



A system developed by (from left) ORNL's Russ Knapp, Saed Mirzadeh and Emory Collins improves upon conventional methods to produce technetium-99m, the principal radioisotope used in diagnostic nuclear medicine. The new method is environmentally cleaner, safer, and less expensive than conventional methods of producing the parent radioisotope, molybdenum-99, by fission of enriched uranium-235. *Photograph by Tom Cerniglio.*

Winning Big in the R&D 100 Awards Competition

In 1997 ORNL and Energy Systems had their best year yet in the R&D 100 Awards competition. Oak Ridge researchers won nine awards, pushing the Department of Energy's Oak Ridge total to 103 since the awards began in 1963. The awards are presented annually by R&D Magazine in recognition of the year's most significant technological innovations. Winning inventions and inventors were

- the High-Performance Storage System (HPSS) used for moving, storing, and retrieving large data files of high-performance computers and networked workstation clusters, developed by ORNL's **Randall Burriss** and research-

ers at Lawrence Livermore, Los Alamos, and Sandia national laboratories and at IBM Global Government Industry;

- modular technetium 99-m concentrator for producing the diagnostic radioisotope without generating highly radioactive waste, developed by **Emory Collins, Saed Mirzadeh, and Russ Knapp**;
- production of succinic acid for making chemicals (e.g., food additives, paints, and plastics) by using a novel microorganism to ferment corn in a bioprocessing system, developed by **Brian Davison, Nhuan Nghiem, and Bruce Suttle** in a joint venture with Argonne National Laboratory, Pacific Northwest National Laboratory, National Renewable Energy Laboratory, and Applied CarboChemicals;
- cationic epoxy resins that are curable by electron beams (an alternative process for producing lightweight, fiber-reinforced plastics that uses less energy, works faster, emits less pollution, and



ORNL's **Srinath Viswanathan** (right) and **Robert Purgert** of Thompson Aluminum Casting Company of Cleveland developed metal compression forming, enabling the fabrication of pore-free cast aluminum alloy components that have properties comparable to those of forged parts at up to one-third the cost. *Photograph by Tom Cerniglio.*



ORNL's Amy Dindal and Mike Sigman developed methylated sol-gel sorbent, a product for detecting airborne pollutants such as carcinogens and industrial effluents. Because of its chemical and thermal stability, the new product is expected to do the job more efficiently and at lower cost than air sampling traps on the market. *Photograph by Tom Cerniglio.*

may be less costly than conventionally used thermal curing), developed by **Chris Janke, George Dorsey** (Y-12 Plant), Stephen Havens (ORISE), and Vincent Lopata (Atomic Energy of Canada);

- methylated sol-gel sorbent for detecting airborne carcinogens and other industrial pollutants, developed by **Michael Sigman, Amy Dindal**, and George Wachob of Supelco Incorporated;
- metal compression forming used to make possible pore-free cast aluminum alloy components that have properties comparable to those of forged parts at up to one-third the cost, developed by

ORNL's Randall Burris teamed with researchers at Lawrence Livermore, Los Alamos, and Sandia national laboratories and at IBM Global Government Industry to develop the High-Performance Storage System (HPSS). HPSS is designed to manage enormous amounts of data produced and used in modern high-performance computing, data collection and analysis, imaging, and enterprise environments. *Photograph by Tom Cerniglio.*



ORNL's Robert Lauf (left) and Don Bible developed the Vari-Wave, a flexible microwave heating system for laboratory research, analytical testing, and process development for industries producing or using advanced materials. Applications of Vari-Wave include processing advanced polymers and composites, as well as curing adhesives and encapsulants in electronic packaging assemblies. *Photograph by Curtis Boles.*

Srinath Viswanathan and Robert Purgert (Thompson Aluminum Casting Company of Cleveland);

- Vari-Wave, a microwave heating instrument that dramatically reduces curing time (from two hours to three minutes) of adhesives and polymers used in the production of circuit boards and components, developed by **Bob Lauf, Don Bible** (both of ORNL) Zak Fathi, Mike Hampton, and Ralph Stevens, all of Lambda Technologies of Morrisville, N.C.;
- Enclosed Space Detection System that detects vibrations from the heartbeat of

a person hiding in a vehicle, developed by **Leo Labaj, Michael Bath, Vivian Baylor, Michael Carroll, Mike Fuller, Tim Hickerson, Tom McCoig, and Richard Pack**, all of the Y-12 Plant, and by ORNL's **Bill Dress** and **Stephen Kercel**;

- carbon-free metal-ceramic composite crucible for melting high-purity metals, such as uranium and copper, using induction heating, developed by **Marvin Morrow** (Y-12 Plant), **James Kiggans, Jr.** (ORNL), **Cressie Holcombe** (retired from Y-12 Plant), and Don Rexford of Blasch Precision Ceramics of Albany, New York.

