

# Additive Manufacturing and Gas Turbines

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MONASH  
University

Carnegie Mellon University  
College of Engineering



# The Barnes Group Advisors



At **The Barnes Group**, we are passionate about manufacturing and technology but the best technology will go nowhere if the economics aren't well understood. Additive manufacturing is growing quickly and industrializing and we believe we can help with all the activity that this acceleration requires. We want it to continue to grow safely.

**The Barnes Group** brings high quality, seasoned specialists to advise and solve problems associated with maturing & industrializing additive manufacturing. We specialize in intimate engagements of adequate duration to ensure a measurable output. We believe in a long term relationship, it just may not require full time support. Additive Manufacturing is growing so fast that we see companies big and small needing subject matter expertise on hand for guidance. **The Barnes Group** focuses on delivering value and rigorous process knowledge.

**Our Pledge to Manufacturing** - As our core belief is in manufacturing, we will commit a portion of our profits each year to furthering the understanding of an aspect of manufacturing. This keeps **The Barnes Group** involved, committed and responsible for the advancement of manufacturing.

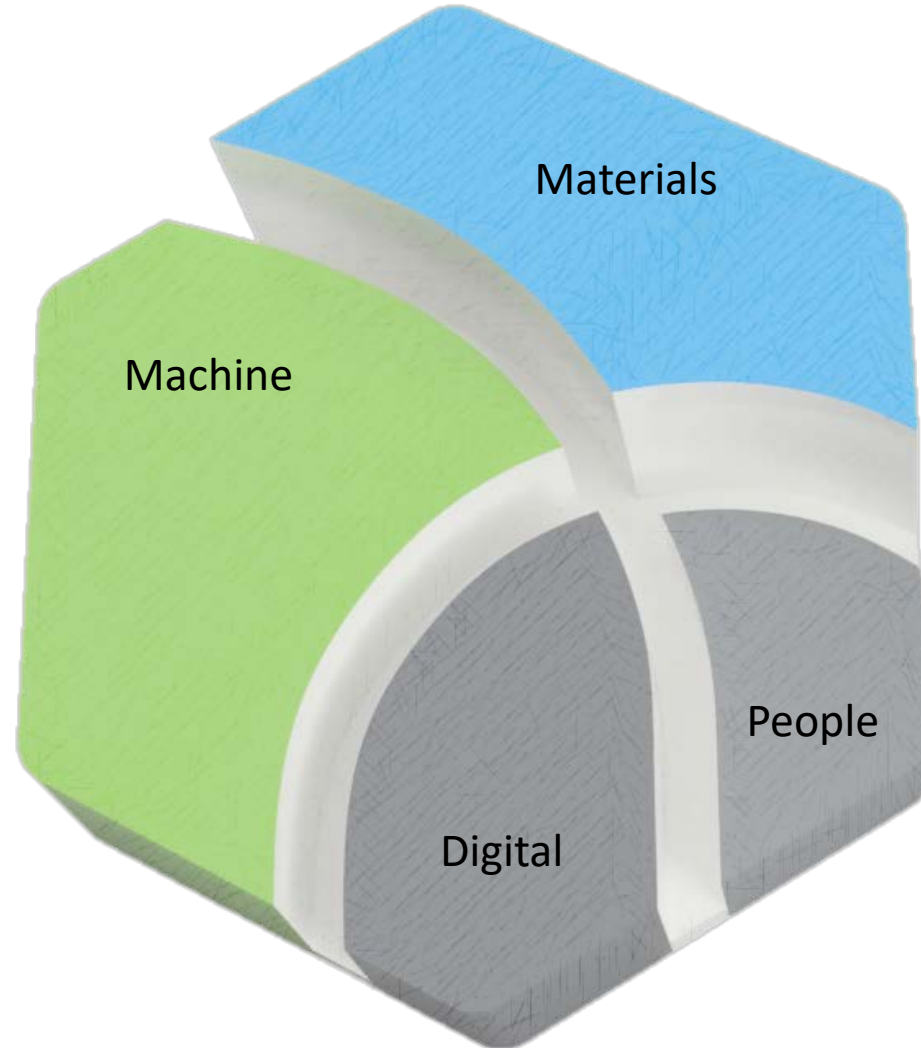


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# Our View of AM

- + Powder is a critical element of process development
- + Post processing and heat treatment need to be optimized for AM
- + Process economics are key

- + Requirements drive process selection
- Size, Shape, function & materials
- + Build file drives final result
- + Process Development
- + AM must do everything existing manufacturing does (but better)



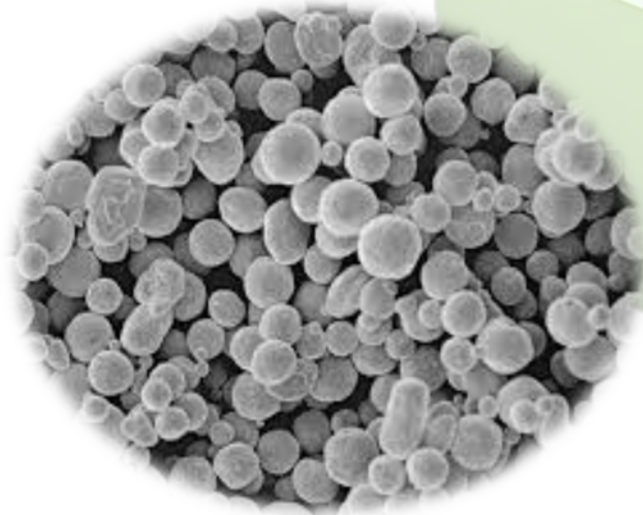
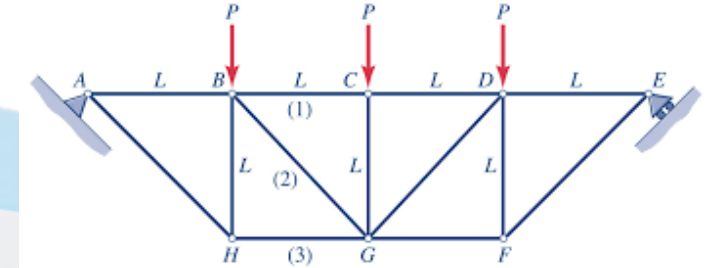
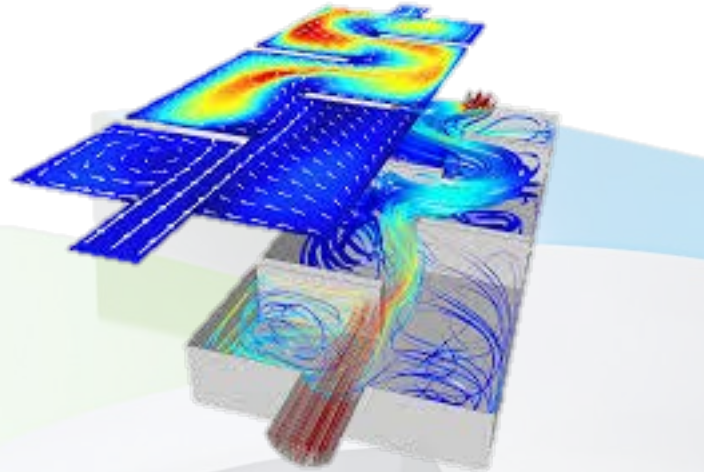
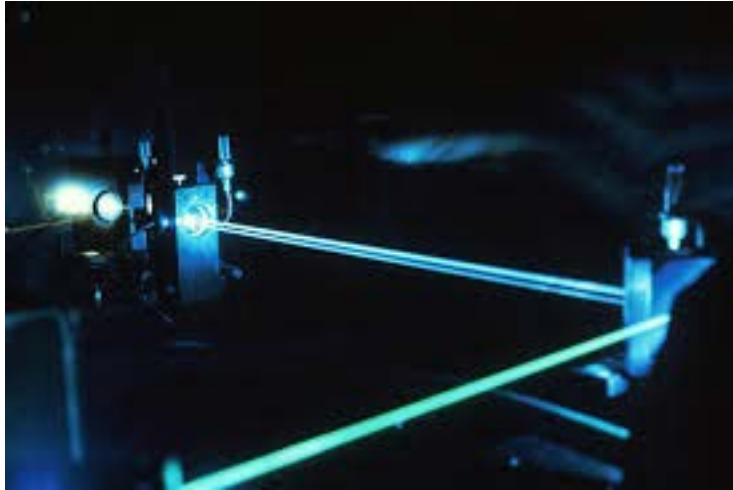
- + Where is the skilled workforce coming from?
- + Design and Engineering skills
- + Everyone has access to the same machines, people will drive the difference

- + Simulation and Analysis improve results
- + QA & Encryption drive quality and business model
- + Convert data to information

# AM is Team Sport

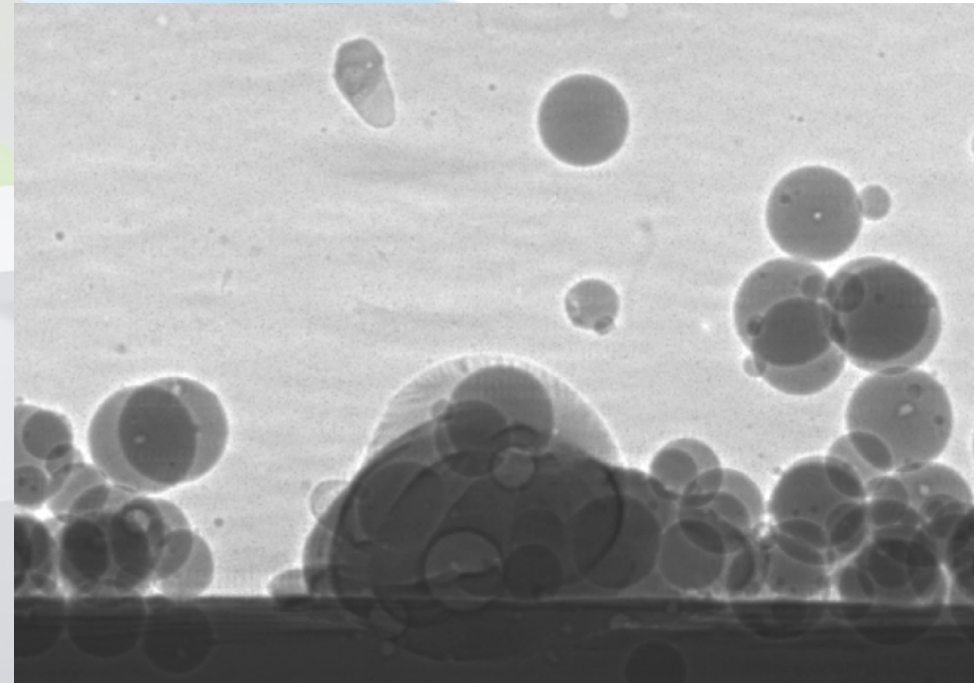


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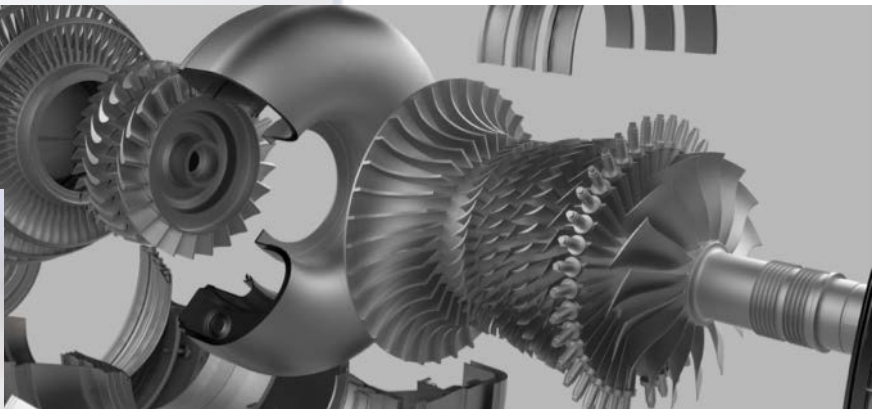
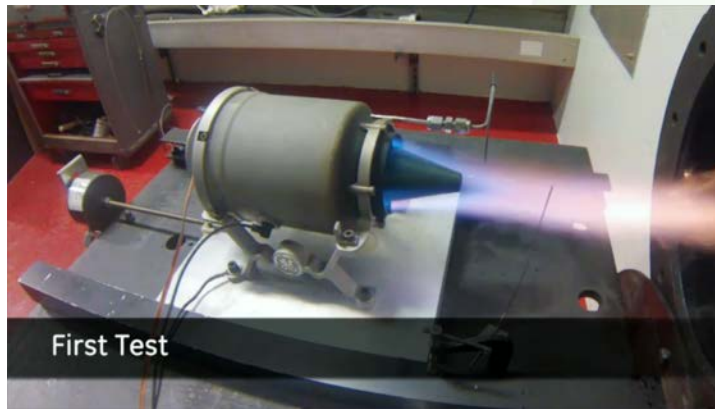
# Material

- Better Understanding of fundamentals involved in both powder flow/spreadability and metallurgy
- All powders are not equal
- More metals
- More conditions
- Better metallurgy
- Better performance



Rollett & Cunningham, Carnegie Mellon University

# AM Parts in Gas Turbines



# Thank you

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