3-D PRINTING
METALS MAP

Because of research from the **NextManufacturing Center**,

metals additive manufacturing (3-D printing) will change drastically over the next five years. The center is developing an entirely new approach—merging data from all parts of the process to create a fully integrated understanding of the technology.

A **HOLISTIC** APPROACH

MATERIALS
- microstructure control
- defect structure/porosity
- material recycling
- new alloy development

PART INSPECTION AND QUALIFICATION
- machine learning and computer vision
- nondestructive evaluation
- mechanical testing

DESIGN
- geometric design
- topology optimization
- design optimization

NextManufacturing
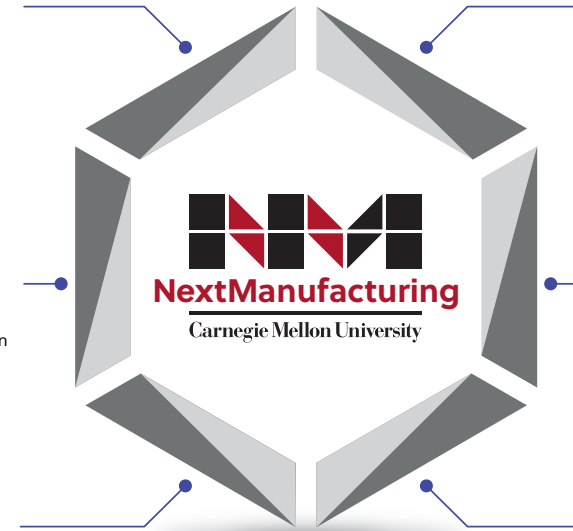**Carnegie Mellon University**

PRINTING PROCESS
- powder spreading
- melt pool geometry
- process modeling and process mapping
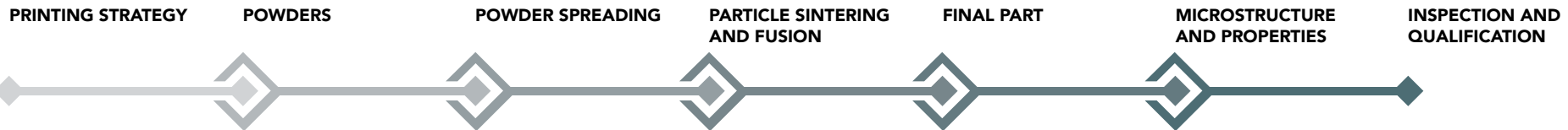- laser powder bed, electron beam, and binder jetting processes

INDUSTRY APPLICATIONS
- innovative component fabrication
- 3-D printing equipment training

COST
- manufacturing feasibility
- technology commercialization modeling

END TO END: 3-D PRINTING METAL PARTS

PRINTING STRATEGY | POWDERS | POWDER SPREADING | PARTICLE SINTERING AND FUSION | FINAL PART | MICROSTRUCTURE AND PROPERTIES | INSPECTION AND QUALIFICATION

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**

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