

John N. Swift, *Occidental College*

Elizabeth L. Ambos, *Office of the Chancellor, California State University*

Cheryl Swift, *Whittier College*

Carolyn Ash, *California Institute of Technology (Retired)*

CUR Focus

A Regional Undergraduate Research Conference Comes of Age in Southern California

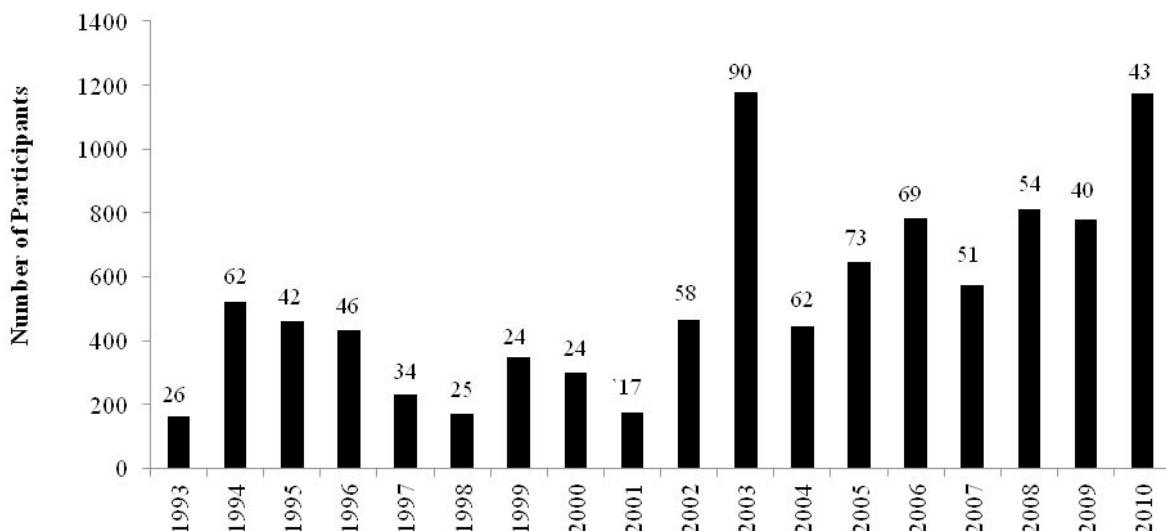
The Southern California Conferences for Undergraduate Research (SCCUR) had their origins in 1993 in a series of conversations within an informal, multidisciplinary group of faculty and administrators representing a few very different kinds of institutions: the California Institute of Technology and its affiliated NASA Jet Propulsion Laboratory; Harvey Mudd College (of the Claremont Colleges consortium) and Occidental College, both small liberal arts colleges; and California State University at Los Angeles. They shared a commitment to undergraduate research as a remarkably effective pedagogy, the kind of innovative practice that would over the next fifteen years come to be called “high impact” (e.g. Brownell and Swaner 2010; Kuh 2008). They also shared a belief that the research conference—the formal presentation of results—was a critical element of that pedagogy, instilling in student researchers discipline, professionalism, and a real sense of the community of scholarship and creative activity.

They saw that Southern California, as one of the most populated metropolitan areas in the United States and home to

more than 100 four- and two-year institutions of higher education, offered a promising location in which to create a multi-institutional network of undergraduate researchers and their mentors. Finally, SCCUR’s founders hoped that the non-traditional aspects of undergraduate research, which redefines professor-student relations as a collaborative inquiry, would be particularly appropriate to Southern California’s economic and cultural volatility, a faster track to success for the region’s many non-traditional and first-generation students (Engle 2007; Jenkins et al. 2009).

The first SCCUR conference, held on the campus of the California Institute of Technology in Pasadena on the Saturday before Thanksgiving in 1993, brought together 163 students and mentors from 26 public and private educational institutions for a day of oral and poster presentations in the sciences, social sciences, and humanities (Figure 1). Its form established the goals that have consistently guided SCCUR through its history: *multi-disciplinarity, inter-institutional collaboration, and diversity*. The first goal reflected a conscious agreement that undergraduate research was a

FIGURE 1. The number of SCCUR participants from 1993 to 2010. Numbers above the bars represent total participating institutions.



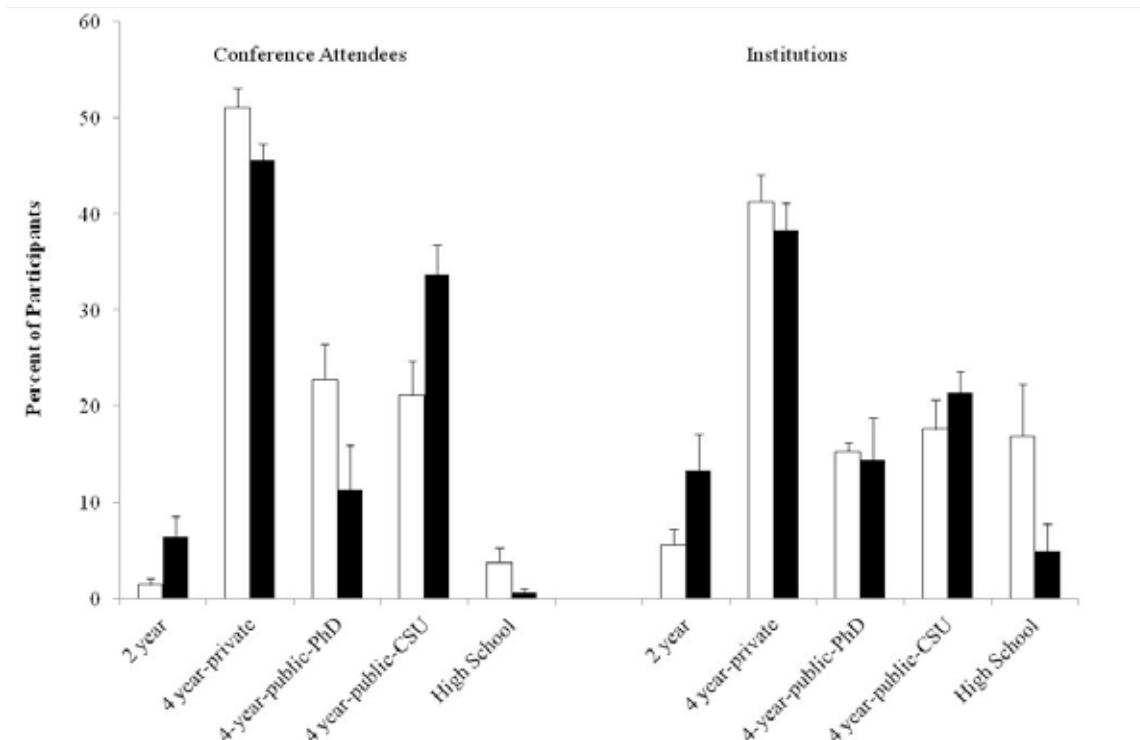


FIGURE 2. The percent of conference attendees and represented institutional types at SCCUR over time. Open bars represent 1993-1995 means and standard errors and filled bars represent 2008-2010 means and standard errors.

good pedagogy for all, from artists to engineers to history majors, and should not be limited to the training of specialists. The second supported a vision of an extended scholarly community, a regional web of students and faculty in conversation across institutional boundaries. The third, growing from the first two, urged that the doors (and resources) of high-quality higher education be opened wide for all kinds of students, at all stages of their educational journeys, at all types of institutions.

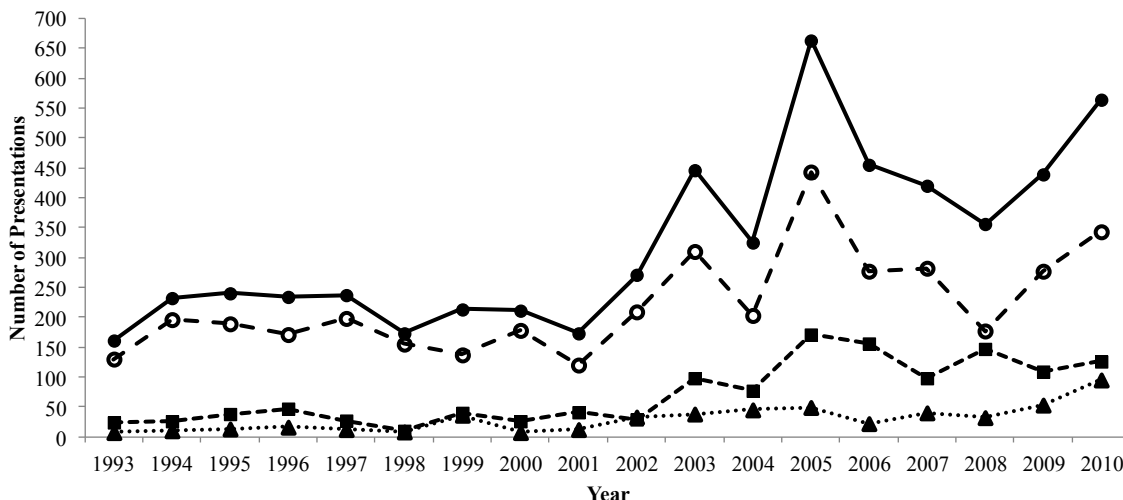
The success of the first SCCUR led to a much larger conference a year later in November, 1994, again at Caltech, with 520 participants from 62 institutions (Figure 1). In 1995 SCCUR moved to Harvey Mudd College in Claremont and began a long migration from host to host around Southern California (see Table 1), literally creating and mapping a great geographical community of undergraduate researchers and faculty mentors. In November 2011, the conference was hosted for the first time by a community college, Mount San Antonio College in Walnut, California; in 2012 it will move to California State University, Channel Islands, the northernmost point of its travels.

In its nearly twenty-year history, SCCUR has matured while maintaining its core values and structure. The format of the one-day conference has remained essentially the same: a cross-disciplinary mix of oral and poster presentations, art exhibits, and performances; keynote speakers (usually

well-known southern California researchers); and professional-development seminars, focused on student success in research and graduate-school opportunities. The goals also remain the same; however, much else has changed. The small, informal planning group of 1993 has expanded to a 21-member volunteer board of directors, and SCCUR incorporated in 2007 as a 501(c) (3) nonprofit educational organization. The board sought to expand SCCUR (and make it financially self-sustaining for the colleges and universities whose campuses host it) by branding it as a familiar, dependable presence in Southern California's landscape of higher education. The branding includes maintaining the Saturday-before-Thanksgiving date, designing a distinctive logo and website (<http://www.sccur.org>), and developing standardized guidelines and financial templates for host institutions.

And the annual conference has grown, achieving an average of 840 participants representing 56 institutions in each of the last five years for which data are available (Figure 1). SCCUR 2010 at Pepperdine University in Malibu, the last for which we have final data, attracted more than 1,100 participants from 43 institutions. Over the years, 237 institutions, most but not all of them in Southern California, have sent students and faculty to SCCUR. Several of these institutions regularly send contingents of more than 50 students each year; one (California State Polytechnic University at Pomona) has sent more than 100 participants annually for

FIGURE 3. The number of presentations in different disciplines from 1993 through 2010. Closed circles are total presentations, open circles are STEM presentations, closed squares are social sciences presentations, and closed triangles are arts and humanities presentations.



the last three years. Total participation at all of the conferences has been close to 10,000.

As the conference has matured, institutional participation has shifted to include more two-year colleges and students, and more California State University students and institutions (Figure 2). These patterns reflect substantial institutional investment (with many colleges and universities choosing to fund the registrations of large groups of attendees), investment particularly remarkable in light of the painful fiscal challenges faced by public higher education in California. SCCUR is sustained by and represents an increasingly stable regional commitment by higher education to undergraduate research as a core practice.

Growing Into Its Goals: SCCUR in 2012

What has all of this growth meant for the achievement of SCCUR's specific goals? The multidisciplinary aspect of SCCUR has increased steadily, mirroring national trends that have seen undergraduate research increasingly adopted as mainstream pedagogical practice by disciplines outside the sciences. While at the first SCCUR in 1993 only 19 percent of all presentations were in non-STEM (science, technology, engineering, and mathematics) fields, that percentage more than doubled by 2010 (Figure 3); even more strikingly, the combined number of oral presentations in the social sciences, arts, and humanities—23 percent of the total in 1993—rose to 54 percent in 2010.

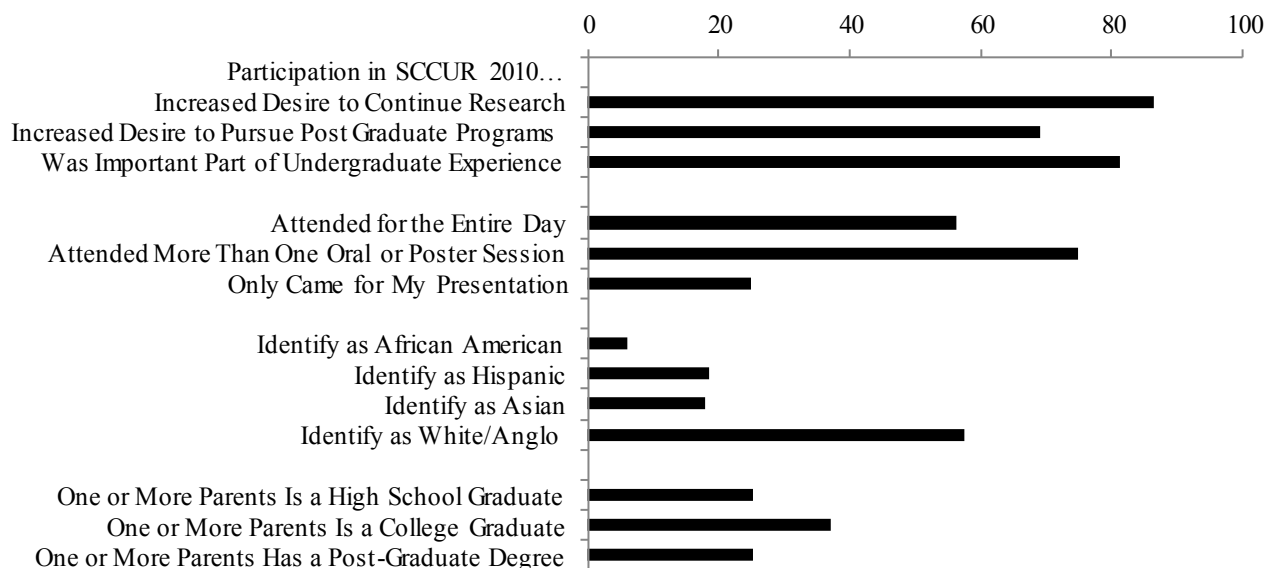
Moreover, SCCUR's growth and its increasingly broad footprint among Southern California colleges and universities (working in fortuitous concert with the developing technologies of electronic communication) have established de facto the kind of informal collaborative web of researchers that its founders envisioned. The staff of any individual SCCUR

conference is simultaneously local and inter-institutional, with the SCCUR board (which includes immediate past and future conference organizers) providing expertise and advice to the host institution.

Equally important, faculty mentors from participating schools volunteer as session moderators and abstract reviewers. SCCUR has adopted an online abstract-submission procedure in which each conference applicant must submit electronically a professional-quality abstract of her or his work to be read online by an anonymous faculty reviewer in the applicant's research field. Most abstracts are returned on first reading with instructions to revise and resubmit, and the process may move through two or more iterations before a final decision is reached. Thus a student presenting work at SCCUR has already experienced "real-world" peer review and feedback from a scholar other than his or her own mentor, and will experience it again vividly at the conference—in an oral session chaired by a faculty member from an unfamiliar institution, with an audience of students and faculty from still more colleges, or at a poster session, explaining his or her work to a similarly varied community of student and faculty researchers.

Finally, SCCUR's board of directors has kept its goal of diverse participation in the foreground of its planning. Its own nomination and election procedures ensure various kinds of diversity: disciplinary or professional (the board includes faculty, academic administrators, and non-academic professionals from the Los Angeles area); institutional, representing a broad range of the region's colleges and universities; geographic and cultural/ethnic/racial, reflecting the diversity of the student populations that SCCUR serves. Term limits maintain the board's flexibility and assure a fresh flow of ideas and perspectives.

FIGURE 4. Results of the survey of 2010 SCCUR participants. Bars represent the percentage of respondents strongly agreeing, agreeing, or responding “yes” to questions.



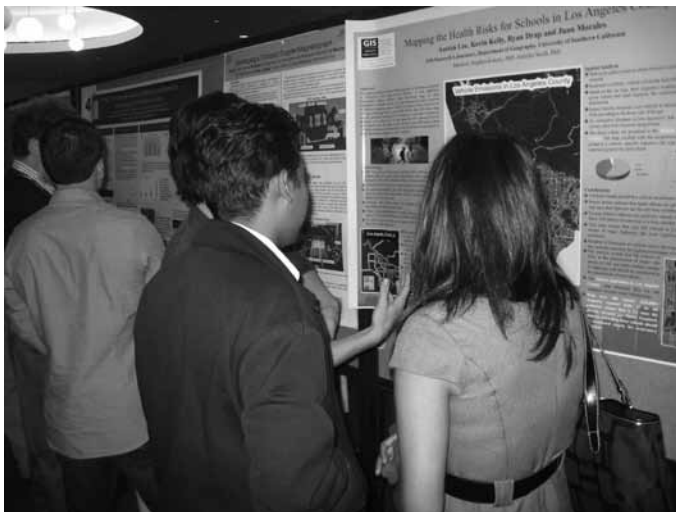
Intentionally identifying and negotiating with future host institutions, the board also has sought to expand the reach of undergraduate research, not only across the academic disciplines, but also engaging the heterogeneous sites of higher education in Southern California, including Hispanic- and minority-serving institutions as defined in federal programs—and among students from economic or racial/ethnic groups underrepresented in higher education (Figures 2 and 4). As Longtine and Jones (2011) point out in a recent *CUR Quarterly* article, additional investment in strategies to increase community college and Latino student success—and we submit undergraduate research conferences are one concrete step—are needed in order to successfully transition more students to baccalaureate degrees and beyond.

Various indicators suggest that SCCUR has mainly succeeded in making significant progress toward these objectives. Fourteen colleges and universities have hosted the conference to date, including three major public research universities in the University of California system, six private universities and small liberal arts colleges, four campuses of the California State University system, and, as noted, one community college. Half of these hosts are either Hispanic- or minority-serving institutions (Table 1). Participating institutions have represented an even broader range of institutional types, with the ratio of public to private increasing from 7:6 in 1993 to 2:1 in 2010 (Figure 2). And although no longitudinal data exist for the demographic or cultural/ethnic/racial diversity of individual participants in SCCUR conferences, a 2010 survey of Pepperdine attendees found that 42 percent identified themselves as non-white and that 25 percent were first-generation college students (Figure 4).

Table 1: List of SCCUR Host Institutions

SCCUR Host Institution	Conference Year
California Institute of Technology	1993, 1994, 2002
The Claremont Colleges	1995
Occidental College*	1996, 2006
California State University, Los Angeles**	1997, 2007
California State Polytechnic University, Pomona*	1998, 2008
Loyola Marymount University	1999
California State University, Long Beach*	2000
University of California, Los Angeles	2001
University of California, Irvine	2003
Whittier College*	2004
University of California, Riverside*	2005
California State University, Dominguez Hills**	2009
Pepperdine University	2010
Mount San Antonio College**	2011

* currently classified as Hispanic Serving Institution (HSI)
 ** currently classified as Minority Serving Institution (MSI)



Poster presenters at SCCUR 2009, California State University, Dominguez Hills.

The Pepperdine survey offered other indications that SCCUR has provided particular benefits to the diverse mix of students that it serves, in part by arousing their enthusiasm in direct, tangible ways. The conference's communal, celebratory atmosphere encouraged participants to learn from the work of others: 75 percent went to sessions other than the one in which they presented and 56 percent stayed for the entire day's program (Figure 4). More than 80 percent described SCCUR as an important part of their undergraduate experience and reported that participating in the conference had made them more appreciative of their research experiences, more eager to continue with them, and more interested in graduate school (Figure 4). In a narrative comment, one participant wrote that SCCUR "helped me see that there is indeed an academic community out there that is interested in the same obscure topics as I am." Another said that the experience "made me feel more included as a minority student from a historically black college." And another, responding to a question concerning the time spent developing and working on his or her research project, simply but eloquently wrote, "FOREVER!"

Challenges, Opportunities, and Lessons Learned

As SCCUR approaches its twentieth anniversary, it has become a Southern California institution. It has negotiated a number of challenges, most having to do with the complex, delicate relationship between the conference and its host institutions. SCCUR's initial choice not to attach itself to a single institution or even to a consortium of institutions, but to adopt instead the traveling model of the National Conferences on Undergraduate Research (NCUR), means that every year SCCUR must be re-imagined and re-tooled while maintaining its essential characteristics and values. Every year institutional administrators must be re-persuaded of the value (and fiscal practicality) of hosting the conference. (The conference is budgeted to break even, with excess revenues split between hosts and SCCUR, but these revenues are historically small and occasionally non-existent. SCCUR relies heavily on private donations and the work of its volunteer board.) Yet the board remains committed to the rotating



Student volunteers welcoming participants in SCCUR 2009, California State University, Dominguez Hills.

host model, whose extraordinary value to SCCUR's goals of multidisciplinary, community, and diversity more than outweighs its difficulties.

More than once in its first decade SCCUR seemed dangerously close to failing to find an annual host, and its core supporters realized that the conference would have to institutionalize itself—to adopt a more business-oriented approach (one at first not entirely comfortable for a group composed mainly of academics)—in order to survive. The result was incorporation as a non-profit entity able to do business with colleges and universities; the creation of a governing board with formal bylaws and financial and other operating procedures; and the development of detailed guidelines and agreements that are simultaneously comprehensive and flexibly responsive to the needs and resources of vastly differing hosts. A site-selection committee was appointed to identify hosts and secure commitments years into the future; a standard informational "toolkit" for potential hosts was written; and board members learned to talk with college presidents and chief academic officers about why their institutions need SCCUR as much as SCCUR needs their institutions. SCCUR today is a self-sustaining professional organization, its conferences under development three years into the future.

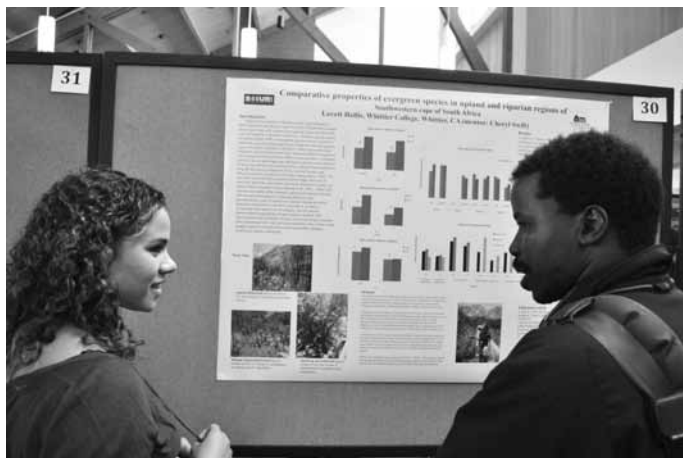
As SCCUR has become increasingly confident of its practices and future, and as the financial returns from conferences have created a small, but real, bank balance, the board is turning to two other major projects. The first is the creation of SCCUR-owned software for the conference's distinctive abstract submission and review process, as well as for conference registration, communications, and data storage. The last eight host institutions have either adapted software

developed at UC Irvine in 2003 or developed their own; in either case, the submission/review process and other online functions represent a substantial and sometimes prohibitive expenditure of institutional IT resources for hosts. The board has concluded that its highest priority must be shifting this responsibility to SCCUR itself, in order to make hosting the conference a real possibility for less wealthy or less technologically equipped institutions. (Relocating IT functions to SCCUR itself will also allow for better record-keeping generally, including the consistent recording and maintenance of longitudinal data necessary to ongoing planning—data similar to the results of the 2010 Pepperdine survey.) The second project is the development of a comprehensive, professional-quality fundraising plan that will build SCCUR's financial resources and allow it to assist host schools, student researchers, and their mentors in other ways. These include keeping conference registration fees affordable, developing grant assistance for students who can't obtain institutional support, and reinforcing the Southern California undergraduate research community at times and places other than the annual SCCUR conference.

The conference itself appears to be approaching its maximum capacity, around 1,000 participants, if the board remains committed to a one-day event (for reasons of participant affordability, among others) and to a meeting that even small colleges might host. But SCCUR will continue to evolve in other ways. The creative and performing arts have been inconsistently represented at the conferences, and although the number of presentations in these fields has increased overall, total conference presentations in STEM fields (Figure 3) clearly outnumber those in the arts and humanities, suggesting that more can be done to cultivate participants in the latter disciplines. The critical role



Students and faculty from Whittier College at SCCUR 2010, Pepperdine University.



Whittier College student Lovvet Hollis discusses her work with Whittier Professor David Mbora at SCCUR 2010, Pepperdine University.

of faculty mentors is not as well understood as it might be, particularly outside of the sciences.

The value of undergraduate research in community colleges is only beginning to be explored, and the choice of Mount San Antonio College for the 2011 conference was a major step in this exploration. As noted in Higgins et al. (2011), community college leadership in undergraduate research is essential to increasing successful transitions of community college students to four-year institutions. Further, the participation of members of minority groups in SCCUR is impressive, but still not fully reflective of Los Angeles' vital diversity. (SCCUR serves the double function of both *encouraging* greater participation of underrepresented minorities in undergraduate research and *recording* or publicly highlighting that participation.) Addressing these challenges will receive more attention in the future.

What have we learned from these years of planning, organizing, adjusting, and growing? And what have we encountered or done that's of use to educators in other parts of the country or world? In some ways SCCUR seems very much like any other multi-disciplinary undergraduate research conference—like NCUR, for instance, but on a smaller scale. It offers students a celebration of student work, an introduction to the conventions and necessities of professional academic life, and a face-to-face exposure to the ongoing conversation of scholarship. From another perspective, some of the genuinely distinguishing features of SCCUR seem particular to its Southern California location. Its emphasis on diversity, for example, is necessitated and enabled by the demographics of its region, and its creation of a genuinely multi-institutional research community is made possible by the unusual number of colleges and universities in the greater Los Angeles area. Some other major metropolitan areas of the U.S. present similar demographic and educational environments, but potential organizers may find SCCUR's goals difficult to import to relatively isolated rural institutions or institutions in more culturally, ethnically, or economically homogeneous regions.

We believe, though, that our conference's goals are worth considering everywhere and that gradually creating an extended and diverse undergraduate scholarly community is an achievable objective. Few colleges or universities are so

profoundly cut off from physical contact with other institutions as to preclude scholarly interactions among students, and twenty-first century communications technology has made complex long-distance collaboration completely possible. Moreover, no region is so homogeneous as to make attention to diversity unnecessary for educators; nowhere is access to the resources of higher education wholly equal and in no need of improvement. In more practical language, we know now from thirty years of practice and assessment that experiences of undergraduate research and creative activity are consistently associated with the traditional indicators of educational success, higher retention and graduation rates (e.g. Lopatto 2009; Nagda et al. 1998). As educators and citizens, how can we not seek to build an academic landscape that makes these experiences available to all?

Acknowledgements

This paper was the result of extensive discussions between and among members of the SCCUR Board of Directors, all of whom (see <http://www.sccur.org> for a listing of board members) have contributed greatly to the ongoing success of SCCUR. The authors want to particularly acknowledge the leadership of current Board Chair Frank Ewers (California State Polytechnic University, Pomona); SCCUR 2010 hosts Steven Davis and Janet Davis, without whom the survey conducted in 2010 would not have been possible; and the dedication and institutional memory of William Whitney, former treasurer of the board, and a staunch SCCUR supporter.

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John N. Swift

Occidental College, swiftj@oxy.edu

John N. Swift is Associate Dean of the College for Curriculum and Student Issues and professor of English and comparative literary studies at Occidental College, where he teaches courses in modern British and American fiction and poetry and general American literary history. He was the founding president of the Board of Directors of the Southern California Conferences for Undergraduate Research, and he has been a member of the Board of Governors of the National Conference on Undergraduate Research. He currently is an elected Councilor in the Humanities Division of the National Council on Undergraduate Research. He has a longstanding interest in undergraduate research in the humanities and has served twice as host coordinator for SCCUR conferences on the Occidental College campus.

Elizabeth L. Ambos is Executive Officer of the Council on Undergraduate Research. Formerly assistant vice chancellor for research initiatives and partnerships in the California State University Office of the Chancellor, she supported the California State University (CSU) system's research and sponsored programs, fostering external and internal support for system-wide initiatives and partnerships. Prior to joining the CSU Chancellor's Office in 2007, she served as associate vice president for research and external support in the Division of Academic Affairs at California State University, Long Beach (CSULB). As a professor in the Department of Geological Sciences at Long Beach, she has worked throughout her career to support undergraduate research, particularly in the geosciences. She is a board member of SCCUR and a former president of the board. She also served as the host site coordinator when SCCUR was held at the Long Beach campus in 2000.

Cheryl Swift is the James Irvine Foundation Professor of Biological Sciences at Whittier College. Her research is concerned with the ways in which plants use physiological adaptations to adapt to fire, flood, and drought in Mediterranean-type ecosystems. In addition to her support and mentorship of undergraduate researchers at Whittier College, she is a founding board member of SCCUR and has hosted SCCUR on the Whittier campus twice.

Carolyn Ash has been associated with California Institute of Technology's Summer Undergraduate Research Fellowships (SURF) program since its inception in 1979, serving as director of Student-Faculty Programs from 1989 until her retirement in 2007. She was a co-founder of SCCUR in 1993 and chaired the 1993, 1994, and 2002 SCCUR conferences. A founding member of the SCCUR board, she has served as secretary since its inception. Her extensive service to national undergraduate research programs includes two stints on the Board of Governors of NCUR (1989-92, 2001-2007), as well as hosting NCUR at Caltech in 1991.