Jerome B. Cohen

JEROME B. COHEN

1932–1999

BY STEPHEN H. CARR, KATHERINE FABER, LYLE H. SCHWARTZ, AND JULIA WEERTMAN

JEROME B. COHEN, Englehart Professor of Materials Science and gineering and former dean of the McCormick School of Engineering and Applied Sciences at Northwestern University, died at home November 7, 1999. He was sixty-seven.

Jerry was born in Brooklyn, New York, on July 16, 1932. He received his B.S. and Sc.D. degrees in metallurgy at Massachusetts Institute of Technology. He cut his teeth on diffraction in Professor Warren's group at MIT, whose lab was the first in this country to use diffraction broadly in the study of defects in materials. He then went on to do a postdoc with André Guinier, the brilliant French physicist. Guinier, together with the English scientist Preston, was the first to use diffraction to study defects in aged aluminum copper alloys. These studies revealed the coherent zones of copper atoms that give rise to the age-hardenable behavior of these important structural alloys. These defining experiences with two of the giants in diffraction were to influence the career-long course of Jerry Cohen's research on the structure of materials.

Jerry had a special zeal for research and extending the power of x-ray diffraction in the study of all materials. Naturally his students had to take the appropriate courses first, and those courses, with their independent lab experiments, were killers. Students from other advisers in the materials department were no surprise in Jerry's labs, but students from physics, chemistry,

several engineering departments, and (later) biology also came to know diffraction as a versatile tool with quantitative sensitivity appropriate to their problems. As for his own graduate students, they often would find little notes on their desks in the morning with his comments about their previous day's work and suggestions of options to consider for the next day. It took them all some time to realize that they were being tested for maturity, for their ability to differ with Cohen's positions (he wasn't *always* right), and for their skills in setting their own directions as a measure of their readiness for the Ph.D.

Cohen's research may be characterized as thematic; he picked broad topical areas and probed them in depth, pushing as far as the technology of the time would allow. Sometimes he moved on, only to return later when the x-ray scattering technology had improved again. In this trait he was no different than many other researchers, but in the number of themes and the innovative approaches he mastered, Cohen was remarkable. An incomplete list of these themes includes short-range order, clustering (these two merged into a broad study of local atomic arrangements in ceramics and alloys), stacking faults and twins, residual stress in metals, structure of catalysts, and (in collaboration with others) defects formed as a result of deformation at high temperatures. He authored or coauthored four textbooks, and he coedited another two. His name appears on more than 300 publications in these areas. His insight into intellectual property issues came first-hand as a result of his development of a portable x-ray device for measuring residual stresses in the field (e.g., the Alaska oil pipeline). This instrument is still sold commercially. He computer-automated the apparatus in his labs long before most others; he used facilities available at various laboratories to do neutron diffraction studies; and he used extensively the various synchrotron x-ray sources. Following his years as engineering dean, he had looked forward to working at the Advanced Photon Source at nearby Argonne National Laboratory. His energy and innovative ideas had already been instrumental in the development there, together with DuPont and Dow, of the Dupont-Northwestern-Dow Collaborative Access Team (DND CAT) line.

Undergraduate education was a passion with Cohen. The Materials Science and Engineering Department offered its first formal undergraduate degrees while he was chairman of the department. He was the driving force behind an experimental effort in group teaching which began in 1970 and which challenged the traditional methods of teaching math, physics and chemistry as independent subjects. Cohen had to browbeat a conservative faculty to accept his ideas. With or without them, he was determined to transform the freshman engineering experience. In this first great experiment, he marshaled the energies of several faculty members in three engineering departments and a few colleagues in math and physics. Teaching was done in teams, with freshman courses reorganized so that math, physics, and engineering were taught for integral blocks of time. Topics were properly sequenced so that students could understand the value and interdependence of these diverse concepts. It was only an experiment, lasting a few years and touching only a fraction of each freshman class, but it was the precursor and motivator for Cohen's successful transformation of the undergraduate engineering curriculum while he was dean.

During Jerry Cohen's time as engineering dean at Northwestern, virtually every aspect of the programs was scrutinized and changed. As described by former Northwestern President Arnold Weber, “Cajoling, scolding, exhorting, he worked with the faculty to bring the McCormick School into the front ranks of engineering education and research enterprises.” The national reputation of the school grew steadily. The school's overall rank among all U.S. engineering schools in the *U.S. News and World Report* rankings rose from thirty-seven in 1990 to thirteen in 1998. Jerry Cohen was able to advance engineering at Northwestern to the point of being an “engineering school second to none”—the challenge put to the school in the 1940s by its major benefactor Walter P. Murphy.” The faculty improved in strength, with more than 60 percent of the current McCormick faculty recruited during his thirteen-year tenure. Women and underrepresented minorities were notably increased across all its ranks. The quality of the student body increased significantly under Cohen's leadership. McCormick attained the third highest percentage

of African-American students in the "Big Ten" and one of the highest graduation rates of all engineering schools. The percentage of female students was the second highest among major engineering schools. Research activity, as judged from external support, grew by a factor of nearly three. He was a tireless fund-raiser, bringing in the needed $125 million for the Technological Institute building reconstruction. As former President Weber noted, "He skillfully managed the complex, often frustrating, process of transforming the Tech building from a Dickensian labyrinth to a modern engineering and science education facility which made a bold statement about the University's aspirations in these areas." A large annex building to house the Materials Science and Engineering Department was constructed. In curricular issues, Cohen was the driving force for the imaginative Engineering First *p*rogram, where students experience directly the elements of thinking as an engineer, rather than take a number of courses on basic subjects, each studied in isolation. "Jerry believed traditional engineering curricula turned people off," said Northwestern President Bienen. The undergraduate Cooperative Engineering Program breathed new life, with participation raised to nearly a third of the undergraduates. Working with the deans of other schools within Northwestern, Cohen helped to develop joint degree programs with other schools of the university: management, medicine, law, journalism, education, and the graduate school. An internship program and seminars on career development and intellectual property issues were initiated to enhance graduate programs.

We are fortunate to work in a profession that strives to recognize its leaders during their lifetime, and Jerry Cohen received such recognition in abundance. His awards include the American Institute of Mining, Petroleum and Metallurgical Engineers Hardy Medal in 1960, the George Westinghouse Award of American Society for Engineering Education for excellence in teaching and research in 1976, the American Society of Metals (ASM) International Henry Marion Howe Medal in 1981, the Barrett Award in X-Ray Diffraction in 1989, the Minerals, Metals and Materials Society (TMS) Institute of Metals Lecturer and Robert Franklin Mehl Award in 1992, and the Acta Metallurgica Gold

Medal in 1992. In 1993 Cohen was elected to the National Academy of Engineering and was made an honorary member of the Japan Institute of Metals in 1999. Cohen was elected to fellow status in both TMS and ASM International. In 1994 he received the honorary degree *Tekniks Doktor* from the Linkoping Institute of Technology in Sweden. Cohen served on the Academic Advisory Board of the NAE and on several National Research Council boards and committees. His professional society participation was capped by the presidency of the American Crystallographic Association in 1982.

Personally, Jerry Cohen enjoyed lifelong learning and "living on the edge." His self-instruction on the piano and the classical harmonica (not too successful), his Porche racing (a hobby taken up rather late in his professional career), and his travels with his wife, Lois, to exotic locales (like the Arctic and the Galapagos Islands) left many wondering what was next. Indeed, his next adventure was to have been in a fighter landing on an aircraft carrier—yet one more indication of his trust in engineering and in the materials selection for a relatively small metal hook!

Jerry Cohen is survived by his wife, Lois, a daughter, Elissa Halpern, a son, Andrew, a sister, Rita Copperman, and four grandchildren. "Jerry loved Northwestern," said Lois Cohen. "He was proud to be associated with the school for the past almost forty years. His contributions were legendary. There are not enough words to describe the loss his family feels." As former Northwestern President Arnold Weber noted in the memorial service, "The deep void created by his sudden passing offers vivid evidence of the prodigious talents and expansive reach that Jerry Cohen brought to his family, friends, colleagues and Northwestern University. He served almost all of his professional career, more than forty years, on the faculty of Northwestern and was the finest representation of the values and traditions of the University."