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Type: Oral

One layer at a time: Unlocking Novel Materials and Structures for Neutron Radiation Environments through Additive Manufacturing

Friday, 26 November 2021 16:40 (15 minutes)

The UOW-ANSTO Seed Funding program is an initiative aimed at encouraging new collaborations between researchers at the University of Wollongong and ANSTO - bringing together teams with diverse and complementary skillsets to tackle questions that require multi-disciplinary approaches.

In 2019, a team of researchers from ANSTO's Australian Centre for Neutron Scattering (ACNS), UOW's Australian Institute for Innovative Materials (AIIM) and the Translational Research Initiative for Cell Engineering and Printing (TRICEP) came together to tackle the question "Can the structures and materials made possible by additive manufacturing enable novel solutions for neutron radiation environments?"

To explore this question, we undertook activities in three themes:

- THEME 1 –Polymers for neutron shielding and collimation
- THEME 2 –Low-hydrogen polymers for neutron sample environments
- THEME 3 –Metals and alloys for neutron sample environments

This presentation will discuss activities undertaken in these themes, including:

- THEME 1: investigating novel boron nitride/polyurethane materials developed by the UOW for use in neutron shielding and collimation applications via experiments on the Taipan, Pelican, Bilby and Platypus facilities at ANSTO;
- THEME 2: the development of a custom low-hydrogen polymer (FEP) printing apparatus and optimised print procedure, to our knowledge one of the first such facilities. This has resulted in the production of low-hydrogen sample holders for use in ANSTO neutron environments; and
- THEME 3: leveraging the world-class facilities and expertise in metal additive manufacturing at TRICEP to produce 'sample can' components in titanium and aluminium for validation and as a platform for future customised sample environment devices.

This presentation will also discuss possibilities and future plans for work in this exciting area.

Presenter Gender

Man

Do you wish to take part in the Student Poster Slam

No

Condition of submission

Yes

Students Only - Are you interested in AINSE student funding

No

Level of Expertise

Experienced Researcher

Pronouns

Which facility did you use for your research

Australian Centre for Neutron Scattering

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Session Classification: Manufacturing & Engineering

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