.

Overall, the attendance to CIRP CSI 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 International 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



*Round table discussion by keynote presenters    Acknowledgement of IET for travel awards*



*Visit to old town of Lyon*