

Preface: Why Get Your Undergraduate Education at a Major Research University?

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[Editor's note: Dean K. Simonton is a Distinguished Professor in the Department of Psychology at UC Davis. After being awarded the 1994 UC Davis Prize for Teaching and Scholarly Achievement, he donated half of the prize money to endow the Simonton Prize for Excellence in Undergraduate Research.]

As an undergraduate I attended a small liberal arts institution—Occidental College down in southern California. In fact, “Oxy” had fewer than half as many students as did my high school! So the class sizes were very small. The instructors could devote lots of attention to each of their students, even in lower-division courses. And the professors were quite dedicated to teaching. That was how they defined their careers. It was also how the institution evaluated a professor's performance when it was time to get promotions and pay raises. As they say in the academic world, liberal arts colleges operate according to the principle of “teach or topple.” If you can't teach, you're out.

In contrast, at research universities like UC Davis the rule is more like “publish or perish.” Professors who haven't published original work in first-rate professional journals will be forced to find another job at a place where the expectations for scholarly work are less demanding. Of course, students at big research institutions often have to contend with large class sizes, even in upper-division courses. Because so much emphasis is placed on research, some undergraduates may complain that they have to take courses from graduate students or from professors who seem preoccupied about publishing enough papers to get their promotions.

So why should an undergraduate even consider attending a major research university such as UC Davis? Why not attend classes at a liberal arts college, like I did, or at a California State University campus, where the classes are much smaller and a lot more importance is assigned to teaching?

One answer is simply that UC Davis undergraduates have the opportunity to take courses from the leading researchers in their discipline. The teacher standing in front of you in the lecture hall might be the person who literally “wrote the book”—the definitive treatment of the field. But this response is not going to be very satisfactory if it's not the expert but the expert's graduate student who's teaching the course. And, even if the world expert is indeed your instructor, it may not help that much more if you are one of over 200 students in the class. So where might we find more compelling reasons to attend a major research university like UC Davis?

I believe that one important reason is that, at UC Davis and other major research institutions, undergraduates have the opportunity to participate directly in research. Students at these schools can learn that knowledge is not just learned, but discovered. The material that students highlight in their textbooks was once actually generated by researchers or scholars, and most often these investigators worked as faculty members at a large university. Moreover, many of these investigations directly involved students as research assistants and even collaborators. And not just graduate students either! It's not uncommon for university researchers to benefit from the efforts of undergraduates.

At first these undergraduates may serve in rather subordinate positions—true assistants. I myself have involved over 300 undergraduates in this way. Their contributions have proven indispensable to many dozens of my publications. Yet in time these undergraduate assistants obtain a degree of research competence that transforms them into junior collaborators. They eventually move from the acknowledgments section in some footnote to a listing as a coauthor on a prestigious publication.

The next step is clear: Once students have acquired sufficient expertise to produce creative work of their own, they have become researchers in their own right, not just useful appendages to their professor-mentor's research program.

These undergraduate student-researchers frequently convert their creative ideas into theses that earn them high or highest honors at graduation. Many also present their research at UC Davis's annual Undergraduate Research Conference (held every Spring quarter), and a smaller number deliver their findings at the National Undergraduate Research Conference or at a professional conference in their discipline. A select few will earn special recognition—by being awarded the Chancellor's Award for Excellence in Undergraduate Research, or, better yet, by having their work published in a professional journal.

In doing so, these student-researchers are giving back to researchers in their discipline what they have taken from them. They learned what was happening at the leading edge of their field, and then did their part to move that edge forward a few inches. For a subset of these students, this contribution is only the beginning. Within a handful of years, they themselves become young professors at major research universities. Besides continuing their investigatory and scholarly efforts, they will become mentors to young undergraduates like they once were, thus completing the generational cycle.

Naturally, research experience has benefits even if the student doesn't become a professor at a research university. Undergraduate researchers understand the content of their fields at a much deeper level than those who never participate in original research. They learn first-hand that the accumulation of knowledge is an active process involving constant change and dynamic growth rather than a passive phenomenon of merely being exposed to what's been engraved on stone for all eternity.

Moreover, undergraduate researchers acquire important critical skills that they can apply to other domains of knowledge. In 2006 Peter "Rocky" Samuel, a student in Psychology, became the first of our majors to receive the Chancellor's Award for Excellence in Undergraduate Research. Upon graduation, he entered medical school rather than taking the expected route to graduate school. Yet I would insist that he will be a far better physician because of his having had that special research experience. And I would draw the same conclusion had he decided to become a lawyer, an engineer, a social worker, or a school teacher. For Rocky and many others like him, the experience of being an undergraduate researcher contributed fundamentally to the benefits made available by an education at UC Davis.

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The articles included in this year's issue of EXPLORATIONS amply illustrate the scope and quality of the research conducted every year by undergraduate researchers at UC Davis.

In "Regional Syncretism at Baodingshan," Lindsay Bregante (a finalist for this year's Chancellor's Award for Excellence in Undergraduate Research) breaks new ground and contributes substantially to scholarly investigations into the role of temple cave art in China. Kenneth Wong adds to astrophysicists' understanding with "Spectroscopic Observations of the Gravitational Lens SBS1520+530 and its Environment." Alison Kootstra's study of "Historic Preservation: Washington, D.C. Neighborhoods and Economic Change" contributes to a more nuanced and scientifically rigorous study of social policy and efforts at urban renewal. Erin Hawkes unravels the complex relationship between music and social vision in "George Eliot's Web: Music and Social Unity in *Middlemarch* and *Daniel Deronda*." Advances in Biology are offered by the research efforts of Teresa Tan in "Identification of HCN Channel Proteins in the Rat Retina" and of Megan Hsi in "Genetic Analysis of *AtPP16-1* and *AtPP16-2*." The results of Alicia Leupp's study on a popular summer outdoor education program for kids offered by the City of Davis can be found in "Gendered Wilderness: The Effect of Outdoor Education on Girls' and Boys' Self-Concept." Finally, Melody Jue offers a fine example of the many inter-disciplinary research efforts going on at UC Davis in "Playing with Metaphor: The effects, problems, and appeal of using a theater metaphor to frame a neurological understanding of consciousness."

None of these student-researchers could have contributed to their fields in the ways that they have were it not for the dedicated efforts of the many professors, lecturers, researchers, and graduate students at UC Davis who welcome undergraduates as research colleagues. This year, the contributors and editors wish especially to acknowledge Professors Katharine P. Burnett (Art History), Chris Fassnacht (Physics), Larry Berman (Political Science; Washington Program), Peter Dale and Colin N. Milburn (English), Andrew T. Ishida (Neurobiology, Physiology and Behavior), William J. Lucas (Plant Biology), and doctoral student Olga Bogatyrenko (Political Science; Washington Program).

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