Investigation of Phase Relations and Reaction Pathways in Pnictide Superconductors

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- Investigate all potential high-temperature superconductors (HTS)
- Focus on cuprates and pnictides
- Developed pathway to form pnictides – mechanically activated self-sustaining reaction
- Currently studying BaFe$_2$As$_2$
  - Polycrystalline bulk - FSU
  - Thin films UW-Madison and Temple (Bicrystals, superlattices)
- Studying transport across grain boundaries, which is a key weakness in HTS
- REU students (UPRM) refurbished DTA for phase studies (2011); building a calorimeter (2012)

- Build calorimeter to investigate thermodynamics of pnictide reactions

Bicrystals - Current decreases with increasing grain boundary angle

Polycrystal - Current in (Ba,K)-122 crosses high-angle grain boundaries