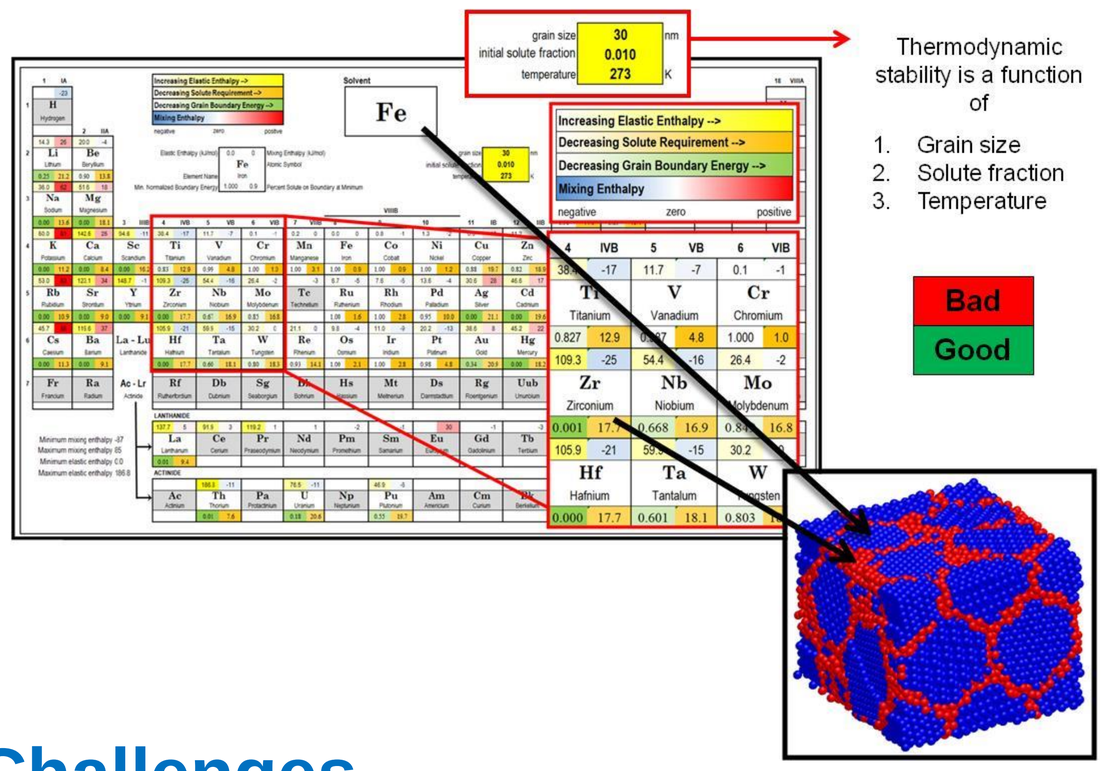
Stabilizing and Synthesis of Nanocrystalline Alloys for Future Army

S&T Campaign: Materials Research
High Strain Rate & Ballistics
Lightweight & Specialty Metals

Kristopher Darling
(410) 306-0862
kristopher.darling.civ@mail.mil

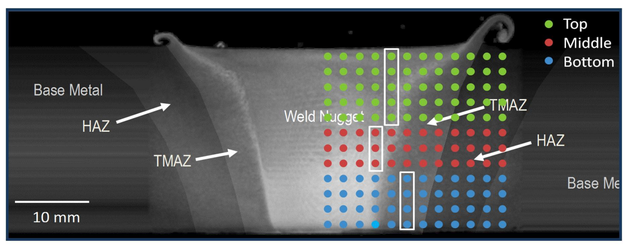
Research Objective

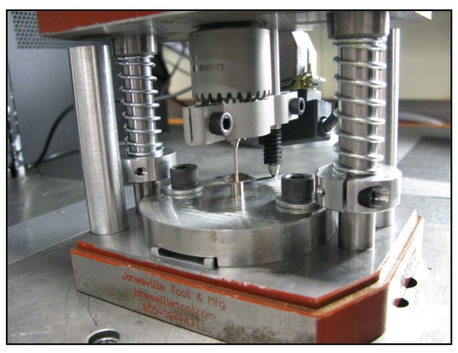
- **Develop bulk, thermally stable nanocrystalline materials with tailored properties for Future Force structural and ballistic applications.**
- **Establish structure processing property relationships utilizing advanced computational and characterization techniques**

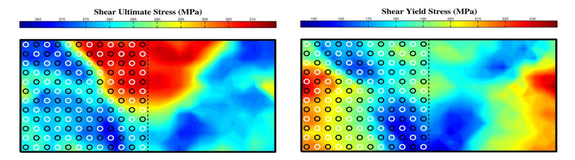


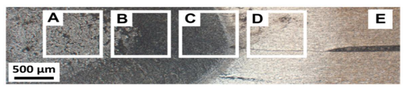
Challenges

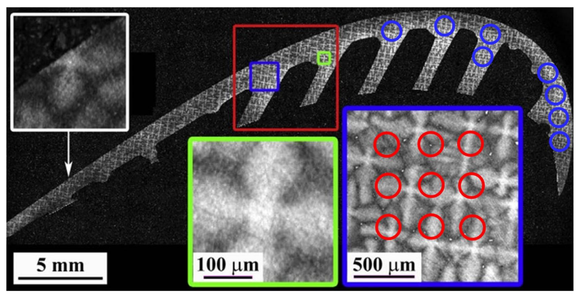
- **Develop quantitative understanding of interfacial science to predict stability**
- **Extract this information, using sophisticated electron microscopy techniques for atom-by-atom analysis of interfacial structures**
- **Advanced computational modeling of complex structures**
- **Novel small scale mechanical testing**
- **Forge new territory in process consolidation**

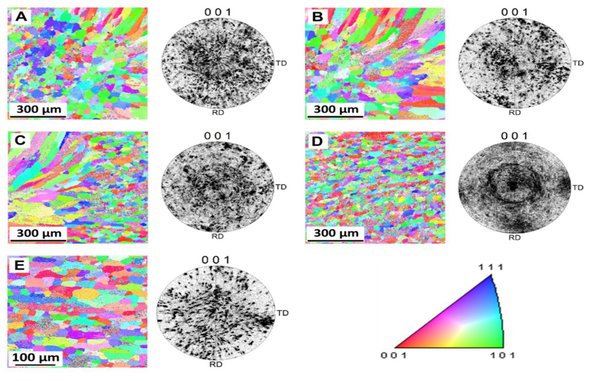








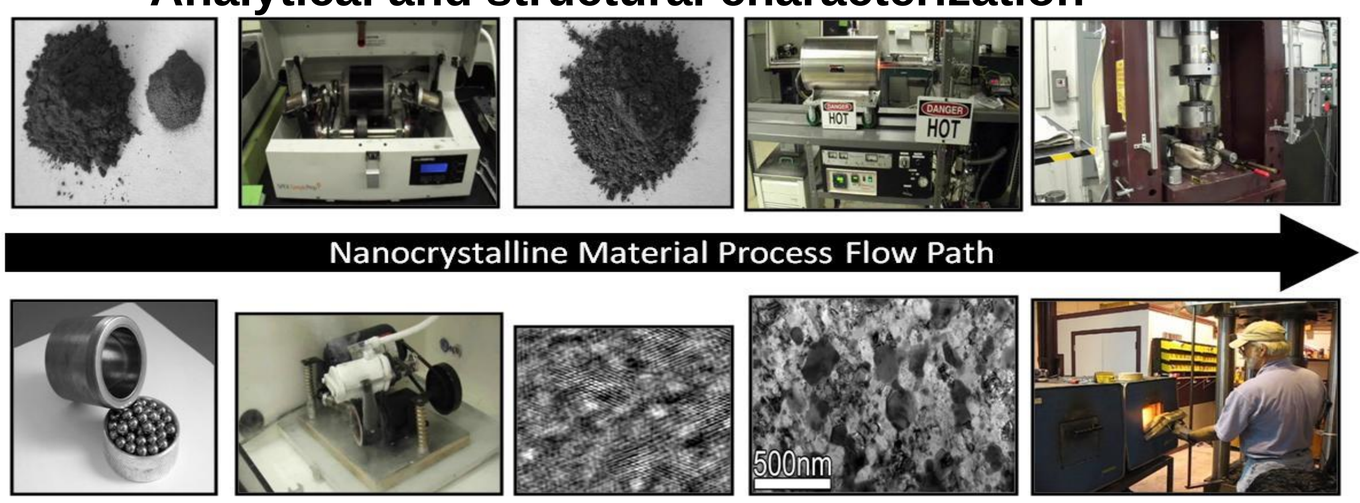




Novel Small Scale Testing

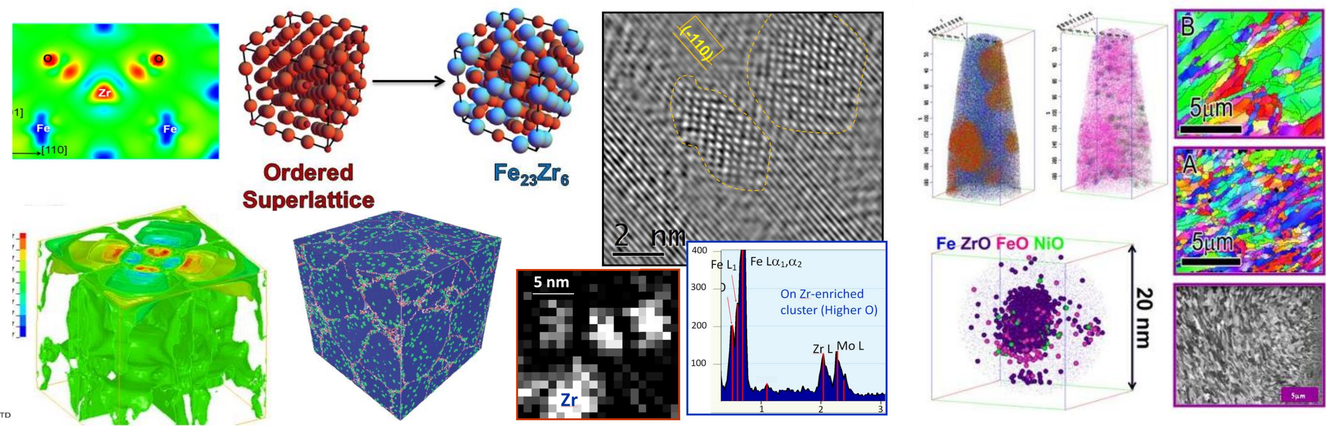
ARL Facilities and Capabilities Available to Support Collaborative Research

- **Concept and rapid assessment powder metallurgy laboratory**
- **Large scale prototype powder metallurgy laboratory**
- **Small scale mechanical testing laboratory**
- **Analytical and structural characterization**



Complementary Expertise / Facilities / Capabilities Sought in Collaboration

- **Large Scale Process Consolidation: HIPing, Extrusion and or other high temperature forging techniques.**
- **Aberration corrected transmission electron microscopy**
- **Melt-spinning and spray atomization for novel powder feed synthesis**
- **Expertise in Thermocalc for phase diagram and precipitate evolution**



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