



**Back row from left:** Armour College Dean Hamid Arastoopour; Argonne National Laboratory Group Leader of ME/ASD, Advanced Photon Source Sushil Sharma; Texas A&M University Emeritus Professor Robert Page; NASA Program Manager, Vehicle Systems, Office of Aerospace Technology Richard Wlezien; NASA Ames Research Center Director for Aerospace Skip Fletcher; University of Illinois at Urbana-Champaign Professor and Head, Department of ME and IE Richard Buckius; Carnegie Mellon University Lord Professor and Head, Department of ME Adnan Akay; Armour College Associate Dean Candace Wark.

**Front row from left:** Footlik and Associates President Robert Footlik; Retired Senior Consultant, Wheelabrator Technologies Les Hardison; MMAE Department Chair Jamal Yagoobi; Kimberly Clark Resarch Fellow, Aesthetics Research Center Herb Velazquez; Northwestern University Walter T. Murphy Professor Ted Belytchko.

**External Advisory Board members not pictured are** General Motors Director, Service Delivery James Korenchan; Alcoa Engineered Products Director of Business Development and Technology Application William Rogers; A. Finkl and Sons Company Chairman and CEO Bruce Liimatainen; and Caterpillar Inc. Advanced Materials Technology Program Manager Ric Woldow.

## External Advisory Board Annual Meeting

The MMAE External Advisory Board (EAB) held their annual meeting on October 3, 2003 at the IIT campus.

The group suffered the painful loss in summer 2003 of board member Karl Smith of General Motors, who passed away.

## New MMAE Faculty Member: Assistant Professor Murat Vural



Dr. Murat Vural joined the MMAE Department as an assistant professor of Mechanical and Aerospace Engineering in the fall of 2003 after three years of postdoctoral research at California Institute of Technology as a visiting associate in aeronautics, where he performed research on various aspects of high-strain-rate deformation and failure in cellular, composite and metallic materials.

Dr. Vural earned his doctor of philosophy, master of science and bachelor of science degrees in aeronautical engineering from Istanbul Technical University.

His recent publications include "Microstructural Aspects and

# faculty

"Modeling of Failure in Naturally Occurring Porous Composites", M. Vural and G. Ravichandran, *Mechanics of Materials*, Vol. 35, pp. 523-536, 2003; and "Dynamic Response and Energy Dissipation Characteristics of Balsa Wood: Experiment and Analysis", M. Vural and G. Ravichandran, *International Journal of Solids and Structures*, Vol. 40, pp. 2147-2170, 2003.

Vural is a member of the Society for Experimental Mechanics, the American Society of Mechanical Engineers and the American Society for Engineering Education.

Vural's field of specialty is experimental solid mechanics. His research is particularly concerned with investigating the mechanical response of materials under severe loading and environmental conditions that involve high-strain-rates, large strains, multiaxial stress states and elevated temperatures. Research emphasis is on understanding and modeling the constitutive response and failure of homogeneous and heterogeneous solids by using experimental and analytical tools along with detailed characterization at microstructural level.

## Faculty News

**Philip Nash** was appointed an Associate Editor for the Journal of Materials Science and the Journal of Materials Science Letters. These journals are now firmly established as the leading sources of primary communication for scientists investigating the structure and properties of all engineering materials.

The new Associate Dean for Academic Affairs in the IIT Graduate College is **Sudhakar Nair**, who also taught for a week in January 2003 at the International School of Technology in Cracow, Poland.

Armour College was restructured into two colleges, the Armour College of Engineering and the College of Science and Letters. The Armour College of Engineering consists of Biomedical Engineering; Civil & Architectural Engineering; Chemical & Environmental Engineering; Electrical & Computer Engineering; and Mechanical, Materials & Aerospace Engineering. **Candace Wark** of the MMAE Department has been named Associate Dean of the Armour College of Engineering.

**Cesar Sciammarella**, a research professor in the MMAE Department, joined the Polytechnic Institute of Bari in Italy as the director of their experimental mechanics laboratory .



**Ganesh Raman** was named a fellow by the American Society of Mechanical Engineers (ASME).

**Michael Gosz** has assumed a new role as MMAE's Associate Chair for Graduate Studies.

**Victor Aronov** retired after many years on faculty in the MMAE Department.

The 2003 Ralph L. Barnett award for excellence in teaching was awarded to **John Kallend**.

*Pictured above from top left: Nash, Nair, Wark, Sciammarella, Raman, Gosz, Aronov, Kallend.*

## Marble Curtain Project

*Associate Professor Sheldon Mostovoy*

The International Masonry Institute (IMI) sponsored an IIT architect, Jeanne Gang, to design and produce a twenty-foot high curtain of approximately twenty feet in diameter at the base made from individual sections of marble. Each of the marble pieces was approximately ¼ inch thick and water jet cut with a "jigsaw puzzle" pattern to interlock. The pieces were assembled in place and connected side-to-side using silicone rubber. Stone is a brittle material not designed to take tensile loads, yet this structure appears to flow from the ceiling as a cloth curtain might and has the beauty of the individual stones from which the sections of jigsaw puzzle were cut.



The safety of the structure was a major concern to the designers; consequently, a testing program was devised by Associate Professor Sheldon Mostovoy, MMAE machine shop supervisor Craig Johnson, and laboratory manager Russ Janota to determine if there would be danger involved with the sudden collapse of the structure in assembly. Would the curtain be able to sustain its own weight without crack-

ing? If an observer were to brush up against the curtain would it come down on top of him or her? The latter question was dealt with by coating the back of each stone with a fiberglass backing which would not prevent cracking but would prevent separation of the stone if cracking were initiated. Another solution was devised to prevent cracking.



*Mostovoy*

Mostovoy's team created test fixtures to determine the failure mode and range of loads that could be expected when a string of jigsaw puzzle pieces were pulled to fracture. The team manufactured these pieces in the department's CNC milling machine and used the Instron Universal Testing machine to test them. Movies and still photographs taken of the fracture process showed that failure initiated at veins and defects in the marble rather than at the most obvious stress concentrations around the small sections used to attach one stone to the next. This range gave the stones a safety factor of at least three in the finished structure. Additional tests in bending, compression, fixture manufacture, and shear were designed and run in our test facilities to identify potential problems from joint separation, collapse, or fracture in unexpected locations.

The completed curtain was featured at the masonry exhibit at the National Building Museum in Washington D.C. in October 2003.