Cornell Announces New Corporate Alliance For Electronic Packaging Research

Cornell recently initiated a multimillion dollar alliance with several corporations to tackle fundamental research in electronic packaging. As part of the Cornell Electronic Packaging Alliance, corporate and Cornell scientists will work together on the science behind new technology at Cornell, and the companies will share the results.

The alliance, whose business agreement is now being completed, will be supported in part by an investment of more than $5 million from participating corporations over the next five years. Other support is expected from federal and state governments and the university. Participating corporations include IBM, AMP Inc., Carborundum Co., Digital Equipment Corp., Rogers Corp., and Tektronix Inc.

A Cornell spokesperson said the alliance will "strengthen American electronic developments, both academic and commercial." He also said that electronic-packaging research must be broad-based, "because it is not possible for a single academic department in a university or a single company to possess all the necessary knowledge or expertise."

Electronic packaging is fundamental to all microelectronics, comprising a significant percentage of the cost of a large computer. For the computer to work, each tiny microchip in it must be protectively nestled on a plastic, composite, or ceramic chip carrier — a carefully engineered holder for the chip. The carrier contains hundreds of tiny metal interconnects that feed power to the chip and transfer data in and out. The carrier also must remove chip-killing heat, and the interconnects must withstand the strains of thousands of cycles of thermal expansion and contraction. The hierarchy of electronic packaging also includes the computer card that holds the interconnected array of chip carriers. These cards, in turn, are plugged into a larger board that interconnects them.

The Electronic Packaging Alliance will have its own research facilities and will draw on a wide range of other Cornell facilities, including the National Nanofabrication Facility, the Center for Theory and Simulation in Science and Engineering, and the Materials Science Center.

Specialty Metals Processing Consortium Formed

Scientists from 10 companies have teamed up with Sandia National Laboratories to form the Specialty Metals Processing Consortium, Inc. (SMPC), a pioneering Department of Energy effort to increase U.S. competitiveness in the world specialty metals market. The SMPC brings together industry, universities, and the DOE.

Currently, about 30-40 companies develop and manufacture specialty metals — high-strength, high-performance steel, titanium alloys, nickel-based alloys, and other high-tech metals — for use in aircraft, satellites, nuclear power reactors, high-speed drills, and other products. Defense hardware that must work after being in stockpile for years also depends on these special materials.

The consortium's goals include developing a focused, industry-wide research and development effort, halting the erosion of the U.S. technology base, and meeting the challenge of expanding capabilities by European and Pacific Rim competitors.

"The companies are pooling research dollars to work on generic process problems that are directly applicable to the industrial sector," said an SMPC spokesperson. "This is a vital industry where the U.S. maintains a competitive advantage. Through collaboration of the government labs, industry, and universities, it is likely that we can keep or possibly even increase this edge."

DOE Signs Letter of Intent for Advanced Manufacturing Initiative

On July 18 the DOE signed a letter of intent with the National Center for Manufacturing Sciences (NCMS) for an Advanced Manufacturing Initiative that would transfer the results from Federal research and development to the private sector. NCMS is a not-for-profit U.S. association with more than 100 member companies, and is dedicated to the improvement of its members' competitive position in manufacturing.

The Advanced Manufacturing Initiative will encompass all manufacturing related activities within the DOE's Defense Programs complex. This includes advanced machine tools, control systems, measurement equipment, and advanced quality control methods with emphasis on energy efficient and environmentally conscious manufacturing technologies.

Secretary of Energy James D. Watkins said the first major project of the initiative will, at NCMS's request, involve cooperative research and development in precision flexible manufacturing.

Congress recently paved the way for this type of cooperation with the National

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Competitiveness Technology Transfer Act of 1989, and by revising the Atomic Energy Act.

According to the cooperative agreement, each participating company will contribute $50,000 annually for five years. DOE will provide financial support over an initial five-year period, after which it is expected the program will be self-supporting. These funds will be used to conduct studies of mutual interest to participants. Projects will be selected by private-sector consortium members and supported by Sandia and university research.

Sandia's role will be to provide technical consultation with a number of experienced materials researchers, to offer access to Sandia's state-of-the-art metals processing equipment, and to undertake associated research.

Members of the consortium are Allegheny Ludlum Steel Corporation, Brackenridge, PA; Allied-Signal Aerospace Company, Garrett Engine Division, Phoenix, Arizona; Carpenter Technology Corporation, Reading, PA; Cyclops Corporation, Cytemp Specialty Steel Division, Titusville, PA; Howmet Corporation, Alloy Division, Plymouth, Michigan; Inco Alloys International, Inc., Huntington, W.Va; United Technologies Corporation, Pratt and Whitney Division, East Hartford, Conn.; Special Metals Corporation, New Hartford, NY; Teledyne Allvac Corporation, Monroe, NC; and Teledyne Wah Chang Albany, Albany, Oregon. SMPC membership will be open to qualified companies until October 31, 1990. Companies or organizations interested in joining SMPC should contact Robert J. Torcolini at Carpenter Technology Corporation at (215) 371-2302 for more information.

New NAS Foreign Secretary, Councilors Begin Terms

James B. Wyngaarden, who was elected earlier this year to a four-year term as foreign secretary of the National Academy of Sciences, and four new members of the governing council officially began their terms on July 1. Wyngaarden, former associate director for life sciences, White House Office of Science and Technology Policy; and former director of the National Institutes of Health (NIH); succeeds William E. Gordon of Rice University, who served as the NAS foreign secretary since 1986.

As foreign secretary, Wyngaarden will coordinate international contacts with the science academies of other nations and supervise the nomination of foreign associates of NAS. In addition, he will serve as chairman of the Office of International Af-

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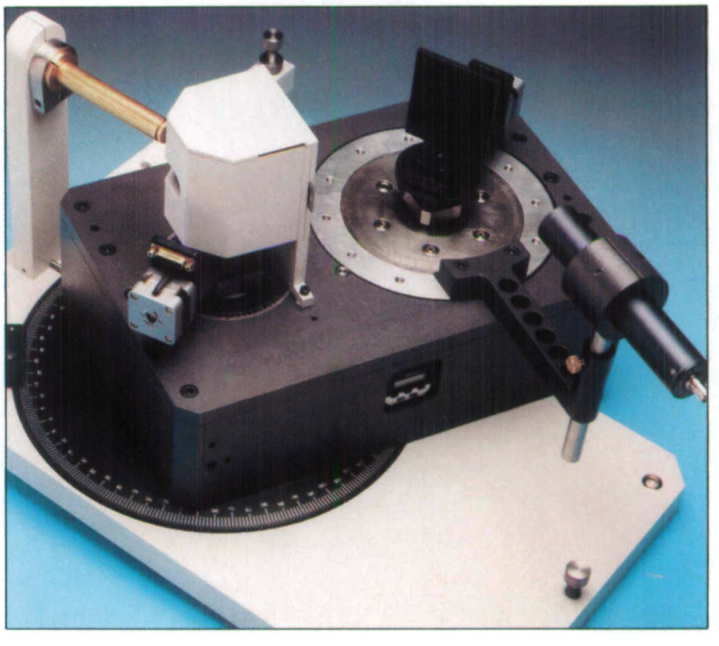

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fairs of the National Research Council.

The Institute of Medicine's (IOM) governing Council also elected Wyngaarden to serve simultaneously as IOM's first foreign secretary. Wyngaarden's goal in this capacity will be to establish new ties with other medical academies around the world and to address international health issues.

The four new members of NAS's governing Council are Kenneth J. Arrow, Joan Kenney Professor of Economics and professor of operations research at Stanford University; Jack Halpern, Louis Block Distinguished Professor of Chemistry at the University of Chicago; Mary J. Osborn, professor and department head, department of microbiology, at the University of Connecticut Health Center; and J. Robert Schrieffer, department of physics, University of California at Santa Barbara.

Sandia Develops New Compact VISAR Interferometer

Sandia National Laboratories has developed a more compact Velocity Interferometer System for any Reflector (VISAR) for measuring shock-related motion such as that produced during an explosion. The new VISAR is less complex and easier to operate than earlier models.

Sandia's VISAR, which Sandia invented about 20 years ago, has become a standard for measuring high-pressure shock wave phenomena in solids. It measures velocities ranging from tens to thousands of meters per second by using a modified unequal-leg Michelson interferometer.

Until now, Sandia's VISARs have been of a "breadboard" design — a table with the numerous optical components mounted on it. This arrangement allows the VISAR to be reconfigured to measure a wide range of velocities and accelerations. However, this flexibility also can be a disadvantage since the components require frequent precision adjustment to maintain alignment.

The new VISAR does not require these frequent adjustments and therefore is easier to use and less expensive. All of its key parts are compactly incorporated into a single unit occupying about 1 cubic foot of space, as opposed to a comparable breadboard VISAR, which uses 12 cubic feet.

This "fixed cavity" VISAR is prealigned at time of assembly and does not need further adjustments. Because this less complex system does not require operation by an optics technician, it is anticipated that it would be attractive to university and industrial laboratories doing basic science studies on material shock properties.

The system also offers improved data quality by eliminating numerous elements and shortening optical path lengths. The light beams are routed from the laser to the test target surface and back to the interferometer through optical fibers. This allows the interferometer and its sensitive photodetectors, amplifiers, recording equipment, and the laser to be located far enough away from the test target and any large electrical noise sources to prevent electrical interference in the data.

The fixed-cavity VISAR was developed by Philip L. Stanton, William C. Sweat, and O.B. Crump Jr.

Abar Group to Establish Centers for Thermal Processing Excellence

The Abar Group U.S.A., which consists of Centorr Furnaces, Vacuum Industries, and Abar Ispen Industries, has announced that it plans to establish world class engineering centers for thermal processing excellence by mid-fall 1990. This restructuring will include combining Centorr and Vacuum Industries engineering resources and redefining the role of Abar Ispen engineering.

Centorr will provide high-temperature high-vacuum expertise, Vacuum Industries will provide the ability to bridge the gap between laboratory and batch production for leading edge technology, and Abar Ipsen Industries will offer the ability to convert new thermal processing technologies into full-scale production systems.

The center's mission will be to establish customer partnerships to anticipate needs and provide solutions to problems in thermal processing. The engineering center will be fully equipped with automated CAD/CAM engineering equipment. Additionally, Abar Group's engineering and client computers can be linked for interactive technology exchange.

Grant to Fund Clemson's Electronics Research

The W. M. Keck Foundation of Los Angeles recently awarded Clemson University's ceramic engineering department a $350,000 grant to help improve methods of making thin film ferroelectrics materials. The money will be used for research equipment, including an x-ray diffraction system and a spin-coating reactor.

Ferroelectrics are a promising group of materials that are finding increasing application in electronics equipment, and the thin film versions will allow their expanded use in future devices involving low voltage, integrated circuits.

Ferroelectrics could address the problem that troubles most computers — a volatile silicon memory. Ferroelectrics materials allow permanent storage in a non-volatile memory that is resistant to electrical surges. This permanence is especially useful in outer space, where the radiation from one gamma ray can cause computer disruptions without warning.

The principal investigator for the grant research is Dr. Gene Haertling, Clemson's Bishop Distinguished Professor of Ceramic Engineering, and inventor of transparent PLZT, a ceramic ferroelectrics material. Clemson's research will be aimed at improving the process of making thin film ferroelectrics materials to allow automated manufacture and a more uniform, reproducible product.

Goodway Elected President of Historical Metallurgy Society

Martha Goodway, a metallurgist of the Smithsonian Institution's Conservation Analytical Laboratory, was elected president of the Historical Metallurgy Society at its annual general meeting on May 5. Goodway is the first president of the Society from outside the United Kingdom.

Goodway, who will begin her duties by presiding at the Society's Annual Conference to be held at the University of York September 14 - 16, studied metallurgy at the Massachusetts Institute of Technology and history in the Graduate School of Arts and Sciences at Harvard University. She is co-author of *The Metallurgy of 17th and 18th Century Music Wire*, and an editor of *Corrosion and Metal Artifacts*. She was elected a Fellow of ASM International in 1988, and is a member of the Materials Research Society.

The Historical Metallurgy Society was founded in England in 1962 as the Historical Metallurgy Group. The Society publishes the *Historical Metallurgy* journal, and has members throughout the world. □

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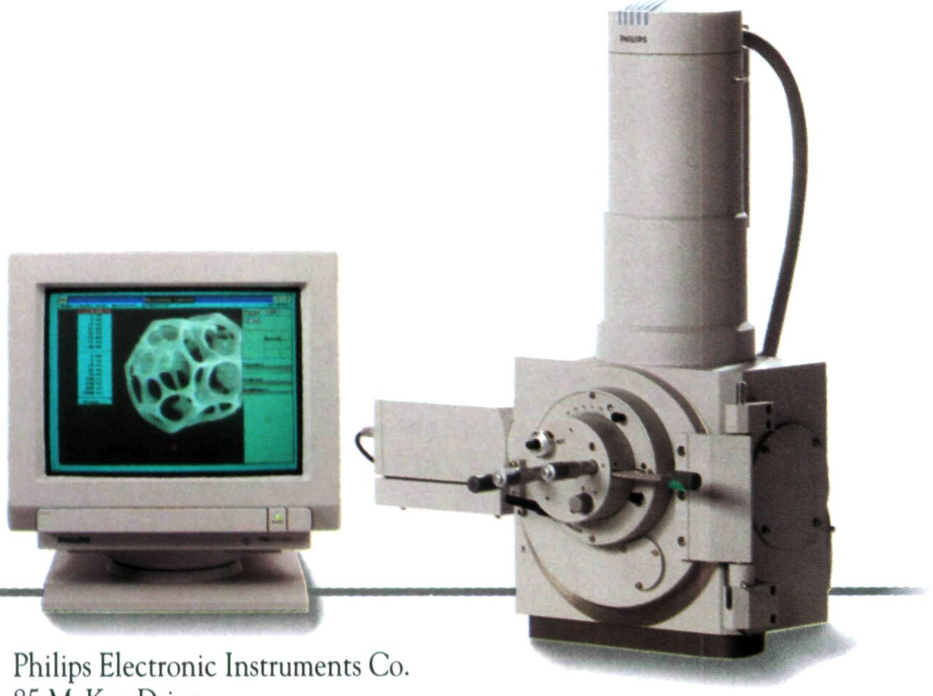

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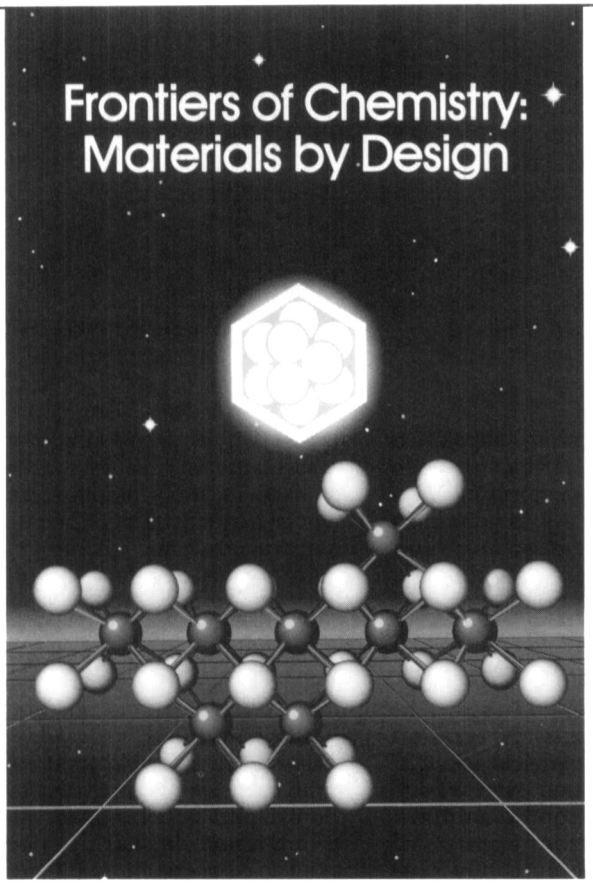

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