Brookhaven Metal Additive Manufacturing Workshop Welcome

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U.S. DEPARTMENT OF **ENERGY** | Office of Science

BROOKHAVEN
NATIONAL LABORATORY

The National Synchrotron Light Source II

- The Nation's newest light source

- Offers coherent, intense synchrotron light ranging from infrared light to hard x-rays for materials discovery

- Department of Energy User Research Facility

- 6 scientific programs supporting materials, chemistry and biology

- 28 world-class beamlines for diffraction, imaging, spectroscopy and scattering

- Experimental support by expert scientific and technical staff

- World leading expertise in *operando* and *in situ* experiments

The Center for Functional Nanomaterials (CFN) develops and offers state-of-the-art facilities for creating, characterizing, and understanding nanomaterials
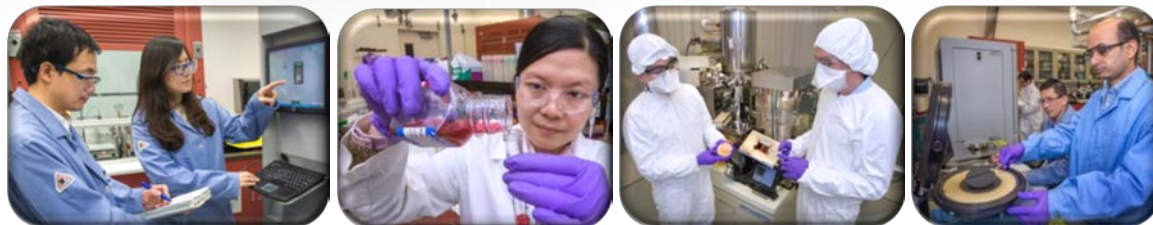
Materials Synthesis

Nanofabrication

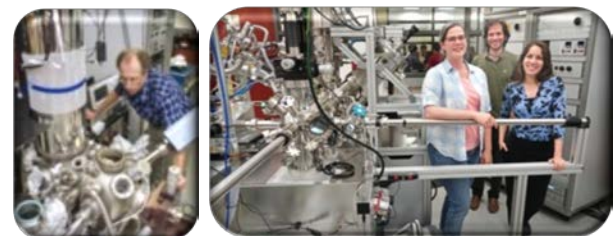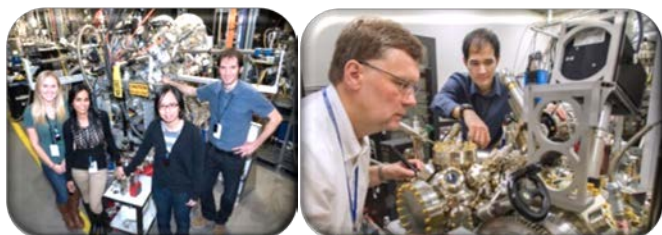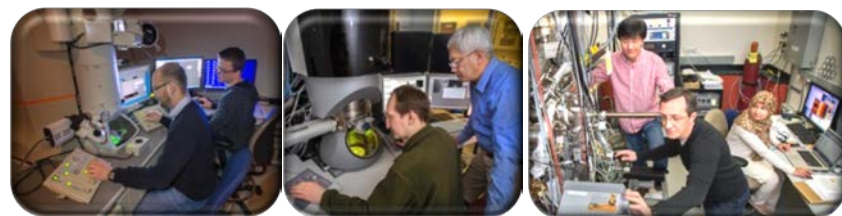Proximal Probes

Electron Microscopy

Advanced Optical Spectroscopy and Microscopy

Advanced X-ray and UV Probes @ NSLS II

Theory and Computation

- CFN invests >$2M each year in new capabilities to remain state-of-the-art

- e.g., (2018) lab-based ambient-pressure XPS; AFM-IR; upgrade TEM sample prep equip

Brookhaven Lab Metal Additive Manufacturing Strategy

The Metal Additive Manufacturing Strategy of Brookhaven Lab aims at combining techniques which provide **multi-length scale information** on statistically relevant ensembles with **data analytics** to correlate specific structural defects with failure probability. Ultimately, the approach allows establishing a **database** of reference information to verify and validate 3D printed structures and materials for superior performance and extended durability.
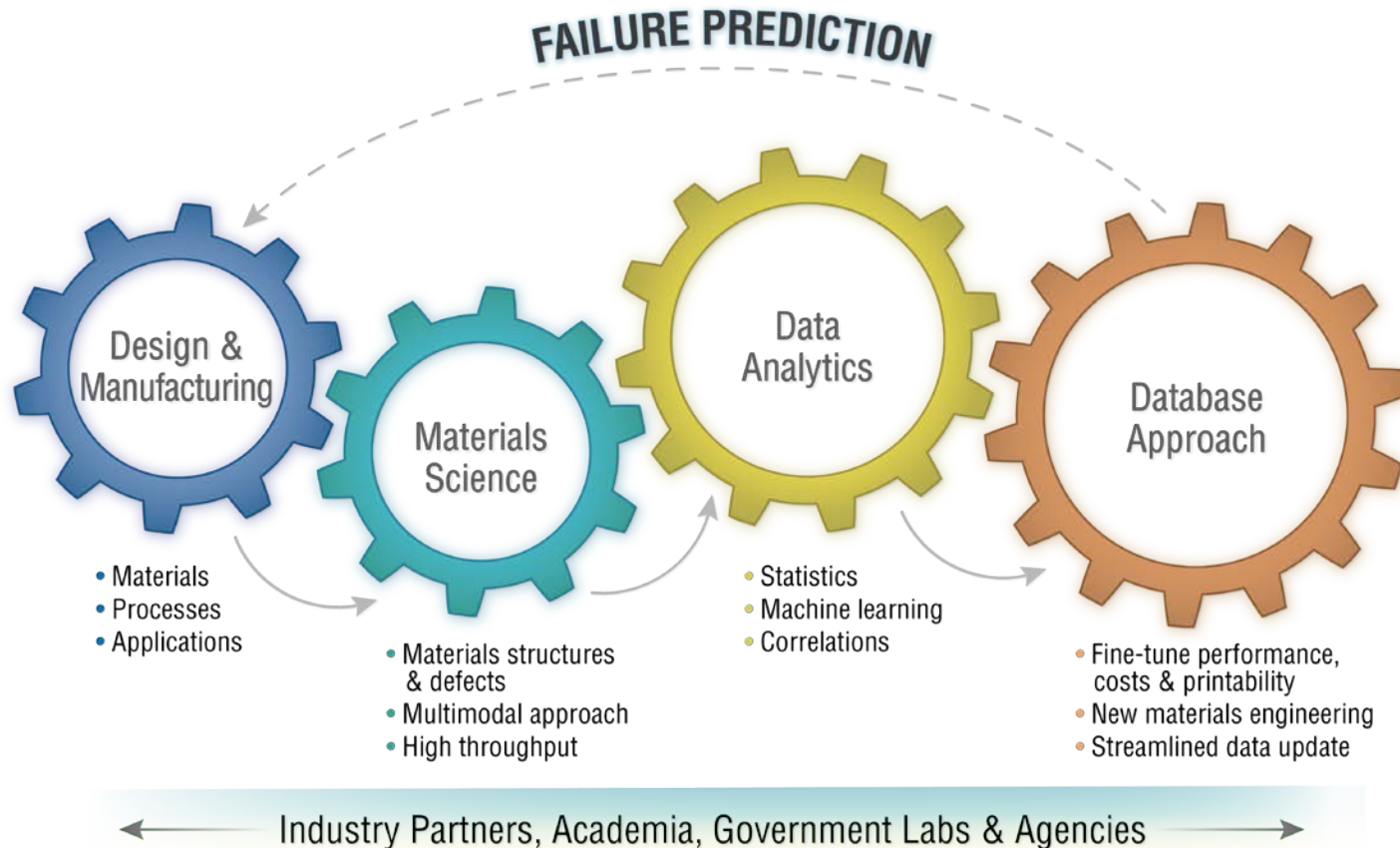
Access to National User Facility

- Non-proprietary: peer-reviewed access - free
- Proprietary: beamtime full cost recovery
- Other mechanisms
  - Strategic Partnership agreements
  - Collaboration Research and Development agreements

Potential Funding

- Joint proposal to STTR/SBIR
- Joint proposal to DoE/DoD
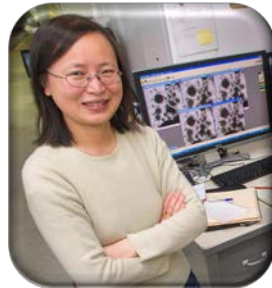- Joint proposal to State funding agency

Industrial Research Support

- Dedicated industrial research program
  - Rapid access
  - Technical consulting

- Industrial Liaison Officer:

  Dr. Jun Wang
  Email: junwang@bnl.gov
  Tel: (631) 344-2661

Metal Additive Manufacturing Strategy

Technical expertise:
- Characterization of structural and functional components.
- Reliability evaluation.
- Development of data analytics to identify failures in structures and processes.

  Coordinator:
  Dr. Alessandra Colli
  Email: acolli@bnl.gov
  Tel: (631) 344-2666

Workshop Goals

- Introduce Brookhaven Lab as partner in developing reliable Additive Manufacturing processes and components.

- Provide a platform to develop a business model for most efficient integration of characterization tools, data analytics and databases.
  - Correlate material analysis tools with specific industry problems.
  - Coordinate data analytics and database approach to achieve failure predictions.
  - Define pilot projects to estimate required resources and validate the approach.

- Allow networking with industry to identify partners and collaborations.

- Prepare a summary report that identifies the specific needs of the Additive Manufacturing industry and tune the Brookhaven Lab strategy accordingly.