

## UC Davis Biology Undergraduate Scholars Program 1988-2019 Bibliography

1. Barlow, A.E. and Villarejo, M. Making a Difference for Minorities: Evaluation of an Educational Enrichment Program. *Journal of Research in Science Teaching* **41**, 861-881 (2004).  
*A comprehensive, quantitative evaluation of an educational intervention program designed to reduce the attrition of minorities from the biological sciences was undertaken to ascertain whether such efforts adequately address the problem. Program participants had greater odds of persisting in basic math and science courses, and of graduating in biology, than did a comparison group, controlling for demographics and academic preparation. Undergraduate research greatly increased the odds of positive graduation outcomes. Program participants were also more likely to pursue graduate study than were university graduates overall. This evaluation demonstrates the value of such programs in increasing the representation of minorities in science.*
2. Villarejo, M. and Barlow, A. E. Evolution and Evaluation of a Biology Enrichment Program for Minorities. *Journal of Women and Minorities in Science and Engineering* **13**, 119-144 (2007).  
*This paper describes the genesis and evolution of the Biology Undergraduate Scholars Program (BUSP), a large, comprehensive educational enrichment program that has enabled underrepresented minority (URM) students to thrive in biology majors at the University of California, Davis, since 1988. Both design and implementation were, and are, collaborative efforts between campus academic and student services sectors. Formative and summative evaluations have played a key role in program development, resulting in continued improvements in student persistence and performance in basic science courses. For example, the BUSP classes entering 1994-1999 outperformed both non-BUSP URM students and the White/Asian majority in the basic science courses, General Chemistry and Calculus. The percentage of BUSP students persisting to graduation in biology majors has increased as the program has evolved and now exceeds the campus average. Much of this persistence in biology may be due to high rates of participation in research by BUSP students.*
3. Villarejo, M., Barlow, S.E., Kogan, D., Veazey, B.D., and Sweeney, J.K.  
***Encouraging Minority Undergraduates to Choose Science Careers: Career Paths Survey Results. CBE-Life Sciences Education*****7**, 394-409 (2008).  
*To explore the reasons for the dearth of minorities in Ph.D.-level biomedical research and identify opportunities to increase minority participation, we surveyed high-achieving alumni of an undergraduate biology enrichment program for underrepresented minorities. Respondents were asked to describe their career paths and to reflect on the influences that guided their career choices. We particularly probed for attitudes and experiences that influenced students to pursue a research career, as well as factors relevant to their choice between medicine (the dominant career choice) and basic science. In agreement with earlier studies, alumni strongly endorsed supplemental instruction as a mechanism for achieving excellence in basic science courses. Undergraduate research was seen as broadening by many and was transformative for half of the alumni who ultimately decided to pursue Ph.D.s in biomedical research. That group had expressed no interest in research careers at college entry and credits their undergraduate research experience with putting them on track toward a research career. A policy implication of these results is that making undergraduate research opportunities widely available to biology*

*students (including “premed” students) in the context of a structured educational enrichment program should increase the number of minority students who choose to pursue biomedical Ph.D.*

*(Sample size too small (210 individuals) for quantitative conclusions.)*

4. Ovink, S.M. and Veazey, B.D. More than “Getting Us Through:” A Case Study in Cultural Capital Enrichment of Underrepresented Minority Undergraduates. *Research in Higher Education* **52**, 370 – 394 (2011).

*To explore the reasons for the dearth of minorities in Ph.D.-level biomedical research and identify opportunities to increase minority participation, we surveyed high-achieving alumni of an undergraduate biology enrichment program for underrepresented minorities. Respondents were asked to describe their career paths and to reflect on the influences that guided their career choices. We particularly probed for attitudes and experiences that influenced students to pursue a research career, as well as factors relevant to their choice between medicine (the dominant career choice) and basic science. In agreement with earlier studies, alumni strongly endorsed supplemental instruction as a mechanism for achieving excellence in basic science courses. Undergraduate research was seen as broadening by many and was transformative for half of the alumni who ultimately decided to pursue Ph.D.s in biomedical research. That group had expressed no interest in research careers at college entry and credits their undergraduate research experience with putting them on track toward a research career. A policy implication of these results is that making undergraduate research opportunities widely available to biology students (including “premed” students) in the context of a structured educational enrichment program should increase the number of minority students who choose to pursue biomedical Ph.D.s.*

5. Sweeney, J.K. and Villarejo, Merna. Influence of an Academic Intervention Program on Minority Student Career Choice. *Journal of College Student Development* **54** (5), 534-540 (2013).

*This qualitative, retrospective study explored how educational experiences provided as part of an undergraduate intervention program helped to shape career decisions for minority biology students. A key goal for the program is to increase minority entry into science research and teaching careers, yet actual career choice has not been studied. Interviews with program alumni uncovered varying perceptions of the benefits of coursework, advising, and research and clinical work by alumni in different careers as well as varying influence of personal factors on career choice. These results support prior findings on the impact of intervention programs on career choice for minority students.*

6. Jones, M.T.; Barlow, A.E.; and Villarejo, M. Importance of undergraduate research for minority student persistence in biology. *Journal of Higher Education* **81**, (1) 82-115 (2010).

*This study examines the association between undergraduate research participation and college success in the biological sciences. We find that undergraduate research participation is significantly associated with earning a baccalaureate degree and with persistence and outstanding performance among biology majors for all racial/ethnic groups at a large research university. (N~7000)*