WHAT WILL
3-D PRINTING
WITH METALS LOOK LIKE
IN 5 YEARS?

THE ABILITY TO MANIPULATE PART DESIGN, POWDERS, PROCESS, AND POST-PROCESSING SIMULTANEOUSLY IN A WAY THAT MINIMIZES COST AND TIME TO MARKET

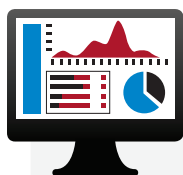**NextManufacturing**
Carnegie Mellon University

The NextManufacturing Center at Carnegie Mellon University is defining the future of metals additive manufacturing.

HERE'S WHAT NextM RESEARCH WILL CHANGE IN THE NEXT 5 YEARS:

PROCESS DESIGN
Users will be able to design the additive manufacturing process as they design their parts, thereby optimizing the process variables based upon the part geometry and specifications.

MONITORING AND CONTROL
Users will be able to monitor and control the additive manufacturing process. Current processes are not significantly monitored or controlled by sensors.

MATERIAL MICROSTRUCTURE
Users will be able to vary the material microstructure and properties in different locations of a part by manipulating additive manufacturing process variables as a part is being built.
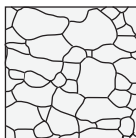
POWDERS
Users will be able to choose from a wide variety of powders. Currently, users are limited to specific powders with very narrow ranges of particle sizes, which makes them expensive to produce.

POROSITY
Users will be able to control porosity to suit the intended use, especially for fatigue or fracture-limited applications.

PART QUALIFICATION
Users will be able to apply machine vision and machine learning across additive manufacturing for more standard part qualification.

ALLOYS
Users will be able to use materials that are optimized for additive manufacturing processes and their high cooling rates. The alloys currently used were actually designed for conventional manufacturing processes.

Carnegie Mellon University
College of Engineering

Read more about how the NextManufacturing Center is defining the future of additive manufacturing from metals to bio-printing at
www.engineering.cmu.edu/next