

**EXECUTIVE SUMMARY [NON-CONFIDENTIAL, NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]:** State 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.

There is a pressing need in the United States for new medicines to treat all sorts of ailments, from bacterial infection to high blood pressure to cancer. The main strategy for the discovery of these pharmaceuticals in the 21<sup>st</sup> century is by making many different chemicals and testing each one for their efficiency at combating the disease in question, by a process termed *combinatorial chemistry*. Combinatorial chemistry uses automation (robots!) to do the work of many people and make whole libraries of chemicals all at once. Every biotechnology or pharmaceutical company in the world has realized in the past decade that the more potential new drugs you can make and evaluate, the better chance you have of finding one that will be medically useful. However, the widespread introduction of this technology and its applications in industry has not yet been followed by its use and instruction in undergraduate chemistry courses and laboratories at colleges. This project seeks to introduce the techniques of robotics and combinatorial chemistry in a lab course aimed at chemistry and microbiology majors, to teach them the techniques involved in making, identifying, and testing large numbers of new molecules using automation. The ultimate goal is to produce graduates with an ability to step right into the environment of a biotechnology company and carry out these procedures, in the hope that one day they will help discover a new medicine using this method, to the benefit of all of society.