Universities and their Regions:  
The Case of Semiconductor Innovation and Entrepreneurship at the University of California

How do industrial regions shape university research? What do universities contribute to their regional economies? To answer these questions, this paper examines a test case: the activities of a single university, the University of California, in a single field (semiconductors), with campuses located in very different regions: UC Berkeley in Silicon Valley, UCLA in Los Angeles, and UC Santa Barbara in the Santa Barbara region. This paper argues that UC campuses, especially UC Berkeley and UCLA, benefited from their proximity to major centers of semiconductor innovation. They built close relations with semiconductor firms, which enabled UC researchers to identify problems of importance to industry, to access people, funding, and ideas, and to bring technologies developed in the corporate world to the university. It was on the basis of these technology transfers that academic administrators and faculty members at UC Berkeley, UCLA, and UC Santa Barbara built major research programs in semiconductors. They used these industrial inputs to make important innovations that were later commercialized through technology licensing, faculty consulting, the hiring of students by industrial concerns, and the formation of new firms. As a result, these UC universities had a significant impact on a critical sector of California’s high tech manufacturing economy.

Within this general pattern, the specific forms of innovation and entrepreneurship and their impact on the semiconductor industry differed widely across the UC system. UC Berkeley, UCLA, and UC Santa Barbara developed specific subspecialties in semiconductors, partially on the basis of their regions'
particular industrial strengths, the technological interests of leading faculty members, and competitive forces within the University of California. Making the most of the resources offered by Silicon Valley, UC Berkeley focused on silicon integrated circuits, especially communications circuits, and on the software tools required to design complex microchips. UCLA brought in technologies from large defense firms in Southern California and developed strengths in broadband communications chips. Entering semiconductor research significantly later than UC Berkeley, UC Santa Barbara concentrated on compound semiconductors, a field where it would not compete with more established campuses. The three campuses also developed different ways of transferring and commercializing these technologies. Some faculty groups, especially at UC Berkeley and UCLA, preferred the free distribution of their findings and software programs, whereas others (at UC Santa Barbara and, to a limited extent, Berkeley) favored more formal forms of technology transfer. Different types of university-based entrepreneurship can also be identified. Some faculty, especially at Berkeley, created many competing spin-offs, while others (at UCLA) sought to build large firms by consolidating existing start-ups. In the case of UC Santa Barbara, researchers established their firms in Silicon Valley and sometimes in the Santa Barbara area – with the goal of having them acquired by larger firms located outside the region.

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