ASME 2017 International Mechanical Engineering Congress & Exposition, Tampa, Florida, USA, 3-9 November 2017

Global research engagement by undergraduates and its impact: Laser metal deposition studies in us - South Africa collaboration

Kumpaty S
Paoli E
Akinlabi E
Ziemer A
Pityana SL

ABSTRACT:

This paper presents the follow-up work of research conducted by Milwaukee School of Engineering senior undergraduate students in South Africa under the second year of the Research Experiences for Undergraduates grant EEC-1460183 sponsored by the National Science Foundation (Principal Investigator Dr. Kumpaty). Elizabeth Paoli and Arianna Ziemer conducted research in summer of 2016 under advisement of Dr. Kumpaty and his South African collaborators, Dr. Esther Akinlabi and Dr. Sisa Pityana. Arianna extended the work of Mueller (reported in IMECE2016-65094), with 10% Mo in the combination of Ti64-Mo deposited on Ti64 substrate at a laser power of 1700 W for five scan speeds ranging from 0.5 to 1.5 m/min. It was observed that lower scan speeds produced elongated grains. Hardness and corrosion tests were also completed in her study. Elizabeth worked on varying the percent of Mo from layer to layer deposited (5%, 10%, 15%) and characterized these functionally graded samples for biomedical applications. Laser metal deposition was completed at the CSIR – National Laser Center, in Pretoria, South Africa and the material characterization was performed at the University of Johannesburg as in the previous year. An alumnus of MSOE, Peter Spyres was an important liaison for our international REU participants as he engaged them during the weekends in a cultural immersion which otherwise would not have been possible. While the research collaborators have generously provided support, it is the care taken by Peter's remarkable household, which enhanced the beneficial value of this global research enterprise. The paper addresses yet another successful completion of the international Research Experiences for Undergraduates.