

This is your invitation to attend and support the

Annual Sir Frank Ledger Breakfast 2025

When:	Wednesday, 19 th November, 2025
Where:	Fraser's Function Centre, 60 Fraser Avenue, Kings Park, Perth
Time:	Door Opens 7:00 am; Full Breakfast 7:30 am Presentation 7:45 am; Finish before 9:00 am
Cost:	<ul style="list-style-type: none">• Members: \$75.00/person• Group Booking (six or more attendees): \$70/person• Non-Members: \$85.00/person
RSVP:	Friday, 14 th November, 2025
Parking:	Parking available behind the venue
Tickets:	Book Here
Enquiries:	Mobin Salasi, Convenor SFLB, wa@materialsaustralia.com.au

“Nuclear Net-Zero: Successes and Challenges in Fusion Reactor Materials”

Rhys James, Worley

Nuclear fusion is advancing rapidly as a potential cornerstone of the future low-carbon energy mix. However, achieving sustained, commercial fusion power requires overcoming formidable materials science and engineering challenges. Fusion environments expose reactor materials to extreme temperatures, high-energy neutrons, strong electromagnetic fields, and severe mechanical stress. This presentation offers a breakfast-level technical overview of the key materials engineering issues shaping fusion reactor development.

Recent fusion milestones - including ignition at the National Ignition Facility (NIF), extended plasma sustainment, and high-energy output demonstrations - are discussed alongside a comparative overview of major fusion reactor designs (tokamak, inertial confinement, and compact high temperature superconductor-based reactors). The implications for long-term reactor operation, scalability, and materials lifecycle under real fusion conditions are considered and the current scale of research efforts are discussed.

The talk explores the key role of plasma-facing materials, structural alloys, superconducting magnets, and tritium breeding systems, focusing on their performance requirements and emerging solutions. Recent innovations such as high-entropy alloys, oxide dispersion-strengthened steels, and high-temperature superconductors, along with material testing methods and facilities designed to mimic fusion conditions are highlighted.

Finally, the session links materials advances to broader goals in achieving net-zero energy systems, emphasizing the role of fusion as a complementary technology to renewables and a key enabler of a resilient, clean energy future.



The Company

Worley is an Australian engineering and professional services company which provides consulting and project delivery expertise to the resources and energy sectors, and complex process industries across the globe.

The Presenter



Rhys James

Materials And Integrity Engineering Department Manager – Offshore Energy, Worley

Rhys is a materials and corrosion engineer with over 20 years' experience in the oil and gas industry, with a particular focus on offshore pipeline engineering. He holds a Master of Engineering degree in materials science, economics and management from the University of Oxford and maintains an interest in cutting edge developments in materials science and engineering.

This breakfast will provide CPD points so please help your organisers by booking via the [link](#) as early as possible. Hope to see you there!

NB: CANCELLATIONS: A cancellation fee of \$20 applies until 12th November 2025. No refund will be given for subsequent cancellations. Only written cancellations will be accepted. Substitutions may be made at any time. This event is subject to cancellation if sufficient attendees are not obtained. Official notification will be given to participants 7 days prior to the scheduled date and Materials Australia will refund fees received.