



The University of California Cal Teach Program: Recruiting Highly Qualified Future Teachers of Mathematics and Science

Edward Landesman and Gretchen Andreasen

Every Tuesday and Friday morning, Ms. Lindsey Wilson's eighth grade Algebra 1A students at Mission Hill Middle School in Santa Cruz, California, had some extra excitement when University of California, Santa Cruz (UCSC) senior mathematics major Crystal Calderón ('12) came to class. Crystal led warm-up activities, helped students solve algebra problems, and created answer keys, all in an effort to prepare herself for a career as a mathematics teacher. Crystal's confidence in achieving her goal was bolstered by knowing that her host teacher, Ms. Wilson, was in Crystal's position a few short years ago—an undergraduate mathematics major and an intern in the University of California Cal Teach program. As a result of her participation in Cal Teach, Ms. Wilson won a scholarship to enroll in UCSC's one-year MA/teaching credential program, and she is now in her third year of a successful teaching career.

Crystal and Lindsey each have been the beneficiaries of an agreement made in 2005 between

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This article was written during the 2011-12 academic year; program data and personal experiences cited reflect this timing.

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the University of California and the governor of California to increase efforts to recruit and prepare greater numbers of mathematics, science, and engineering majors for K-12 mathematics and science teaching careers. The agreement, the Science Mathematics Initiative, was a response to the decades-long shortage of well-prepared K-12 mathematics and science teachers, particularly in schools serving low-income students. The Initiative recognized the fact that nearly half of mathematics, science, and engineering baccalaureate degrees awarded in California are awarded by the University of California (UC) system.* In response to the Initiative, the recruitment of greater numbers of highly qualified mathematics and science teachers took on increased significance at UC, and each UC campus initiated a "Cal Teach" program.

Cal Teach at UC Santa Cruz

The UCSC Cal Teach program is typical of Cal Teach programs implemented since 2005 across the UC system. Cal Teach is designed not only to recruit more highly qualified future teachers but also to prepare those teachers to remain in teaching for the long term. At UCSC the program includes a sequence of three new seminar-type courses designed for prospective K-12 mathematics or science teachers, each course featuring a K-12 classroom internship. The coursework and internships have been incorporated into new undergraduate majors, including a physics

*Source of data is the California Postsecondary Education Commission website, <http://www.cpec.ca.gov/OnLineData/OnLineData.asp>, data for 2009.

education major that integrates a mathematics emphasis and a new science, technology, engineering, and mathematics (STEM) education minor. Mathematics majors participate in high numbers. Over one-third of participants in UCSC's program have been mathematics majors, and over one-half of the internships have been in mathematics classrooms. Through the new sequence of courses and classroom field work, undergraduates are introduced to students at various grade levels within middle schools and high schools and at multiple levels of performance, ranging from honors to remedial. The students also encounter host teachers and schools in communities of varying socioeconomic status and cultural diversity.

At UCSC, as on other UC campuses, a Cal Teach Resource Center was established and serves as the campus's central point for information about mathematics and science teaching careers and also coordinates the internship and academic programs. The center provides information to any interested undergraduate with appropriate mathematics or science preparation, to faculty and staff who may advise students, to prospective transfer students, and to professional scientists and engineers who may be considering career changes.

Statewide Efforts and California Community College Partnerships

Early in the formation of Cal Teach, the first author led a UC/California Community College (CCC) partnership to identify, support, and recruit community college students to teach mathematics and science. As a result, as many as twenty-five community colleges around the state developed internship programs similar to Cal Teach and formed relationships with their local UC campuses to ease the transfer of mathematics and science majors to the university. This year, for the first time, a UCSC Cal Teach mathematics major is working as a math tutor at UCSC's nearest community college partner (Cabrillo College), with a goal of expanding the recruitment of future mathematics and science teachers to UC.

Frances Venegas, now a successful fourth-year science teacher at Harden Middle School in Salinas, California, transferred to UCSC from her local community college. Frances credits Cal Teach with introducing her to teaching and with altering her career path. Frances started college in 2003 after twenty-two years in the restaurant business, planning to become a marine biologist. After an academic quarter of field work in French Polynesia, she returned to campus, where she enrolled in a Cal Teach internship. This catalyzed her decision to teach. Frances's experience reflects the importance of reaching out to community college transfer students in the Cal Teach recruitment process. The two-year California community colleges are the entry point to UC for many lower-income

students from diverse backgrounds who are underrepresented as mathematics and science teachers. These transfer students often express an interest in teaching careers and in returning to their communities to assist future generations of students. For example, Frances is now teaching in the same low-income community where she has lived for many years.

Impact

Since UC began its Science and Mathematics Initiative in 2005, over five thousand undergraduates system-wide have completed a K-12 classroom internship. Currently, Cal Teach programs across the UC system coordinate about two thousand classroom placements each year. As Cal Teach undergraduates across the state have gained crucial experience for their own professional development, they have also enriched the classroom experience of hundreds of thousands of K-12 students across California.

The teachers who serve as classroom mentors welcome the energetic and inspired college students as an additional resource in their classrooms and value the exposure of their students to these successful role models. At UCSC alone, over fifty teachers will host interns in at least ten regional schools this year. Most of these mentor teachers continue to volunteer year after year. One skilled and generous host teacher of over twenty-five UCSC undergraduates says he is waiting for the right Cal Teach graduate to come along to fill his job so he can retire! He may soon get his wish. Approximately two hundred forty UCSC Cal Teach students have graduated, and seventy-five (nearly one-third of those graduates) have entered a teaching credential program. Over twenty-five of these graduates have begun teaching in Santa Cruz or a nearby county. Of course, it is too early to have data on the relative effectiveness or retention of these recent Cal Teach graduates, but anecdotal evidence from school district collaborators suggests that the new teachers are thriving. One partner district is happily recruiting new teachers from the Cal Teach graduates, while another partner district was grateful to fill a midyear opening with a Cal Teach graduate. A third district reports that its new teachers with Cal Teach experience are "hitting the ground running."

Sustaining and Extending the Model

To continue to thrive, the UC Cal Teach program will require the ongoing support of university faculty in the mathematics, science, engineering, and education departments, as well as partnerships with community colleges and K-12 schools. The good will developed among the many partners and the successes of these first years, along with help from alumni and private donors who understand the importance of producing future highly qualified

mathematics and science teachers, should help sustain the program.

The Cal Teach model can be replicated. The single most important requirement for building such a program is the designation of a staff or faculty member whose time is committed to developing and sustaining the program. This effort includes the coordination of partnerships among the many university, community college, and K-12 stakeholders, as well as concentrated interaction with the students who participate. Most, but not all, UC Cal Teach programs are housed in a division of mathematics, science, or engineering with partners in the school or department of education. This partnership and organizational structure help to ensure that academic planning and student support are tailored to meet the needs of future math and science teachers.

A successful program of internships along with academic seminars also requires financial support to ensure small class sizes and to cover the costs of placing students in K-12 classrooms. On most UC campuses, stipends are provided to K-12 teachers who host the interns and to the interns themselves. Most host teachers would participate without an honorarium, although the honoraria do help build a sense of professional responsibility and commitment to the Cal Teach students. Similarly, many students would participate without internship "stipends", but the stipends help recruit a greater number of students and reinforce the value of their career choice. Details of the Cal Teach programs vary from campus to campus, depending upon local campus traditions and strengths. However, the basic model—engaging greater numbers of STEM majors to explore and prepare for future careers in K-12 teaching—has been implemented successfully on UC campuses throughout the state. The Cal Teach model can be replicated throughout the country. For further information about the program, the second author can be contacted at calteach@ucsc.edu.

Acknowledgment

Professor Landesman retired from the University of California in February 2011, but he continues to support future teachers through fundraising for UCSC's Cal Teach program. Dr. Andreasen serves as the director of the UC Santa Cruz Cal Teach program, collaborating with UC and CCC colleagues around the state.



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