Currently there are two main projects for undergraduate involvement in Dr. Rabiei's group:

1. New generation of Metallic Foams: The objective of this research is to develop new generation of metallic foams and metallic foam matrix composites with light-weight and ultra strength properties. The undergraduate students will be teamed up with graduate students to process new metallic foams using casting and powder metallurgy techniques. The new metallic foams and metallic foam matrix composites will then be characterized, using various mechanical and material characterization techniques, in order to evaluate their properties and modeling their failure. This project has been funded by the National Science Foundation through a CAREER award.

2. High temperature thin film shape memory alloys (SMA): The objective of this research is to develop a thin film high transition temperature SMA micro-actuator for Micro Electro Mechanical Systems (MEMS). The undergraduate students will be teamed up with the graduate students to process new thin film SMA through Ion Beam Assisted Deposition (IBAD) technique for micro-actuators application. The composition, Crystallinity, mechanical and microstructural properties of the material will then be characterized using various experimental tests. In a final effort the test results will be used to fine tuning the processing technique.

3. Novel processing for thin functionally graded Hydroxyapatite coating: New processing technique will be developed for improving osseointegration of biomedical implants. Such osseointegration provides mechanical stability to the implant in situ, minimizes motion-induced damage to surrounding tissues, and is imperative for the clinical success of bone implants. The new coating selectively increase bone formation while limiting functions of competitive cells that lead to soft tissue formation.