



## SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

### ADDITIVE MANUFACTURING

## Powder-Based Manufacturing and Repair of Large Structural Components for Critical Applications

This Symposium aims to convene researchers and engineers with extensive background in powder metallurgy shape fabrication and repair, especially powder-based technologies for manufacturing large-scale metallic and metal-ceramic composite components or claddings. Thus, with this shared information and the interactions that result, we would like to bolster research and development activities in this rapidly growing area of advanced manufacturing. Of principal interest will be highlighting of industrial needs for advanced powder-based manufacturing or repair of low numbers of parts with highly critical properties. We expect the talks to address technology developments that couple smart (e.g., additive or hybrid) manufacturing and advanced materials, including consolidation or fabrication processing advances and incorporation of sensors to ensure uniform fully dense structures that demonstrate robust microstructure-property-performance relationships.

Examples of the large-scale metallic components are related to:

- Aerospace: rocket boosters, rings, discs, airframe sections, landing gear.
- Navy/Military: valves for submarines, gun barrels, armaments.
- Land Based Gas Turbines: turbine discs, turbine casings, rotor shafts (e.g., 10 tons/piece).
- Nuclear: small modular reactor heads, reactor coolant pumps, steam generators, pressurizers, large valves, control rod drive tubes.
- Oil and Gas: valves, underwater blowout preventers, seal plates and rings, pump components and ground engaging tools.

A list of the powder-based advanced manufacturing methods of interest includes:

- Hot isostatic pressing (HIP) and vacuum hot pressing (VHP)
- Special additive manufacturing (AM) methods with laser (plasma) melting, e.g., big area AM (BAAM) and wide area AM (WAAM), along with powder-blown/wire-arc DED
- Thermal spray and cold spray deposition methods are also of interest, especially for repairs.

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TMS Materials Processing & Manufacturing Division; TMS Powder Materials Committee; TMS Additive Manufacturing Committee

#### ORGANIZED BY:

- **Iver Anderson**, Iowa State University Ames Laboratory
- **Kyle Tsaknopoulos**, Worcester Polytechnic Institute
- **Hani Henein**, University of Alberta