

**EXECUTIVE SUMMARY [NON-CONFIDENTIAL, NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]:** 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 relevant to California. Do not include proprietary or confidential information. This may be distributed before the funding decision has been finalized.

The goal of this project is to attempt to understand the basic responses responsible for mechanical toughness in hydrogels and to use this knowledge to design tougher materials for a synthetic cornea or synthetic corneal onlay. Using new and controlled network-forming chemistry, we plan to systematically prepare a series of model hydrogels with carefully controlled architecture. Mechanical testing will allow us to develop a model for a tougher cornea. A basic understanding of the structure-property relationships for these solvent-swollen networks is of crucial importance to the design not only of corneal materials but for an enormous variety of materials applications and is of fundamental scientific value. This collaborative effort between Cal Poly SLO, IBM-Almaden, and Stanford University's Medical School and Department of Chemical Engineering provides a valuable partnership for the CSU. CSUPERB funding will help provide training for students in the field of biomaterials and will assist in the development of a basis for future collaboration. This project emphasizes the interdisciplinary nature of biotechnology research by fostering interaction between scientists (students and faculty) in areas as diverse as synthetic chemistry, materials science, polymer chemistry, chemical engineering, and medicine.