

The Role of the UC-Riverside Statistical Consulting Collaboratory  
In Undergraduate Research and Mentoring (thru March 8, 2007)

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The Collaboratory has facilitated a number of opportunities for supported undergraduate research for students from a variety of majors. Since the Fall of 2003, there have been 9 different undergraduate students who have been members in the Collaboratory working on collaborative research projects that provided hourly stipends. One of the major projects was a knowledge database discovery (KDD) project for the Department of Homeland Security which provided 12-month positions for four students from statistics, computer science, physics and mathematics. These undergraduate students worked with graduate students from statistics and gained an appreciation for inter-disciplinary research. The physics student continued his work on the project over the summer as an intern at Bell Laboratories. The project involved the development of a software tool that generates synthetic data sets for the purpose of testing data mining algorithms. All of the undergraduate students are co-authors of research papers that were accepted into refereed engineering and data mining conferences SIGKDD 2005, ITNG 2006 and MILCOMM 2006. One of the computer science students presented his role in the research at the 2005 Southern California Conference on Undergraduate Research (SCCUR) that was hosted by UC-Riverside.

Another significant project involved the development of a hand-held sequential sampling device and employed an undergraduate computer science major working with two graduate students from statistics. This project grew out of collaborative research with a professor in the Entomology department at UC-Riverside. The device, which implements classic sequential sampling protocols such as SPRT, 2-SPRT and Sequential Bayes algorithms is targeted toward the market of pest management advisors who need a portable device to enable the use of efficient sequential sampling procedures. The computer science student and one of the graduate statistics students won first prize in a 2005 poster contest sponsored by the local chapter of the American Statistical Association.

A project related to Statistics Education is our on-going STATGAMES project where a suite of animated games has been developed over the past three summers for the purpose of enhancing the prospect of high school students choosing statistics as a college major. Undergraduate students from computer science, computer engineering, physics, business administration and graphic arts design have been involved in the project and their roles have been software development, graphical and user interface design, script writing, and system testing. The students have presented their work at meetings of the local chapter of the American Statistical Association, and in May 2007 the business administration student (along with two statistics graduate students) will participate in a poster presentation at the regional EDUCAUSE conference in San Francisco. The business administration student has also been selected by UCR to star in a recruiting video that is being made to market the undergraduate research opportunities at UCR to prospective in-coming students. All of the undergraduate students associated with this project have presented posters at either the 2005 or 2006 SCCUR conferences.

Another on-going collaborative project in the Collaboratory involves research and development of change-point algorithms for network surveillance. An undergraduate computer science major has participated in this research over the past 12 months, including a summer internship at the sponsoring company Integrien Corporation. The computer science student has worked closely with two graduate students in statistics to implement and test innovative change-point algorithms within the client's test bed network. All of the students, including the undergraduate student, are co-authors of a paper submitted to Journal of Quality Technology. The computer science student also presented his role in the research at the 2006 SCCUR that was hosted at Occidental College.

The Collaboratory has employed a statistics undergraduate student for the past 3 quarters (and will continue in the spring 2007) to help with traditional statistical consulting activities. Her most recent activity has been to participate in the use of CART to build a classification tree for predicting successful graduates of an anti-poverty program being run by a Riverside county government office. The activity afforded her an opportunity to learn both about tree classifiers as well as logistic regression. She has also helped the Collaboratory recently with some efforts relating to our website maintenance.

During the summer of 2005 the Collaboratory hosted an undergraduate mathematics major that was enrolled in the CNAS Scholars program. The summer commitment for the scholars was to find a host that would mentor them for a 10-week summer research project. The student applied continuous-time discrete-state Markov models to a reliability modeling project the Collaboratory was engaged in for Lucent Technologies, and during this activity he learned not only of the modeling methodology but also obtained skills in using the Relex software tool that facilitates designing and solving elaborate Markov models. He presented his work at the 2005 SCCUR conference.

Finally, the Collaboratory has been instrumental in helping the University administrators unravel several important questions pertaining to undergraduate curriculum issues. Data analyses by the Collaboratory have helped in deciding which of two academic entities was more successful at preparing international students to pass an English communications skills class, and whether or not a discussion section format improved the pass rate of freshman chemistry. The Collaboratory is currently involved in an analysis of survey data to identify the most influential factors that influence why incoming freshman decide to select UC-Riverside over other UC campuses. The Collaboratory is a visible player in undergraduate recruiting events, both on-campus and off-campus such as being a paying sponsor of the Career Day that is organized by the local chapter of the American Statistical Association. The Collaboratory participation at Career Day encourages the attendance of our undergraduate statistics majors who benefit from the industry exhibits and the selected speakers.

The Collaboratory wants to acknowledge and thank Pengyue James Lin for his voluminous contributions toward our mission of providing undergraduate research opportunities. James, the Chief Technology Officer of the College of Humanities, Arts and Social Sciences, has worked with us to plan software designs and architectures that are needed for several of our projects, and then helped us recruit and provide mentoring and oversight to undergraduate students from his group that work in the Collaboratory and realize the plans.