**A Tale of Two Departments:**

**Computer Sciences and Electrical Engineering at U.C. Berkeley, 1965-1973**

In December 1966, the University of California at Berkeley did not have a department of computer science. By July 1967, they had two: The Department of Computer Sciences and the Department of Electrical Engineering and Computer Sciences.[[1]](#endnote-1) Having two departments was not a typical or ideal solution to the problem posed by the emerging discipline of computer science. It was instead the result of years of controversy and fighting between people with different visions for computer science and the source of additional years of controversy as Berkeley struggled with the so-called “two-department solution.” Between 1967 and 1972, scholars and administrators attempted to justify a variety of different solutions that would combine the two spaces for computer science into a single department. These solutions had different implications for the power and influence of the individuals and disciplines involved. Ultimately, the faction that favored intimate connections between computer science and electrical engineering succeeded, and the independent computer science department was merged into the large electrical engineering and computer science department. In this talk, I discuss aspects of this history to argue that the controversy over the position of computer science at Berkeley was in fact a controversy about the identity of computer science as a discipline. Importantly, the different spaces for computer science within the university assumed different practices of scientific knowledge production, either more closely aligned with mathematics or with engineering, and each of these alignments entailed different identities for the computer scientist.

Already in the late 1950s, a few courses that retrospectively might be labeled “computer science” were being taught in mathematics and electrical engineering at Berkeley.[[2]](#endnote-2) These courses, focused on numerical analysis, digital computers, and programming, were like those offered at the same time other places, and as elsewhere, over the early 1960s, the number and variety of courses gradually increased.[[3]](#endnote-3)

By the mid-1960s when the efforts to institutionalize computer science at Berkeley began to gain traction, people had begun to recognize the difficulty posed by computer science for Berkeley’s internal university politics.[[4]](#endnote-4) On the one hand, electrical engineering had developed a group of scholars interested in computer-related research who were not interested in leaving electrical engineering. Unsurprisingly, many of these scholars had been originally trained in electrical engineering. They argued that their work was inseparable from other work being done in electrical engineering because electrical engineering was shifting to emphasize computing. On the other hand, those working on computer science in the math department did not want to join the electrical engineering department. Those researchers wanted to stay within the College of Letters and Science since it contained scholars with more similar backgrounds and methodologies. Preferences of the departments also mattered. In particular, the electrical engineering department was neither interested in expanding its scope far enough to include the topics addressed within the math department nor interested in losing its computer science research. Additionally, the math department wanted to move computer science out of its space; the mathematicians were concerned about their department being overtaken by a growing field that didn’t qualify as “mainstream” mathematics.[[5]](#endnote-5) Thus, already in 1965, people had started to conclude that the best solution would be to create a computer science department but simultaneously recognize the role of computer science within electrical engineering by changing that department’s name. Although most people involved in the decision seemed to be resigned to the “two-department solution,” it did not become official until the beginning of 1967.

Both before and after Berkeley settled on the two-department solution, people regularly raised concerns about how the disparate practices of knowledge production relevant to computer science ought to influence the place of computer science at Berkeley. Many of them were concerned about how practices drawn from mathematics and logic would coexist with practices developed in engineering. These different ways of doing computer science represented different visions of who the computer scientist was and how the work of computer science would be done.

Alongside the concerns about knowledge practices themselves, people worried about related problems surrounding hiring and promotion: the expectations for a new hire in the engineering school were traditionally slightly different than those expectations for the people hired in the humanities, arts, and sciences. Moreover, the qualifications of researchers who might be considered computer scientists varied significantly, and some of those involved in the discussions about where to put computer science at Berkeley worried that limiting the location of computer science would limit hires to those sorts of researchers. This was a concern not only for the mathematically-aligned researchers who wanted to develop an independent department, but also for the researchers who worked in electrical engineering and intended to continue to do so.

Still others worried that placing computer science fully within the engineering school would be problematic because it would complicate the divisions that had been developed between the engineering school and the College of Letters and Science. As two chairmen of the math department explained, the strain of computer science drawn from mathematics “still uses and requires people with mathematical standards of abstraction, rigor, and elegance, and relies on sophisticated mathematical tools. The distinction between the College of Engineering and the College of Letters and Science would be violated by assigning such research to the College of Engineering.”[[6]](#endnote-6) Certain kinds of knowledge production practices belonged in each space within the university, and breaking that rule by placing a discipline that, at Berkeley at least, clearly had multiple kinds of knowledge practices threatened important institutional boundaries. Both groups acknowledged the importance of both engineering-oriented and mathematically-oriented computer science and wanted Berkeley to fulfill the needs of both kinds. For Berkeley to become a major center of computer science research, they all recognized that Berkeley needed to have both. By the time the two-department solution would come to an end in 1973, however, people began to simplify this aspect of the reasoning used to create the two departments. They came to believe that the autonomous computer science department was created largely because of beliefs that “the next stages in the evolution of computer sciences would emphasize the more strictly mathematical phases of the field,” work most naturally done in the College of Letters and Science.[[7]](#endnote-7) While this view was simpler than those discussed at the time, it was nevertheless the case that concerns about ensuring a place for mathematically-oriented computer science were central to how people understood the place of computer science at Berkeley during this period.

Even though Berkeley decided to create two homes for computer science on campus, few considered this a good solution. Already by January 1968, for example, deans and scholars involved in computer science were seriously discussing the possibility of creating an autonomous department of computer science over the next few years that would to both the engineering school and the school of letters and science.[[8]](#endnote-8) These sorts of discussions stemmed from frustrations over the position of computer science at Berkeley: it had been divided because of differing visions of what the discipline should be and because of differing views of the ideal relationship between computer science and electrical engineering.

The division of computer science into two spaces was not inherently a problem, but the arrangement at Berkeley did not work. In part this was a matter of resources. For example, in 1968 and 1969, as a small, new department, the computer science department had few resources and difficulty acquiring funding to hire more faculty.[[9]](#endnote-9) In the same period, the electrical engineering and computer science department had available professorships for computer science, but they were having far more difficulty than the computer science department filling those positions.[[10]](#endnote-10) From the point of view of the faculty in the computer science department, the electrical engineering and computer science department had professorships “about to be sacrificed to adequate but unexciting people.”[[11]](#endnote-11) The allocation of resources thus not only was inefficient but also managed to stoke hostilities between the two groups of computer scientists. Over the course of the early 1970s, the resource problem only got worse. While resources had been somewhat difficult to acquire in the late 1960s, university- (and nation-) wide budget reductions in the early 1970s resulted in even stricter limits on faculty hiring.[[12]](#endnote-12)

Beyond the problem of resources, the two departments were insufficiently cooperative: they neither coordinated on faculty recruitment nor constructed complementary curricula.[[13]](#endnote-13) It seemed as though the departments worried that cooperating was unnecessary or even detrimental to their own positions of power and that the departments both contained many people uninterested in cooperating.[[14]](#endnote-14) In a time of resource shortages, having two departments that overlapped too much and had no interest in cooperating more successfully was a problem. Thus, while the problem of having two departments had been festering since the beginning, a 1972 visiting committee report catalyzed a new effort to consolidate computer science on campus.[[15]](#endnote-15)

Even though everyone was concerned about the ways the two-department solution was negatively affecting the future of computer science at Berkeley, they did not agree on the solution. By 1972 when these discussions began in earnest, people agreed that computer science would need to be consolidated into one location within the university, but they contested whether computer science ought to be autonomous in some location in the university or ought to be merged into the electrical engineering and computer science department. Although the latter of these is ultimately what happened, it was not obvious that this would be the case.

The computer scientists in the computer science department were concerned about the possibility of a merger, particularly if it would place them into the department of electrical engineering and computer science. Unlike the computer scientists already located in that department, they were invested in the idea of an autonomous department of computer science and worried that placing computer science entirely within a well-established department would limit the future of computer science at Berkeley. They feared that it would not only create conflicts between the interests of the two disciplines but would also complicate other interdisciplinary connections and the identity of computer science itself.[[16]](#endnote-16) Their position was unsurprising: this group of computer scientists did not want to give up the autonomy they had recently enjoyed to become part of a larger department not focused solely on their discipline.

Members of the electrical engineering and computer science department, on the other hand, were the earliest and strongest advocates of a merger of the computer science department into their own department. They tied their arguments to concerns about the strength of both electrical engineering and computer science at Berkeley. In part, they argued that the fields could no longer be separated at Berkeley.[[17]](#endnote-17) Over the preceding twenty years, computing-related work had developed in the department, so the divisions between the two disciplines as performed in the department were too fuzzy to separate them. As part of this intertwining of disciplines, they argued that electrical engineering at Berkeley had become and would need to continue to be oriented towards computing.[[18]](#endnote-18) Thus, removing the computer science group from the department would not only be difficult but would also “maim” electrical engineering.[[19]](#endnote-19) While others sometimes wondered why Berkeley did not consider converting the department into an electrical and computer engineering department, as happened at other schools around the same time, members of the department saw their work as operating at the intersection of electrical engineering and computer science.[[20]](#endnote-20) Lastly, they argued that the connection to electrical engineering strengthened computer science and would be good for its future.[[21]](#endnote-21) The electrical engineering and computer science department was powerful and had much better access to resources than would a smaller computer science department. In a moment of relative resource scarcity, access to these sorts of resources mattered even more than disciplinary autonomy.

While many in the electrical engineering and computer science department wanted to avoid a split, many others in the engineering school disagreed. These scholars tended to favor the consolidation of computer science into a single autonomous department in the engineering school.[[22]](#endnote-22) Arguments for computer science as its own engineering department included concerns about the desires of those in the computer science department and about the position of computer science as a discipline with significant interdisciplinary ties.[[23]](#endnote-23) They also argued that computer science was clearly becoming an important and well-established discipline. Lastly, they were concerned that merging all of computer science into the electrical engineering and computer science department would create a massive department that would eventually overpower the other departments in the engineering school. Thus, it is unsurprising that the scholars in the electrical engineering and computer science department worried that the engineering school would advocate for a separation of electrical engineering and computer science.

Between December 1972 and February 1973, Berkeley concluded that the computer science department would be merged into electrical engineering and computer science.[[24]](#endnote-24) While those involved in the discussions had seriously considered combining the two groups of computer scientists into an autonomous department, they decided that it was more important to keep the unified electrical engineering and computer science department.[[25]](#endnote-25) This had risks and would not give computer scientists their own space, but the electrical engineering and computer science department was important enough that splitting the department was not worth it.

Beyond the implications of the merger at Berkeley, because of the national influence of Berkeley’s electrical engineering, the merger also significantly impacted contests over the place of computer science elsewhere. MIT serves as an excellent example. There, research and teaching about computing had almost always occurred within electrical engineering.[[26]](#endnote-26) By the 1970s, however, people within the department had begun to argue over whether computer science ought to remain within electrical engineering at MIT. Faculty members and administrators raised many possibilities, but the faculty ultimately agreed to remain a single department, the Department of Electrical Engineering and Computer Science.[[27]](#endnote-27) This decision was not made in a vacuum. Discussions at MIT specifically cited the decision at Berkeley to merge the independent computer science department into the department of electrical engineering and computer science.[[28]](#endnote-28) Berkeley’s decision gave significant weight to the argument that computer science ought to remain within electrical engineering at MIT.[[29]](#endnote-29)

Ultimately, debates at Berkeley in the late 1960s and early 1970s about the place of computer science in the university were debates about the disciplinary identity of computer science: was it mathematics? Engineering? Or something else? They were therefore equally arguments about who the computer scientist was and how he would do his work. Decisions at influential centers of American computer science like Berkeley and MIT to retain close ties between computer science and engineering were thus signals that computer science was engineering, and the computer scientist should somehow be an engineer.

1. UC Berkeley Archives, CU149, Box 115, Folder 64. [↑](#endnote-ref-1)
2. See, for example, University of California, “University of California Register,1958-1959 with Announcements for 1959-1960,” *University of California Bulletin* 53, no. 28 (August 10, 1959), http://digitalassets.lib.berkeley.edu/generalcatalog/text/b100640394\_1958\_59\_v.1.pdf. [↑](#endnote-ref-2)
3. University of California, “University of California Berkeley General Catalogue 1965-1966,” *University of California Bulletin* 59, no. 17 (July 15, 1965), http://digitalassets.lib.berkeley.edu/generalcatalog/text/1965\_1966\_courses.pdf. [↑](#endnote-ref-3)
4. “Report of the Physical Sciences Council on Computer Sciences.” September 9, 1965. UC Berkeley Archives, BANC MSS 78/144c, Carton 1, EECS General 1961-1970. [↑](#endnote-ref-4)
5. “Report of the Physical Sciences Council on Computer Sciences.” September 9, 1965. UC Berkeley Archives, BANC MSS 78/144c, Carton 1, EECS General 1961-1970. Similar concerns had been voiced by members of the electrical engineering department in 1964, near the beginning of cooperative efforts to develop “computer science” at Berkeley (see UC Berkeley Archives, CU149, Box 75, Folder 17). [↑](#endnote-ref-5)
6. “Letter from M.H. Protter and Henry Helson to Lincoln Constance.” June 9, 1965. UC Berkeley Archives, CU149, Box 74, Folder 49. [↑](#endnote-ref-6)
7. “Reorganization of Computer Sciences.” April 12, 1973 revision. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-7)
8. “Conference: Vice-Chancellor Bouwsma with Dean Knight.” January 10, 1968. UC Berkeley Archives, CU149, Box 115, Folder 65. [↑](#endnote-ref-8)
9. “Letter from Beresford Parlett to Walter Knight.” May 26, 1968. UC Berkeley Archives, CU149, Box 115, Folder 66. [↑](#endnote-ref-9)
10. “Letter from Beresford Parlett to Walter Knight.” May 26, 1968. UC Berkeley Archives, CU149, Box 115, Folder 66. [↑](#endnote-ref-10)
11. “Letter from Beresford Parlett to Walter Knight.” May 26, 1968. UC Berkeley Archives, CU149, Box 115, Folder 66. [↑](#endnote-ref-11)
12. “Minutes: Dean’s Coordinating Advisory Council, March 3, 1971.” UC Berkeley Archives, BANC MSS 78/144c, Carton 2, College of Engineering Dean’s Coordinating Advisory Council #1. [↑](#endnote-ref-12)
13. “Letter from Walter Knight to Robert Connick.” February 3, 1970. UC Berkeley Archives, CU149, Box 115, Folder 67; “Letter from Walter Knight to Robert Connick.” April 16, 1970. UC Berkeley Archives, CU149, Box 115, Folder 67. [↑](#endnote-ref-13)
14. “Letter from Walter Knight to Robert Connick.” April 16, 1970. UC Berkeley Archives, CU149, Box 115, Folder 67. [↑](#endnote-ref-14)
15. Minutes of the [EECS] Executive Committee Meeting March 15, 1972.” March 16, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-15)
16. “Letter from S.L. Graham, M.A. Harrison, R.M. Karp, J. Morris, B.N. Parlett to Calvin Moore.” September 25, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-16)
17. “Reorganization of Computer Sciences.” April 12, 1973 revision. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-17)
18. “Report of Ad Hoc EECS Committee on Consolidation of Computer Science and Engineering.” October 9, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973; “Memo on Reorganization of Computer Science from L.A. Zadeh to T.E. Everhart.” October 5, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-18)
19. “the enhancement of visibility of computer science would be attained at the cost of maiming one of the best electrical engineering departments in the country;” from “Memo on Reorganization of Computer Science from L.A. Zadeh to T.E. Everhart.” October 5, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-19)
20. “Letter from Beresford Parlett to (Dean) Walter Knight.” May 26, 1968. UC Berkeley Archives, CU149, Box 115, Folder 66; “Memo on Reorganization of Computer Science from L.A. Zadeh to T.E. Everhart.” October 5, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-20)
21. “Memo from T.E. Everhart to EECS Faculty.” December 15, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-21)
22. “Memo from Committee to Study the Department’s Position with Respect to the Proposed Merger of CS and EECS to EECS Faculty.” December 5, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-22)
23. “Report by the College of Engineering Ad Hoc Committee on Computer Science.” Undated [late 1972]. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-23)
24. “Memo from T.E. Everhart to EECS Faculty.” February 16, 1973. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-24)
25. “Reorganization of Computer Sciences.” April 12, 1973 revision. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973. [↑](#endnote-ref-25)
26. See Aspray, “Was Early Entry a Competitive Advantage? US Universities That Entered Computing in the 1940s.”. [↑](#endnote-ref-26)
27. MIT Archives, AC268, Box 8, Folder 23. The influence at MIT is somewhat ironic given that the status of computer science at MIT had been used in some arguments for keeping computer science with electrical engineering at Berkeley (e.g. “Memo on Reorganization of Computer Science from L.A. Zadeh to T.E. Everhart.” October 5, 1972. UC Berkeley Archives, BANC MSS 78/144c, Carton 2, EECS General 1971-1973.). [↑](#endnote-ref-27)
28. MIT Archives, AC268, Box 5, Folder 4. [↑](#endnote-ref-28)
29. MIT Archives, AC268, Box 5, Folder 4. [↑](#endnote-ref-29)