Geosciences at California State University, Long Beach (CSULB): Synergistic Earth System Science/Community-Research Based Education Partnerships

Elizabeth L. Ambos, Professor of Geological Sciences and Associate Vice President for Research and External Support, California State University, Long Beach*

The Geological Sciences department at CSULB is valued for high quality of instruction, faculty research, and a strong focus on student achievements and opportunities. Geological Sciences is also a major contributor to the general education and teacher preparation programs at CSULB. Faculty members have been successful in acquiring external funding for research and education programs from such entities as the National Science Foundation, ACS-Petroleum Research Fund, and the National Geographic Society Foundation, to name a few.

But perhaps of greater importance to the department's success has been the ability of department faculty to look outward – to see the possibilities of linkages to other areas of the university – toward creation of a new, more flexible identity. As Rick Behl of CSULB Geological Sciences noted in his recent GSA presentation: when faced with the need to recruit more students to major in geology, the department could have "circled the wagons" – tried to identify key competitors for scarce resources (i.e., student majors, research equipment, space), and fought for dominance. Instead, key faculty in the department opted to focus on interdepartmental and inter-institutional collaborations to expand the *total* numbers of students engaged in geosciences. These collaborations are characterized by attention to three important elements: (1) outreach & recruitment, (2) continuity within the educational pipeline transitions of high school, to community college, to university, and, (3) synergistic - *not forced* - sharing of resources

Aspects of what might be termed "geoscience" are taught in at least three departments housed within two separate colleges at CSULB. Although the bureaucratic challenges to forming a shared geoscience identity on campus are not insignificant, a thriving community *has* formed over the course of the last ten years. The three main departments that teach and do research in aspects of the geosciences include: geological sciences, geography, and anthropology (which houses the archaeology program).

Although there are many examples that could be cited, I have chosen to highlight three recent developments at CSULB that demonstrate the breadth and depth of partnerships in the geosciences. These examples serve to illustrate how the department of Geological Sciences, has been "propelled …to its current position of strength" through both "intentional and strategic partnering."

(1) **Environmental Sciences and Policy B. A. and B.S. degree**. After more than five years of in-depth and detailed consultations between faculty in variety of departments in the College of Liberal Arts and Natural Sciences and Mathematics, two exciting new undergraduate programs in Environmental Science and Policy emerged. The leaders of the new undergraduate major: Stan Finney, Chair of Geological Sciences, and Darwin Hall, Professor of Economics, collaborated to create a broad-based, project-oriented curriculum that brings together rigorous science preparation with humanistic and policy issues at the forefront. The program began in Fall 2003, and already has substantial enrollments. http://www.csulb.edu/programs/es-p/

(2) **IIRMES - Institute for Integrated Research in Materials, Environments, and Society.** This exciting collaboration between geology, biology, and archaeology faculty seeks to enhance the educational and research opportunities of students and faculty members who wish to pursue academic studies in a new interdisciplinary field that attempts to integrate the physical, natural and social sciences. Acquired & maintaining key instrumentation for student and faculty research has been achieved by Institute members through NSF MRI, CCLI, and standard research grants. Equipment holdings currently include: (1) Quadropole ICP-MS, (2) Time-of-flight ICP-MS with laser ablation, (3) Environmental Scanning Electron Microscope with EDS & WDX, (4) Gas-source light stable isotope mass spectrometer, (5) Optical and infrared thermoluminescense reader (dating), (6) Ground-penetrating radar, electrical resistivity, and magnetometer equipment. http://www.csulb.edu/programs/iirmes/

(3) **Geosciences Diversity Enhancement Program (GDEP)**. For the past three years (2002-2004) faculty in the departments of geological sciences, geography, and anthropology at California State University, Long Beach have joined to offer an NSF-funded (GEO-0119891) eight-week summer research experience to faculty and students at Long Beach area high schools and community colleges. GDEP's goal is to increase the numbers of students from underrepresented groups enrolling in geoscience undergraduate programs. As GDEP has matured, research projects have become more interdisciplinary, and faculty research teams have expanded. In the first year, each CSULB faculty member tended to lead her/his project as a separate endeavor. By the third summer, faculty were collaborating in research teams. Several projects have involved community-based research, at sites within an hour's drive from the urban Long Beach campus. For example, last summer, four faculty linked together to conduct a comprehensive geography and geology study of an Orange County wilderness area, resulting in creation of maps, brochures, and websites for use by the general public. Another faculty group conducted geophysical surveys at an historic archaeological site in downtown Los Angeles, producing maps of underground features that will be incorporated into a cultural center and museum. Over the past three summers, the program has grown to involve more than 25 high school and community college students, and more than 30 CSULB, high school, and community college faculty. http://www.csulb.edu/depts/geography/gdep/

The story of geosciences at CSULB seems to mirror the evolving culture in the greater Los Angeles area: less of a melting pot….more of a multicultural stew. Each of the departments retains its separate identity, but collaborations form to benefit all partners in geoscience education at CSULB. Perhaps most intriguing are the close linkages now present between natural and social sciences, fulfilling the promise of earth system science education, and echoing one of the opening paragraphs in E. O. Wilson's **Consilience**.

"*The greatest enterprise of the mind has always been and always will be the attempted linkage of the sciences and humanities*." (**Consilience**, Chapter 2: The Great Branches of Learning, E. O. Wilson)

**What you have read is (more or less) my own personal opinion, and reflects my particular perspective – that of an academic administrator who is also a geoscience educator. I would like to thank Rick Behl of the Department of Geological Sciences at CSULB, who generously shared his fall 2004 GSA presentation with me, and with whom I held helpful conversations about this essay topic. Thanks, Rick – many of the ideas presented here are yours/mine/ours. – Beth Ambos*