Ph.D. dissertation on

Computational Modeling: Additive Manufacturing of Shape Memory Ceramic for Civil Engineering Applications

Overview. Based on the 2017 Infrastructure Report Card from the American Society of Civil Engineers (ASCE), 24% of public-school buildings were in fair or poor condition and 40% of the 614,387 bridges in the National Bridge Inventory were 50 years or older and 9.1% were structurally deficient. To address the emerging and critical problems associated with a rapidly decaying infrastructure, a fundamental rethinking of material performance and manufacturing is required. This project on advanced manufacturing of metal matrix composite aims to understand and explore a new potential for the phase transformation mechanism of ZrO_2 ceramic, and study the underlying fundamentals and identify exciting opportunities for a new additive manufacturing process to drive innovations in a new generation of holistically superior, energy/stress dissipative materials and structures. The ideal candidate will be proficient in solid, damage, and computational mechanics, with a strong interest in the mechanics and physics of composites. Coding experiences would be appreciated.

Advisors: Prof. Maryam Shakiba (Civil and Environmental Engineering), Prof Kathy Lu and Prof. Hang Yu (Materials Science Engineering)
Duration: 3 years, starting in Spring 2020.
Location: Virginia Tech campus at Blacksburg, VA., U.S.A.
Salary: Full funded GRA position.
To apply: Send CV, transcripts, and letter of motivation to mshakiba@vt.edu