

ufacturing shortly after voting to eliminate the geography department. Similarly, last November, they gave the go-ahead for a Center for Molecular Genetics on the very day they approved the closure of the Institute for the Study of Mental Retardation and Related Diseases. Although there is no direct link between the birth of these new centers and the demise of the older programs—indeed, the centers will get most of their support from outside the general fund—the juxtaposition of the events reinforced a comment by Frye that “at the same time that we are looking forward to new and expanding activity in some areas we must be prepared to plan for shrinkage or closure in others.”

Aside from being areas of growth in an otherwise constrained budget, the robotics and genetics centers are noteworthy because they mesh with two major state-supported high-technology initiatives. In an attempt to provide a catalyst for the growth of high-technology industry in Michigan, then-Governor William Millikan last year approved the establishment of a \$100-million Industrial Technology Institute. The institute, whose creation was recommended by a task force consisting of academics, businessmen, and government officials, will receive \$17.5 million from the state, and the remainder will come from private foundations.

Although the institute will be independent from the university and will do mostly in-house research under contract, it will be built on the edge of the Ann Arbor campus, and some faculty members are likely to have joint appointments there. The institute's acting director, for example, is a university computer science professor who has taken a leave of absence to help get the operation under way.

The robotics center will be the university's chief point of contact with the new institute. Initial funding for the center came from the state, the National Science Foundation, and private industry, but last year the center won a fierce competition with Stanford, Carnegie-Mellon, and Massachusetts Institute of Technology for a \$3.4-million contract from the Air Force. This now provides core support for the center. The award proved to be controversial, however, because it came in the midst of a growing debate on campus about the university's involvement with defense research. Although a small fraction of the total, Department of Defense-sponsored research at Michigan has been rising in recent years. The campus debate culminated in a 40 to 15 vote by the Senate Assembly on 21 March calling on university depart-

ments to establish a mechanism that would bar research “a substantial purpose of which is to destroy or permanently incapacitate human beings.”

The Center for Molecular Genetics has been less controversial. An interdepartmental unit that involves some 40 re-

searchers in 14 departments, it was established to channel more resources into molecular biology and foster more interaction among geneticists on campus. Part of the rationale for creating the center, according to a proposal drafted for the regents, is that Michigan has lost

NAE Elects New Members

The National Academy of Engineering has elected 49 new members and 5 new foreign associates. This brings the total U.S. membership to 1142, with 102 foreign associates. The new members are:

Norman R. Augustine, president, operations, Martin Marietta Denver Aerospace; **Richard T. Baum**, partner, Jaros, Baum & Bolles; **Arden L. Bement, Jr.**, vice president of technical resources, TRW, Inc.; **John G. Bollinger**, dean of engineering, University of Wisconsin, Madison; **John L. Cleasby**, professor of civil engineering, Iowa State University of Science and Technology; **Harry W. Coover**, vice president, Eastman Chemicals Division, Tennessee Eastman Co.; **L. Eric Cross**, professor of electrical engineering, Pennsylvania State University, University Park; **W. Edwards Deming**, consultant in statistical studies, Washington, D.C.; **Thomas B. Drew**, professor emeritus, Massachusetts Institute of Technology; **Charles A. Eckert**, head of chemical engineering, University of Illinois, Urbana; **G. David Forney, Jr.**, vice president, information systems group, Motorola, Inc.; **Richard H. Gallagher**, dean of engineering, University of Arizona; **Harry C. Gatos**, professor of electronic materials and molecular engineering, Massachusetts Institute of Technology; **Ralph S. Gens**, consulting electrical engineer, Portland, Oregon; **Serge Gratch**, director, chemical sciences laboratory, Ford Motor Co.; **Wilfred M. Hall**, chairman of the board, C. T. Main Corp.; **Alfred J. Hendron, Jr.**, professor of civil engineering, University of Illinois, Urbana; **Raymond J. Hodge**, partner, Tippetts-Abbett-McCarthy-Stratton; **David A. Hodges**, professor of electrical engineering and computer sciences, University of California, Berkeley; **Richard R. Hough**, retired executive vice president, American Telephone & Telegraph Co.; **John W. Hutchinson**, professor of applied mechanics, Harvard University.

George R. Jasny, vice president, Union Carbide Corp. Nuclear Division; **Charles C. Ladd**, professor of civil engineering, Massachusetts Institute of Technology; **J. Halcombe Laning**, head of manufacturing automation and computation, C. S. Draper Laboratory, Inc.; **Raymond C. Loehr**, professor of engineering, Cornell University; **Joseph C. Logue**, manager of Josephson technology, Thomas J. Watson Research Center, IBM Corp.; **Alan L. McWhorter**, head, solid state division, M.I.T. Lincoln Laboratory; **Harry O. Monson**, senior mechanical engineer, Argonne National Laboratory; **Morris Muskat**, retired technical adviser to the executive group, Gulf Oil Corp.; **Norman A. Nadel**, president, MacLean Grove & Co., Inc.; **William Nierenberg**, director, Scripps Institution of Oceanography; **Ralph L. Palmer**, IBM Fellow, IBM Corp.; **Dalton H. Pritchard**, fellow of the technical staff, David Sarnoff Research Center, RCA Laboratories; **Lawrence R. Rabiner**, supervisor, acoustics research department, Bell Laboratories; **Brian H. Rowe**, senior vice president, Aircraft Engine Business Group, General Electric Co.; **Mario G. Salvadori**, partner, Weidinger Associates, Consulting Engineers; **Harris M. Schurmeier**, associate director, utilitarian programs, Jet Propulsion Laboratory, California Institute of Technology; **Charles V. Shank**, head of quantum physics and electronics, Bell Laboratories; **Maurice E. Shank**, director, engineering-technical, commercial products division, Pratt & Whitney Aircraft Group, United Technologies Corp.; **George E. Smith**, head, metal oxide semiconductor device department, Bell Laboratories; **Kenneth A. Smith**, professor of chemical engineering, Massachusetts Institute of Technology; **Fred Sterzer**, director, Microwave Technology Center, RCA Laboratories.

William D. Stevens, retired chairman of the board, Foster Wheeler Corp.; **Derald A. Stuart**, vice president and general manager, missile systems division, Lockheed Missiles & Space Co., Inc.; **Nickolas J. Themelis**, professor of mineral engineering, Columbia University; **Charles W. Tobias**, professor of chemical engineering, University of California, Berkeley; **John F. Welch, Jr.**, chairman and chief executive officer, General Electric Co.; **Willis S. White, Jr.**, chairman and chief executive officer, American Electric Power Co., Inc.; **Paul Zia**, professor and department head, North Carolina State University, Raleigh.

The foreign associates are: **Giuseppe Gabrielli**, retired technical director, Fiat Aeronautical Division, and retired professor of aircraft design, Polytechnic Institute of Turin, Italy; **Cyril Hilsun**, chief scientific officer, Royal Signals and Radar Establishment, Worcestershire, United Kingdom; **Fritz Leonhardt**, retired professor, Institute for Concrete Structures, Stuttgart University, West Germany; **Robin B. Nicholson**, chief scientist, central policy review staff, Cabinet Office, Whitehall, London, United Kingdom; **Ewald Wicke**, professor emeritus, University of Munster, Westphalia, West Germany.