

**EXECUTIVE SUMMARY:** *(State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project for California.)*

When medical devices are implanted in the human body they see a unique environment that is not typical for engineered products. They are subjected to repeated loading due not only to the nature of human activity, but also due to the fact that the cardiovascular system pulsates at an average rate of 72 beats per minute. Cyclic loading can significantly reduce the service life of medical implants; this is called “fatigue”. Another factor that can affect the service life is the chemistry of the human body with which implants come into contact. Current fatigue test methods do not adequately address the unique needs of medical devices either because the environment is not accurately reproduced during the testing, or, the test methods are extremely expensive. In this project engineering students will collaborate with the PI to design and develop a new fatigue test method and apparatus that can use actual wires and hypotubing that are used in medical devices. Upon completion of the fabrication of the equipment the students will use it for their research. The PI will use this as the basis for developing proposals for submission to the National Science Foundation. It is also expected that several companies that design and manufacture medical devices will be interested in accessing this new testing capability. This will result in California companies having access to improved testing capabilities for their medical devices. Engineering students will also receive education and training on the application of engineering knowledge and skills towards improved design and construction of medical devices, especially implantables.