

Assessing Science Inquiry and Leadership Skills (AScILS): An NIH-Funded Study to Support Biomedical Research Career Development, August 1, 2004 through June 30, 2008
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### **Project Description**

This four-year project aims to strengthen programs that promote success in biomedical research careers, particularly by underrepresented minority students. UCSC has a long-standing network of successful programs, such as ACCESS, MBRS/MARC, the Center for Adaptive Optics, and COSMOS. Faculty, staff, and students from these and similar programs at UCSC and sister CSU and UC campuses will be invited to participate. The research questions are: 1) how do program activities, particularly research participation and mentoring, influence: a) students' skills in science inquiry and teamwork, b) their beliefs in these abilities, and c) their stage-appropriate career outcomes; and 2) are these influences similar for minority and non-minority students.

Successful science careers demand high ability both in the scientific inquiry process and in scientific leadership and teamwork. Scientific inquiry skills can be thought of as the ability to design and carry out research studies by applying scientific tools and procedures to address a research question. In the scientific leadership and teamwork skill set, we include establishing and communicating vision, developing and using resources, developing and implementing action plans, and leading and participating in group processes such as decision-making and delegation.

Our study of these skill sets will involve students from high school, community college, undergraduate, and graduate levels. An Alumni Retrospective Survey will involve alumni from science support programs and a comparison group of science graduates who did not participate in formal programs. These responses, as well as qualitative information from current program participants, faculty, and staff, and from field observations will provide the foundation for developing simulations that serve both as performance-based assessments and as educational experiences. Simulations are standardized assessments in which program participants, either individually or in teams, perform tasks designed to contain key elements of the research process such as framing hypotheses, interpreting results, etc. In the COSMOS Simulation and Survey, high school students recruited because of their high abilities in science and mathematics will participate at the beginning and end of their four-week residential programs during summer 2006 and 2007. In the Undergraduate Simulation and Survey, undergraduates involved in science support programs and a comparison group not involved in those programs will participate in the simulations at the beginning and end of the 2006-07 academic year. One-year follow-up surveys will document academic outcomes and career interests.

In addition to the scientific contribution of this study, assessment tools and simulations will be useful for relevant programs. They can be embedded as learning objects in the program activities themselves, serving both to evaluate education needs and to develop skills. The research will inform program designers as they consider the length of research experience, complementary activities, and new models for building research into broader educational settings.

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