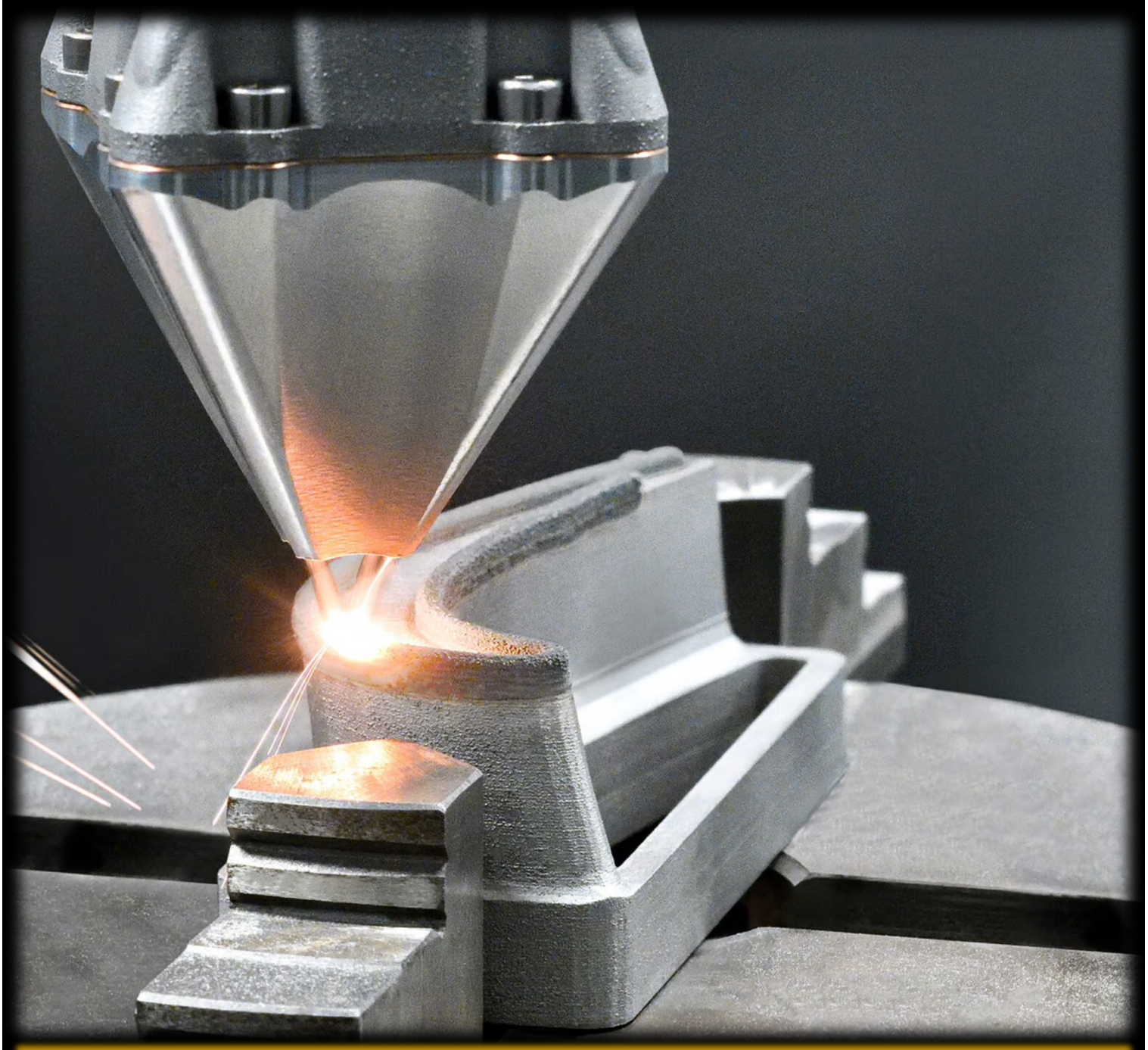
PFAM LAB
PHOTONFORGE AM LAB
CURTIN UNIVERSITY

PhotonForge
Additive Manufacturing Lab



Innovating the Future, Layer by Layer

PFAM@curtin.edu.au

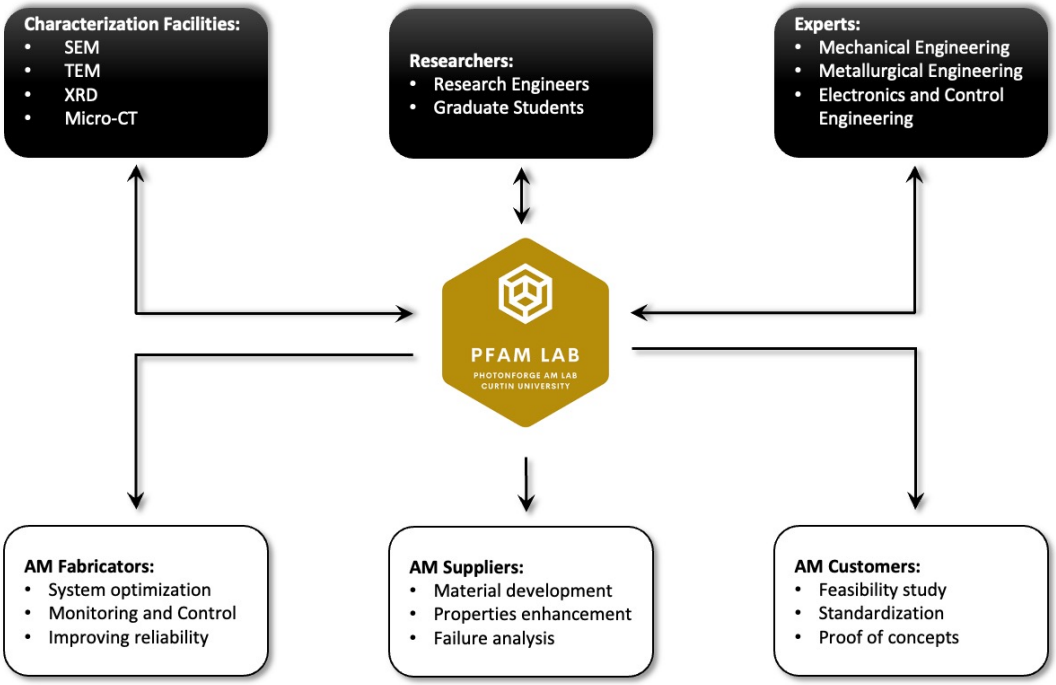
Curtin University

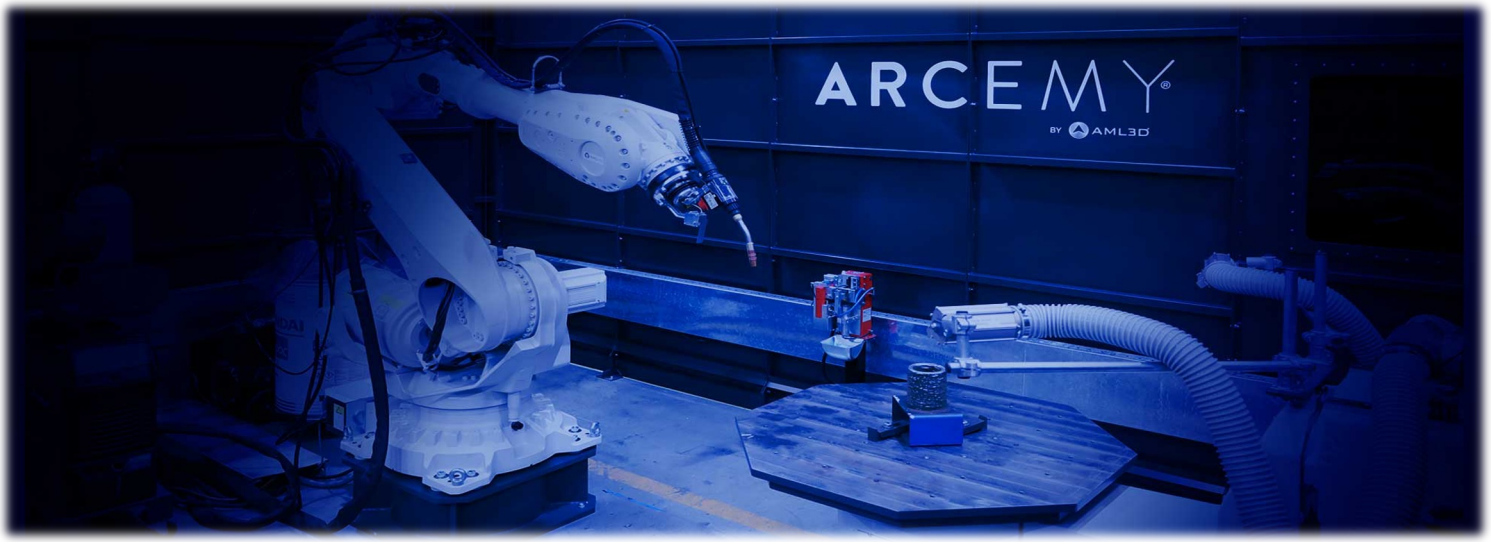
Our Mission

The mission of PFAM Lab is to build world-class metal additive manufacturing (MAM) infrastructure to support research excellence and foster collaborative projects driven by end users. Our mission involves training highly skilled research and engineering graduates about the practical application of MAM technology in industry.

Why PFAM Lab?

PFAM Lab is in close contact with the main three groups of industries that are either the end users of the AM applications, AM service providers, or AM system fabricators. PFAM Lab has strong connections to research groups and facilities at Curtin University to support the needs of all three groups from systems qualification and reliability enhancement, to material development and quality improvement, as well as supporting new standards registrations.





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Membership Plans

PFAM Lab is a one-stop design, fabrication, and research environment to support AM-related industries. To maximize the benefits of collaborations with PFAM Lab, a membership plan is developed. Contact us for more details.

Industry Advisory Panel

PFAM Lab facility leader is in close contact with an industry advisory panel consisting of industry members of the lab to receive guidelines for future investments and funding opportunities. One of the benefits of membership in Tier 1 is becoming a member of the industry advisory panel.

Target Industries

AM Fabricators: metal AM system manufacturers are potential partners of PFAM Lab. A lab with industrial-level AM facilities and sophisticated characterization equipment is a powerful research arm for an AM system manufacturer. Reliability enhancement, monitoring and control, and new material development are some examples of collaborations.

AM Suppliers: metal AM service providers are at the front line of technology delivery to end customers. Meeting specified standards and quality defined by customers is always a challenge. In addition, extending the processible materials and enhancing the quality of the parts are non-stop targets. PFAM Lab is a potential lifetime partner with this group of industries.

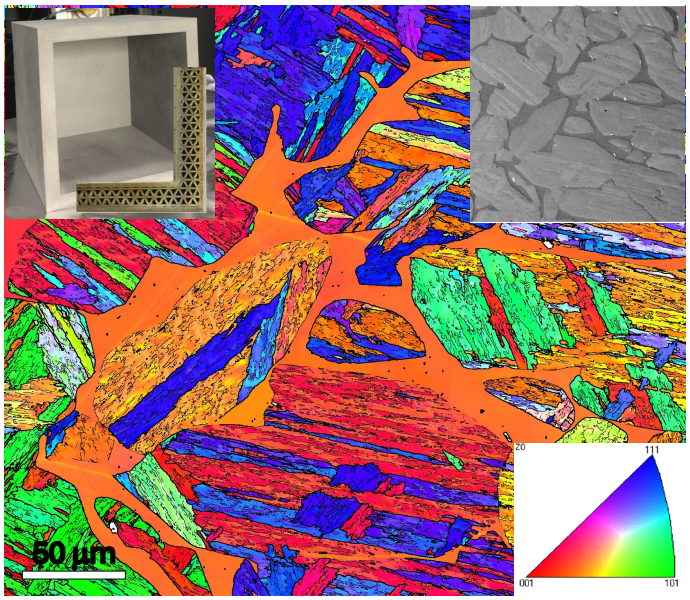
AM Customers: in many industries, adopting AM technology requires a long process of testing and qualifications to update the traditional standards based on the new technology. PFAM Lab is a matching partner on this journey to help the development of new standards and making feasibility studies for different components.

Case Studies

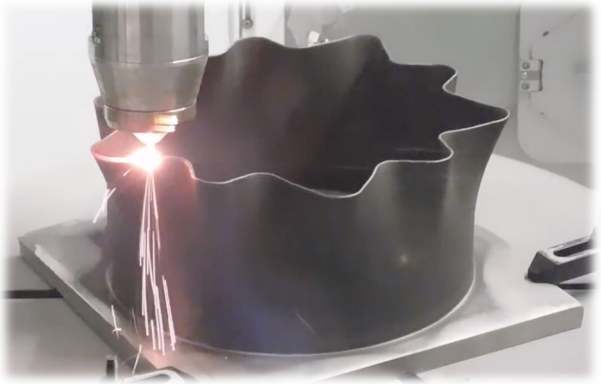
One of the case studies of university-industry collaborations goes back to 2021, when Curtin University, AML3D, and Austal Australia developed a hybrid manufacturing approach to fabricate a large complex structures (a sample shown in the above figure). In this project, WAAM process was adopted to produce a structure made of aluminum. The printed component received DNV certificate.

In another research, 17-4PH stainless steel was 3D printed via M-FDM process and received different post processing. The strength showed to be altering by martensitic and precipitation structures.

Austal Australia, Curtin University, and AML3D collaboration on metal additive manufacturing of a complex structure made of Aluminum



3D printing and characterization of stainless steel 17-4PH, in this figure, printed sample, EBSD, and SEM analysis are shown



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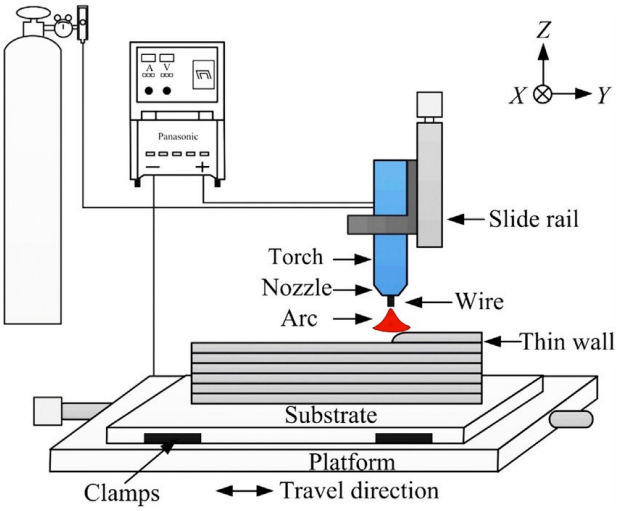
Our Technologies:

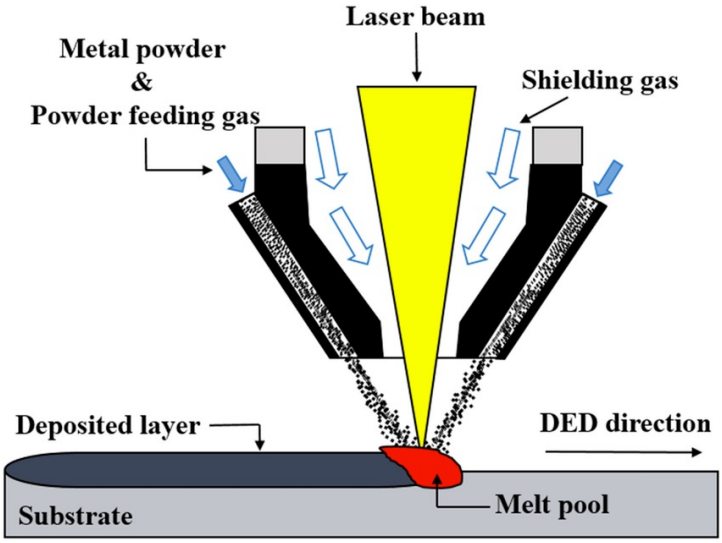
Wire Arc Additive Manufacturing (WAAM):

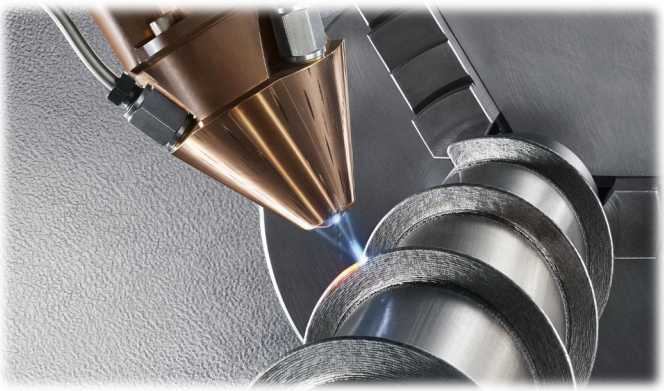
- Arc welding-based AM technology
- High production rate
- Free from size limitations
- Useful for defense and mining industries



Direct Metal Deposition (DMD):

- Laser-based metal AM technology
- Metal and ceramics Powder
- Capable of producing FGM surface coatings
- Capable of repairing valued components
- Useful for mining and O&G industries





Metal Fused Deposition Modelling (M-FDM):

- Indirect metal 3D printing
- Low-cost equipment
- Metal and ceramics material
- Requires post-processing for final properties