

The IEEE Computer Society and the Tools of the Past

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What would our founders think of the current IEEE Computer Society and the circumstances that it faces in 2020? Leadership must tackle that question as it looks to the future without disregarding the past.

No discussion of the future of computing, particularly the one found in this issue of *Computer*, is complete without a discussion of the future of the IEEE Computer Society (CS). For a decade or perhaps a little more, the CS has been marching through a transition in the way that it fundamentally operates and in the population that it serves. Ultimately, we may find ourselves working within an organization that is quite different from the one that was formed in 1970 and grew rapidly in the 1980s and 1990s. At the time, we

reflected many of the aspects of the computing community. We were dynamic and a little inchoate, but we were filled with enthusiasm about our field. As our organization and field have matured, we have to decide how we fit into the computing landscape.

Despite our claims to have been founded in the late 1940s, our organization is both newer and older than that date suggests. It is older because many of the early computer developers were members of the Institute of Radio Engineers (IRE), the progenitor of the IEEE. Howard Aiken of Harvard (who built the Mark I) and J. Presper Eckert of the University of Pennsylvania (who built the ENIAC) are two IRE members who helped pioneer the electronic computer. However, the CS was formed in 1970, a date that is important because it stands at the cusp of computer science. Prior to that date, computing was not really considered a field of its own. Most practitioners viewed it as a combination of mathematics and electrical engineering. Only in the mid-1960s did we begin to see government agencies such as ARPA sponsoring research in computer science and universities offering degrees in the field.

As an organization of the 1970s, the CS proved to reflect the attitudes of its time as it was a division of an engineering professional society and yet kept a certain distance from engineering. In its founding documents, the Society's leaders argued that they did not wish to limit membership to electrical engineers, which at the time was a requirement for membership. "Full membership in the Society shall be permitted for Non-IEEE members," they wrote, and full membership privileges would be given to "computing professionals who may not be engineers." The leaders noted that they "would be careful to maintain high professional qualifications for membership" but were also aware that the field contained people trained in mathematics, philosophy, accounting, and a variety of other technical disciplines. In making this statement, they issued a gentle warning to the IEEE leadership. If the new Society was not able to embrace computer professionals outside of the engineering community, it would mark a decline in "the IEEE's role in computer related matters."

For the next 30 years, the Computer Society maintained a polite distance from the IEEE and handled its affairs independently of those of its parent organization. It established its headquarters in Southern California, which, at the time, was more the center for computer development, rather than the San Francisco Bay area. Many of these organizations were like RAND Corporation, a company that supported the aerospace industry, which was then at its height with the Apollo Program. The region also had the offices of the hardware company Scientific Data Systems, the software firm SDC, and several other computer vendors. Perhaps, most importantly, it hosted one of the two large semiannual conferences on computer science, a conference that was soon cosponsored by the CS.

The Society grew rapidly over the next 30 years, adding members that often had little connection to electrical engineering. The makeup of the organization is suggested by the list of magazines that the Society published during this era: *Computer* (1968), *IEEE Micro* (1981), and *IEEE Computer Graphics and Applications* (1981). The first magazine that had no direct ties to hardware was *IEEE Software* (1984), followed by *IEEE Internet Computing* (1997), *IEEE Concurrency* (1997), *IEEE MultiMedia* (1999), and *IT Professional* (1999).

After 2000, the Society continued to grow and add new communities of interest to its members. It created five new magazines that captured the creative work of the new millennium: *IEEE Intelligent Systems* (2001), *IEEE Pervasive Computing* (2002), *IEEE Security & Privacy* (2003), *IEEE Distributed Systems Online* (2004), and *IEEE Cloud Computing* (2013). At the same time, it was clear that the world had started to shift for the CS. Los Angeles was no longer a center for computer or software development; instead, Silicon Valley, 500 mi to the north, had become the capital of computing technology. The large semiannual computing conference had gone out of business and been replaced by dozens of small, specialized meetings. Furthermore, the publication business was no longer as profitable as it once was. Computing technology had reduced the cost of entry and encouraged competition. Both of these things forced the Society to adjust the way that it did business as publications and conferences accounted for three-fourths of its budget.

Had the CS been faced merely with changes in the business environment or the relocation of its members, it would have had a sufficient challenge. However, the first years of the millennium also marked a period when the IEEE reevaluated its relationship with the Society and took a number of steps

to alter it. We are probably too close to those years to tell the story of that process clearly. In talking with Society leaders of that period, I often find myself hearing a very heated version of events. However, the way that this story unfolded is far less important than the outcome.

In 2000, the CS was able to operate an independent organization. A decade later, it was operating within the framework of its parent organizations. The CS Board of Governors was regularly briefed on its relationship to the IEEE. Decisions that had once been made in California moved to New Jersey. The Society, including those members who had little or no connection to electrical engineering, were reminded that they were all part of the IEEE.

The point of this story is not to complain or reminisce about a past time in which the world was better. The point is that the CS is in a much different place than it was in January 2000, when the new millennium began. Many of the things that have changed involve business or social forces and, hence, are common to all institutions in the field. They include the points that publishing is now very competitive; conferences are no longer the large unifying activities they once were; the center of computing development has shifted to Silicon Valley, Haidian, Dublin, and other places; and our first point of contact with our members is often not a local Chapter but IEEE *Xplore*.

These business and social changes have altered the landscape for computing professional societies. There are now 35 regional or national computer societies that do the same kinds of things that the CS does. They publish periodicals. They hold conferences. They train workers. Some of these societies are as large or larger than the CS. The Australian Computer Society has 45,000 members, the British Computer Society has 68,000, the

Chinese Computing Federation has 38,000, and Association for Computing Machinery has 65,000 (not counting student members).

Most of these regional societies focus on subjects that we might characterize as belonging to IT, which is only a minor interest of the CS. However, that is actually a key point. The founders of the Society had envisioned that their organization would become “the foremost institution” concerned with “information processing sciences” as well as computer science. The fact that we have moved away from that vision suggests no disrespect to the founders. The CS had to establish its place in the computing ecosystem, a place that has only loose connections to IT.

In addition to moving away from IT, the CS has moved toward becoming the computing division of an engineering society. There is nothing wrong with this role, and indeed, it could be argued that all engineering


societies need a computing division. The founders of the Society would not have necessarily objected to this role. “Computer technology will in time be the major technical discipline of the IEEE,” they wrote. Yet they also believed that the CS should not be “constrained by the IEEE and its structure.”

There are certainly other stories that could be told about the CS and its current state. For the most part, these are stories of day-to-day business decisions that tried to identify opportunities for the Society or avoid operational threats. They are interesting in their own right, but they don't suggest a structural change for the Society. At this point, 50 years from the organization of the Society, we can identify five elements that are quite different from the environment of 1970.

First, computer science is now an organized discipline taught in colleges, universities, and even in high schools. Second, there are now many places to

get information on computing that are not professional societies. Third, the largest center of computing development has moved away from the area around the CS's office in Los Angeles to places such as Silicon Valley or Redmond, Washington. Fourth, the major activities of the Society are no longer capable of generating the revenue that they once could. Finally, the Society is now operating as a division of an engineering society rather than working as an independent organization.

I cannot say what the Society founders would think of these changes or our current state of affairs. They would certainly note that the CS had indeed expanded the role of computing within the IEEE. If you look at the modern methods of electrical engineers, you will find that many of them are creating digital devices and developing software. They would certainly be pleased that the IEEE now includes many members who received degrees outside of traditional electrical engineering and that the structure of the IEEE now includes nearly 40 Societies that follow the pattern set by their proposal for the CS.

What would our founders conclude regarding the current CS and the circumstances that it faces in 2020? Would they push for the Society to expand its publishing division, build large conferences, or try to operate independently of the IEEE? I don't know the answer to that question, although I do know that it is hard to abandon a set of ideas that once produced a successful organization. Ultimately, that is the question that the CS leadership must face in 2020. How do we meet the needs of the future without thinking that we must use the tools of the past? 



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