MSE LEMENTS
Materials Science and Engineering Department

Fall 2003

Hoover Hall
October 4, 2003:

A new home and bright future for MSE

On a sparkling autumn afternoon, an overflow crowd of nearly 500 friends, faculty, and students of the College of Engineering gathered to celebrate the dedication of Gary and Donna Hoover Hall, the new home of the Department of Materials Science and Engineering.

"You are the first audience to sit in the Kent-Stein Foundation Auditorium of Hoover Hall," remarked Dean **James L. Melsa**. "To Gary and Donna, to all of you I say, welcome to your Engineering Teaching and Research Complex, the material fulfillment of your vision and faith in our future."

A series of speakers shared their enthusiasm for the impressive new facility. Iowa State President **Gregory Geoffroy** was effusive in his praise.

Continued on page 2

"The ETRC is the most ambitious project we've undertaken at Iowa State. It's from this foundation that our faculty and students can indeed *'reach for the top.'"*

—ISU President *Gregory Geoffroy*

IOWA STATE UNIVERSITY

"Standing up here as a former professor," he said, "I can imagine what a great facility this will be to teach in—and to learn in. Achieving excellence as a land-grant university requires that we achieve excellence in engineering—and we're doing that today."

Dr. **Debra Turner**, president pro tem of the Iowa Board of Regents, lauded the generosity of all who worked for the ETRC and Hoover Hall. "The stand you have taken to support higher education in the state of Iowa is awesome," Turner observed. "It takes special people to recognize the significance and support the efforts of a land-grant university."

"As impressive as this facility is, it wasn't built to impress, but to conduct research and educate young engineers whose work will make a material difference in the lives of people the world over."

—Dean James L. Melsa

In his remarks, **Gary Hoover** commended the vision of Dean James Melsa. "The bricks and mortar you see here today are necessary, but they're not sufficient," Hoover continued. "You need good people to make great things happen. The ETRC is a great idea created by Jim Melsa, and I just supported that idea."

At the end of the dedication ceremony, Melsa presented the Hoovers with a stained-glass rendering of Gary and Donna Hoover Hall. And a grateful crowd presented them and all of the supporters of the ETRC with an extended ovation. A reception and open house followed the ceremony.

"I want to thank my parents for seeing I got the best education possible—and for sending me to Iowa State to get it. I'm just a guy who chose to return a small portion of those blessings to his alma mater."

—Gary Hoover, BSME'61

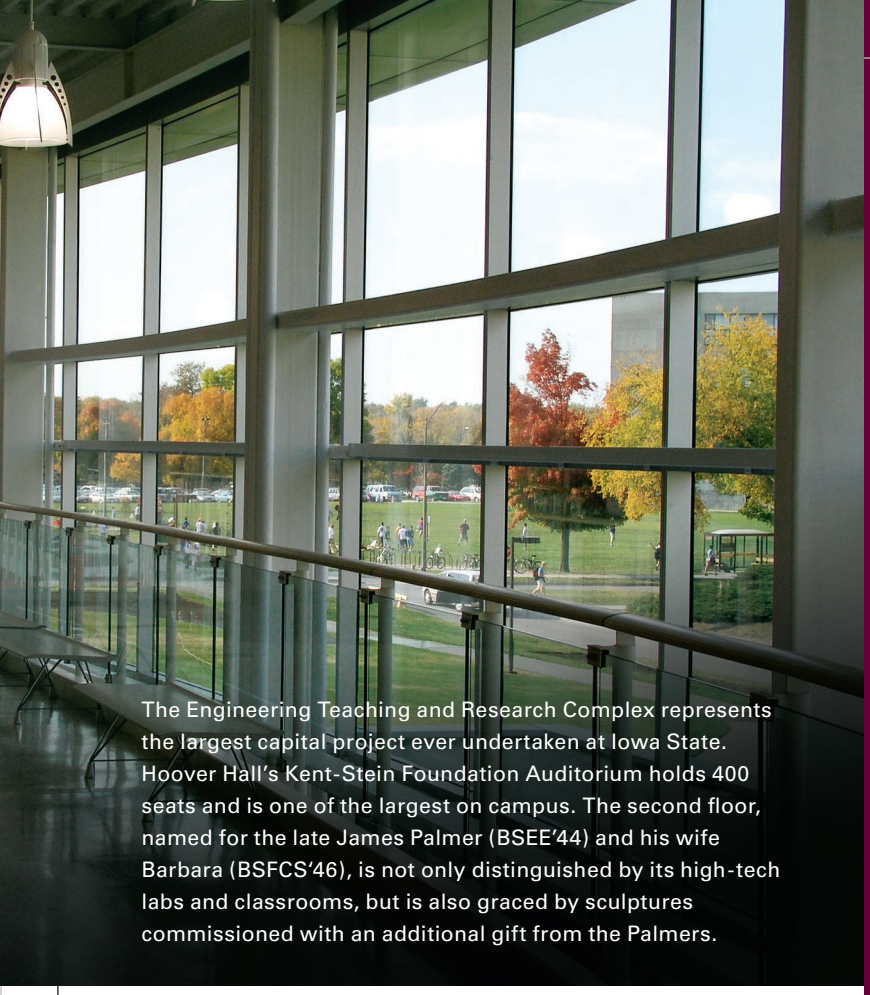
Vision and the view from Hoover Hall

It is clear when you enter Gary and Donna Hoover Hall that, more than its state-of-the-art auditorium, classrooms, and laboratories, this magnificent new facility is a tribute to hundreds of alumni who care deeply about Iowa State. You can feel the connection and sense the history in hallways whose large windows open to views of fountains trickling over a marble wall toward Marston Water Tower, which supplied water to the campus in its early days. The fountains are a feature of the H. H. Henningson Plaza, a gift from Chuck Durham to honor his father-in-law, who graduated from Iowa State in electrical engineering in 1907.

MSE reception lobby

Home to the Department of Materials Science and Engineering and Engineering Computing Support Services, as well as labs for the mechanical engineering department, the new $27-million facility was made possible by a gift from Gary Hoover (BSME'61) and his wife Donna. Iowa State's first "sky bridge" connects Hoover with the first phase of the ETRC, Howe Hall, a $35.5-million facility completed in 1999 and named for benefactors Stanley Howe (BSE'46) and wife Helen, major contributors to Hoover Hall as well.

Gary and Donna Hoover at sky-bridge entrance to MSE



The Engineering Teaching and Research Complex represents the largest capital project ever undertaken at Iowa State. Hoover Hall's Kent-Stein Foundation Auditorium holds 400 seats and is one of the largest on campus. The second floor, named for the late James Palmer (BSEE'44) and his wife Barbara (BSFCS'46), is not only distinguished by its high-tech labs and classrooms, but is also graced by sculptures commissioned with an additional gift from the Palmers.

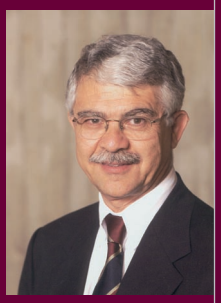
Corporate donors such as Square D/Schneider Electric and Caterpillar partnered with alumni to make many of Hoover's labs and classrooms possible. For example, the James Gayle Boyd Product Realization Laboratory will allow students to build and test the machines they design, and the Caterpillar Mechatronics Laboratory will combine hydraulics, electronics, and mechanical testing features. The Joseph C. (BSCE'54) and Elizabeth A. Anderlik Innovative Learning Environment will give students room to both listen to lectures and meet in small groups.

College of Engineering leaders are confident that these and other of Hoover's many amenities will help propel the college into the top 20 engineering programs in the nation. The challenge has been met by the vision of Gary and Donna Hoover, along with Hoover Hall's many other benefactors. As Hoover Hall's prime beneficiary, it now falls to MSE to meet the challenge as well.

Classroom in Hoover Hall

Mufit Akinc with Dean and Marge Wiley, who donated a student computation lab

Greetings from the Chair



On October 4, we dedicated Hoover Hall, our new home. The ceremony was held in Hoover's Kent-Stein Foundation Auditorium—almost precisely over the spot many will remember as the department's office in the old Engineering Annex Building. Although the location is the same, the facilities have definitely taken a big step up! If you visit campus in the future, I strongly encourage you to visit Hoover; it is quite impressive.

We put great effort into acquiring teaching and research equipment for the new facilities last year, and I am pleased to report that we acquired $2 million of mostly teaching equipment for our laboratory classrooms. Starting next semester, all of our teaching will be in Hoover Hall, soon followed by ceramic and electronic materials research activities.

We had another record attendance for the annual Scholarship and Awards Banquet April 17th. We recognized the achievements of our students, staff, and faculty and awarded undergraduate scholarships totaling $40,000—another record! Professor Subra Suresh, department chair at MIT and an ISU alum, was the banquet speaker.

You will read about Professor Tsukruk's research in this issue. He leads a large team investigating the structure and properties of nanostructured polymeric and hybrid materials. Professor Vitalij Pecharsky's new textbook, *Fundamentals of Powder Diffraction and Structural Characterization of Materials*, is also featured, along with Distinguished Professor Rohit Trivedi, who added the Mathewson Award to his collection.

If you haven't noticed, we've added a few more pages to the newsletter and decided to publish on an annual basis rather than semiannually. Let us know what you think.

Again, we are very excited about moving to Hoover Hall and the recent successes of our faculty and students. We are on our way to *REACH FOR THE TOP!*

Mufit Akinc, Chair

Gschneidner, Russell

Discover ductile intermetallic compounds

Scientists have known for over 100 years that intermetallic materials—compounds consisting of two or more metals bonded together—possess chemical, physical, electrical, magnetic, and mechanical properties that are often superior to ordinary metals. The problem with intermetallics is that they're quite brittle—until now.

MSE researchers with the U.S. Department of Energy's Ames Laboratory have discovered a number of rare earth intermetallic compounds that are ductile at room temperature. The discovery, announced in an article in the September issue of *Nature Materials*, has the potential to make these promising materials more useful.

"Many intermetallic materials are too brittle to handle," says ***Karl Gschneidner, Jr.*** *"If you drop them, they shatter. But you can beat on these new materials with a hammer, and they won't shatter or fracture—they're that ductile."*

So far, the Ames Lab research team, led by Gschneidner and **Alan Russell**, has identified 12 fully ordered, completely stoichiometric intermetallic compounds. Such materials could be used to manufacture products such as flexible superconducting wires and extremely powerful magnets.

"Tens of thousands of intermetallics have been identified," Russell says. "But in order to make them even somewhat ductile, a whole menu of 'tricks' has been developed, such as testing them at high temperatures, or in zero humidity, or shifting them off stoichiometry. The materials we're studying are the first ones that don't need these contrivances."

By combining a rare earth element with certain main group or transition metals, the resulting binary compound has a B2 crystal structure. That alpha-numeric designation, developed by crystallographers, means that the compound has a crystal structure similar to cesium chloride (CsCl), in which an atom of one element is surrounded by a cubic arrangement of eight atoms of the other element.

In tensile testing, a number of materials showed remarkable ductility. For example, yttrium-silver stretched nearly 25 percent before fracturing, compared to 2 percent or less for other intermetallics. In other measurements, the materials showed American Society for Testing and Materials fracture toughness values comparable with commercial aircraft aluminum alloys.

Why these materials deform while others shatter isn't clear, but theoretical calculations by Ames Lab physicist **James Morris** show that the ductile materials possess much lower unstable stacking-fault energies. Because their energies are lower, it is easier for the ductile materials to plastically deform instead of fracturing at the grain boundaries.

"There are particular planes [within the B2 structure] that tend to slip most easily," Russell says, "and particular directions on those planes where deformation slip occurs most easily. However, our transmission electron micrographs identify slippage in more than one direction, so there are probably other factors at work as well."

While there may be applications for these ductile materials because of other characteristics such as high-temperature strength or corrosion resistance, Gschneidner and Russell hope that studying them will actually lead to a better understanding of the brittle intermetallics.

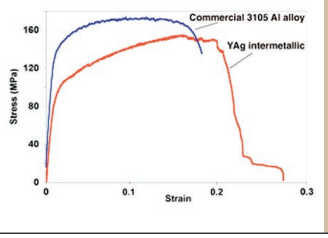
"The most exciting thing about this is finding a material that breaks all the rules. It provides a great opportunity to figure out fundamentally why the others are brittle," Russell says. "To see one that's the exception gives you a new perspective on all the others."

Gschneidner adds, "The exceptions are the ones you want to concentrate on because they can tell you a heck of a lot more than all the ones that obey the rules. It can steer you in a whole new direction."

[The above article was written by Kerry Gibson of Ames Lab and is reprinted by permission.]

Gschneidner at anvil

YAgbutton



Pecharsky writes new standard for powder diffraction

As of September, it was number 1,248,498 on Amazon's sales list, steadily moving up among the site's 2.5 million books since it was published in May. But Professor **Vitalij Pecharsky** never intended *Fundamentals of Powder Diffraction and Structural Characterization of Materials* as reading for the beach. However, if you'd like to characterize the structure of the sand, *Fundamentals* is where you begin.

Pecharsky, appointed to Ames Lab as well as MSE, and co-author **Peter Zavalij** of SUNY, Binghamton spent nearly three-and-a-half years on *Fundamentals of Powder Diffraction*—"about a year-and-a-half really hard work every weekend near the end," Pecharsky says. The result of that work is a combination text and reference book that addresses what Pecharsky considers a significant gap in lab and classroom resources.

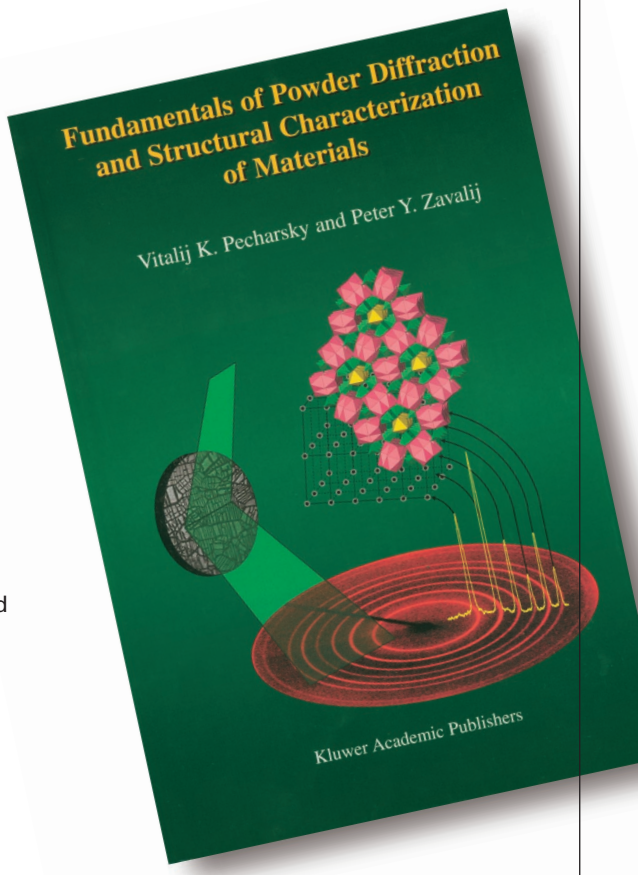
For decades, the standard text on materials characterization has been Bernard D. Cullity's *Elements of X-Ray Diffraction*. But although a third edition of Cullity was published last year, says Pecharsky, technological advances have outstripped that work's modern premises. "It is a very good book," Pecharsky observes, "but thirty years is a long time for any experimental characterization technique, especially considering the explosion in computation."

The vastly improved ability of even beginning students today to crunch numbers compared to the 1960s, Pecharsky notes, underlies a revolution in powder diffraction that argues for a new standard text and reference.

"You can now take a one-dimensional projection of a three-dimensional diffraction picture and restore it into a three-dimensional image with a crystal structure," Pecharsky says. "The experimental setup remains simple compared to single crystal diffraction. But the information is nearly as accurate as with single crystal diffraction. This is due to improved resolution of the data, better detection of x-rays, and the availability of very high computing power."

This and other advances in powder diffraction made the time right, Pecharsky says, to establish a new standard for a field that cuts across the boundaries of several scientific and engineering disciplines (co-author Zavalij is a chemist). "The book closes the gap on what was state of the art thirty years ago and today," Pecharsky says, noting the text's potential for widespread use in materials characterization courses across the nation, as most departments teach courses in x-ray powder diffraction similar to his own.

As for that Amazon ranking, Pecharsky expresses little concern that his work won't find a regular readership. "We've had many inquiries about the book," he smiles, "many knew it was in the works."



Fundamentals of Powder Diffraction and Structural Characterization of Materials

By Vitalij K. Pecharsky and Peter Y. Zavalij
© 2003, Kluwer Academic Publishers

MSE research expenditures for the past eight years:

Fiscal Year	1995	1996	1997	1998	1999	2000	2001	2002
Total MSE	***$8,109,975***	***$8,821,641***	***$9,070,859***	***$9,893,714***	***$9,351,418***	***$10,293,440***	***$14,203,791***	***$14,954,268***
Total CoEng	37,012,167	38,312,767	38,156,056	37,884,412	39,428,448	49,340,054	47,646,202	54,711,443
% total MSE from CoEng	***22%***	***23%***	***24%***	***26%***	***24%***	***21%***	***30%***	***27%***

‘Snake eyes’: Tsukruk, SEMA develop breakthroughs in biothermal sensor

Although he came to Iowa State just four years ago, **Vladimir Tsukruk** has built his surface engineering and molecular assemblies group (SEMA) into one of the largest and most dynamic research groups on campus.

SEMA currently employs 3 post-docs, 13 graduate students, and 3 undergraduates on 14 separately funded projects. Postdocs supervise upper-level graduate students, who in turn work with new grad students and upper-level undergraduates as they move up the ladder. According to Tsukruk, this hierarchical structure gives the group continuity, which is important since projects can span many years and different grant cycles.

Divided into three work groups, SEMA focuses on high-resolution molecular structures on the surfaces of soft matter.

Tsukruk currently manages between $1.5 and $2 million in grants, spread over cycles of two to three years, with expenditures averaging between $500 and $600 thousand annually. Efficiency and accountability, therefore, is the name of the game and the foundation for SEMA’s research, ranging from the application of ever-thinner polymer coatings for microelectronic devices to the development of thermal sensors for military applications.

Over the last few years, SEMA has been part of a consortium studying these sensors for the Air Force Office of Scientific Research. Used by snakes to “see” the presence of enemies or prey, the sensors can detect differences in temperature as small as two-thousandths of a degree from the background environment. “We came up with a couple ideas of why snake sensors work,” Tsukruk says, “and why they’re so much more sensitive than any solid-state device available for the military today.”

As a result of the consortium’s initial findings, the Air Force is moving the project from basic research into applications. Partnering with Agiltron, a Boston manufacturer of fiber optic components and infrared photonic sensors, Tsukruk and SEMA began the next phase of the project this autumn.

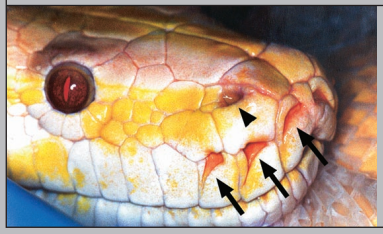
“We’ll be doing Agiltron’s microelectronic sensors for thermal detectors,” Tsukruk says, “modifying polymers to simulate something that would be observed in snakes. We’ll send them back to Boston, and they’ll measure their properties.”

Melbs LeMieux and **Maryna Ornatska** are graduate researchers who represent the combination of continuity with fresh perspectives that Tsukruk values. LeMieux has been with Tsukruk since he studied materials science and engineering with him at Western Michigan University in the late 1990s. He followed his mentor to Ames when he began graduate studies at Iowa State in 2000. By contrast, Ornatska came to SEMA as a graduate student only after finishing her bachelor’s degree at the Kiev Polytechnic Institute in Ukraine.

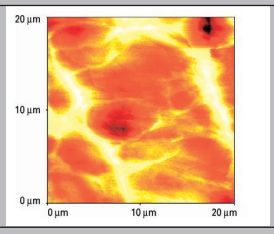
Ornatska, whose interests lie in channel proteins and artificial membrane components, notes that previous cohorts of SEMA student researchers had worked with snakes and beetles to determine their thermal sensory capabilities, focusing on structural analysis of the animals’ sensors. It is her job, she says, to apply this research to biomimetic systems.

That engineers should look to the animal kingdom for new ideas is hardly a novel concept, given that human flight would be impossible had engineers not studied the aerodynamic properties of birds. “In many cases nature is the best optimizer,” LeMieux observes, “so engineers try to mimic nature. ‘Bio-inspired’ research is a key word today.”

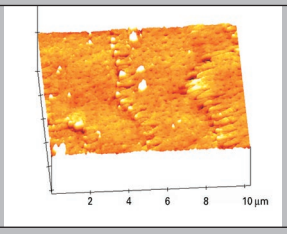
Photos from *Biomacromolecules*



Snake head with thermal sensors (arrows)



Surface distribution of temperature on snake skin at high magnification (10,000x)



Snake skin with nanofiber rows at high magnification (50,000x)

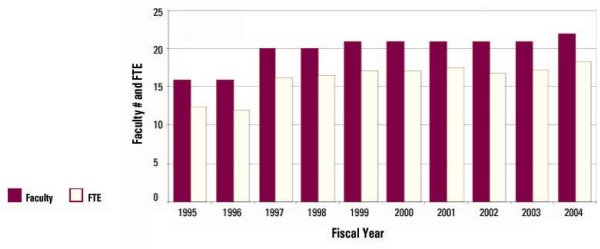
According to Ornatska, the sensors SEMA is developing employ membranes formed from a combination of polymers with single-crystal silicon that encloses ion-channel proteins that are extremely sensitive to environmental factors such as heat, pH, and moisture. "We try to preserve ion-channel proteins in a polymer system so they act like live tissue," Ornatska says. "When the membrane is stretched, this channel opens—the same detection principle we found in snakes and beetles."

While Ornatska has been with the project awhile, LeMieux, who specializes in the nanomechanical testing of thin polymer layers, is just coming on board. "Our ultimate goal is to develop an array of cantilevers or silicon beams," he says. "To increase their sensitivity, we put something with a much higher thermal sensor coefficient on it such as polymers. Our job is to show that we can coat these with an optimal polymer at the optimal thickness. The substrates we're modifying are 200–300 microns long. It's going to be tough."

Adds Ornatska, "Our aim is to get as close as we can with existing polymers in the next six months, to show that this direction works. I was skeptical when we started this," she says, "but now we've had some promising results and the project is continuing into more applied areas. We started by studying live tissues, and now we are creating 'semi-live' materials, so to speak."

"It's still basic research with snakes," Tsukruk says, "but at the next generation." If successful, he adds, SEMA will be able to go back to the Air Force and request up to $1 million for the next phase of development.

MSE faculty history: 1995-2004



Alumni profile:
Robert C. Tucker, Jr.

Among MSE's many accomplished alumni, few stand out for both academic excellence and business success as much as **Robert C. Tucker, Jr.**

Upon leaving Iowa State with his Ph.D. in 1967, Tucker joined Union Carbide as a senior research metallurgist and associate in the firm's Coatings Service Department. He would remain with Union Carbide (now Praxair Surface Technologies) until he retired in 1998 as a corporate fellow and director of business development.

But Bob Tucker is more than just a successful "company man." While rising through Union Carbide, he simul-taneously pursued a variety of career pathways. From 1989 to 1992 he was a visiting associate professor and then adjunct professor in the Department of Materials Science and Engineering at the University of Illinois. In addition, since 1999 he has also served as an adjunct professor in the Department of Chemistry at North Dakota State University, where he earned his B.S. in 1957.

Tucker's research centered on the development of thermal spray, physical vapor deposition and chemical vapor deposition materials, and processes to increase the resistance of materials to corrosion from oxidation, sulfidation, and extremes in temperature. His work helped to develop several generations of composite and thermal barrier materials for aircraft and space vehicles. An expert on thermal spray coatings, PVD, CVD, tribology, and corrosion, his research resulted in 23 U.S. patents as well as scores of publications and presentations.

A Fellow and current president of the American Society for Materials and a leader in numerous other organizations, Tucker has headed his own consulting firm, The Tucker Group, since his retirement from Praxair. He and his wife of 46 years, Mary Ann Hess Tucker (MSChem, ISU), have two children and eight grandchildren.

MSE faculty history: 1995–2004

30 entries:
8 remained same,
4 resigned,
5 joined, 9 hired,
7 have been (or will be)
on leave or sabbatical,
12 received either promotion or tenure or both

MSE Summer Program in England:
Educating engineers, building world citizens

Kristin Schipull left Iowa State a small-town girl the summer of 2002. Now, one year later, she's become a woman of the world. Credit this amazing transformation to MSE's Summer Program in England, under the direction of Professor **Scott Chumbley**.

Offered in conjunction with Brunel University on the outskirts of London, the two-year-old program was begun to boost MSE's international efforts beyond single student exchanges. Participants from across the College of Engineering enroll in the six-week program to fulfill their basic materials course requirement under the direction of Iowa State faculty, as well as taking a humanities course from a Brunel professor.

"We wanted to make the opportunity as attractive as possible," Chumbley says, "so in addition to the materials course, the program satisfies the students' international perspectives requirement. And by taking an American diversity class, they satisfy another requirement. So in only six weeks, they take care of three graduation requirements."

The program would be a bargain if it offered only that. Yet one of the greatest dividends of travel overseas, Chumbley stresses, is the change it makes in the perspectives of young people growing into their adult and professional lives. Schipull is a case in point.

Before coming to Iowa State, Schipull's travels had extended no farther than Canada. But the opportunity to see another country while satisfying several graduation requirements was too good an opportunity for the Northwood, Iowa, native to pass up.

Chumbley seconds Schipull's sentiments. "It really changes the students' perspectives," he says, "how they look at the world, yes, but also how they look at themselves." Satisfying graduation requirements may be great, he adds; however, the real bargain is not what students finish but what they begin: life as citizens of the world.

"It definitely made me more open-minded," Schipull says. "It gave me a new perspective on a world I'd never really seen before. And it gave me a different perspective on the U.S., being on the outside looking in. It's hooked me on seeing more cultures."

And not just cultures close to her own. This spring Schipull spent an entire semester in Singapore. During a Philippines stopover on the way home, she traveled to remote areas where people had rarely seen Caucasians. "People would come up to me. I even got pinched a couple of times," Schipull recalls. "They wanted to see if my skin was real!"

The experience has only whetted her appetite for more. Now a vocal advocate for study abroad—she works in the College of Engineering's International Programs office—Schipull next has her sights set on Turkey. "The culture is so different from anything I've experienced."

Kristin Schipull

2003 Spring banquet: Success in bloom for MSE

The MSE department held its annual spring awards banquet and Industrial Advisory Council dinner April 17 in the Scheman Building at the Iowa State Center in Ames. About 180 faculty, students, family, and IAC members attended the event, which was preceded by a reception in the Scheman lounge.

In remarks delivered after dinner, MSE Chair **Mufit Akinc** reviewed the department's many accomplishments during the past academic year, as well as its goals for the future, with particular attention given to the department's contributions to the College of Engineering's *Reach for the Top* initiative and MSE's impending move to Hoover Hall in the nearly completed Engineering Teaching and Research Complex.

Dr. Akinc followed his discussion with recognition of several faculty members for their achievements over the year. Professor **Scott Chumbley** received the MSE Teaching Effectiveness Award for Excellence in Teaching, and Professor **Steve Martin** was honored with the MSE Departmental Service Award for Excellence in Service to the Department. Professor **Vitalij Pecharsky** was recognized with the MSE Departmental Research Award for Excellence in Research or Scholarship.

Following recognition of the faculty, MSE's scholarship recipients for the 2003–2004 academic year were presented, including twelve National Merit Scholars and several dozen recipients of scholarships supported by named donors, industrial supporters, general alumni contributions, and the College of Engineering. In addition, **Jeff Leib** (MSE 6) received special recognition in the form of MSE's Outstanding Senior Award for Achievement in Academics, and **Meredith Berger** (MatE 4) was given the Outstanding Senior Award for Student Leadership and Service to the Department. (A complete list of scholarship winners may be found on the next page.)

Keynote speaker for the dinner was Dr. **Subra Suresh** (MSME'79), currently department head and Ford Professor of Engineering in the materials science department at MIT, whose talk, "Iowa State: Gateway to a New World," recounted his experiences as a master's student at Iowa State in the late 1970s, as well as a personal reminiscence of Ames and the many people who helped him adjust to life in America after leaving his native India. A Fellow of the National Academy of Engineering and the youngest living Fellow of The Minerals, Metals, and Materials Society, Dr. Suresh is one of the world's most highly cited researchers in the field of materials science. His MIT research group focuses on the mechanical properties of nanoscale to bulk materials.

Suresh offers seminar: Nanoscale materials

As part of his visit to Iowa State and MSE April 17, Dr. Subra Suresh of the Massachusetts Institute of Technology participated in MSE's Spring 2003 Seminar Series with a discussion titled "Nanoscale Contact at Surfaces: Engineering and Biological Materials."

Taking advances in instrumentation and computer hardware and software as his point of departure, Suresh discussed what he views to be new opportunities to assess the mechanical response of materials and surfaces at nanoscale lengths. His presentation covered recent advances—many originating in his own research group at MIT—in determining the mechanics and mechanisms of nanoscale contact in both engineering materials and single biological scales and molecules.

Suresh offered examples of nano-mechanical response drawn from microelectronics, magnetic storage media, micro- and nano-electro-mechanical systems, and bioengineering as well as opportunities for experimentation and computation in these areas down to the detection of the functional properties of materials during ultrafine-scale deformation. He concluded by summarizing the effects of size scale on the properties of materials across a broad range of applications.

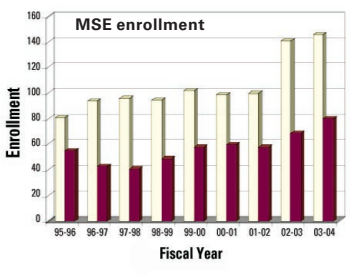
A graduate of the Indian Institute of Technology, Dr. Suresh received his M.S. from Iowa State in 1979 and his Ph.D. from MIT in 1981. His research group at MIT works in experimental, analytical, and computational aspects of the properties of thin film and bulk materials.

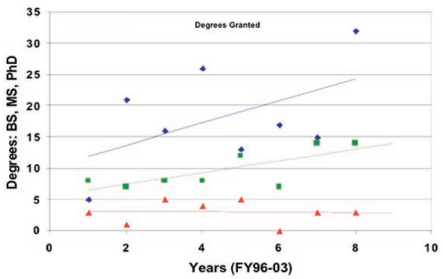
2003–2004
MSE National Merit Scholars

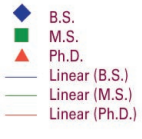
Andrew Becker
Drew Enlow
Christopher Hansen
Jonathan Havenga
Joshua Huffman
Matthew Larson
Paul Matlage
Dustin Menke
Amber Schneeweis
Paul Stanley
Eric Van Horn
Scott Williams

2003–2004
MSE scholarship recipients

David R. Wilder Scholarship		Brad Stumphy
Square D Foundation Scholarship		Emily Kinser
Clarence Ford Scholarship		Ryan Haase
Rockwell Women's Scholarship		Shannon Jurca
L. C. "Doc" and Lina Allen Scholarship		Eric Patterson
Patricia Werner Merten Scholarship		Richard Fleming
Clayton H. Cooper Scholarship		Sarah Shiley
Deere & Company Minority Scholarship		Joshua Huffman
Richard and Marilyn Engle Scholarship		Daren Breid
Engineers' Week Scholarships	Kathryn Bergman Lucas Hale Kent Heitman Jessica Raim Amber Schneeweis	Shannon Dudley Kenda Headley Kelly Lawson Kristin Schipull Grant Thomas
Frank McCutcheon Scholarship		Jon Bolluyt
Paul E. Morgan Scholarship		Colleen Prosser
Murray Gautsch Scholarship		Charles Rossa
Roderick Seward, Flossie Ratcliffe, and Helen M. Galloway Scholarship		Andrew Frerichs Jeff Nissen Christopher Paar
Otto and Martha Buck Scholarship		Peter Van Zante
Mary and Donald Martin Scholarship		Jason Walleser
Deere & Company Scholarship		Eric Wagner
Samuel Walker Beyer Scholarship		Carly Nelson
David T. Peterson Scholarship		Tyson Pederson
Frank Kayser Memorial Scholarship		Neal Porter
Materials Engineering Alumni Scholarships	Keith Bormann Cole Petersburg	Christopher Baker Jennet Kramer Nathaniel Phillips
Lane Wells Scholarship		Todd Boge
College of Engineering Scholarships	Rebecca Ahrens Andrew Wright	Stephen Davis Ben Zimmerman







MSE degrees granted years (FY96–03)

Jiles named Anson Marston Distinguished Professor

MSE professor **David Jiles** was named Anson Marston Distinguished Professor in Engineering by ISU President **Gregory Geoffroy** at the university-wide convocation held September 29 in the Memorial Union. First conferred in 1956, the title of Distinguished Professor is the highest academic honor bestowed by the university. Awarded for the rest of a scholar's career at Iowa State, the honor recognizes exemplary performance by a senior faculty member and comes with a permanent increment in base salary.

In addition to MSE, Jiles holds a joint appointment with the Department of Electrical and Computer Engineering. He is a senior scientist with Ames Laboratory and is affiliated as well with the Center for Nondestructive Evaluation. An expert in theoretical and experimental elastic properties, hysteresis, and the modeling of magnetic materials, Jiles has applied complex research findings to practical issues such as the evaluation of fatigue in steel pipes and rails. He is a Fellow of both the American Physical Society and the Institute of Mathematics in the United Kingdom.

Neri receives Dean's Staff Excellence Award

MSE administrative specialist **Carmen Neri** was named winner of the Dean's Staff Excellence Award, presented by Dean **James L. Melsa** at the College of Engineering's fall convocation, held August 27 in the Alliant Energy-Lee Liu Auditorium of Howe Hall. The award is given annually to a staff member from any of the college's departments or units whose work is recognized as outstanding and integral to the success of his or her unit.

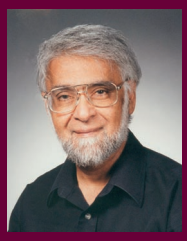
Neri came to MSE in 1998 after moving with her family to Ames from Albuquerque, where she had worked in admissions and human resources at the University of New Mexico. She quickly familiarized herself with MSE's complex accounting procedures (MSE has many split appointments with Ames Lab and other campus research centers) and has since proved herself indispensable to the efficient running of the department.

"Carmen hasn't been content just to learn the basics," Melsa remarked. "She devotes herself to seeing the big picture, tackling new challenges and everyday tasks with boundless energy and a strong commitment to excellence."

David Jiles

Carmen Neri

Trivedi to receive Mathewson Award



Dr. Rohit Trivedi, Anson Marston Distinguished Professor in Engineering, was recently named a recipient of the prestigious Champion H. Mathewson Award for a paper he co-authored, "The Effect of Convection of Disorder in Primary Cellular and Dendritic Arrays," with P. Mazumder and S. N. Dewari. The award, which recognizes significant contributions to metallurgical or materials science, honors Champion H. Mathewson, president of the American Institute of Mining, Metallurgical, and Petroleum Engineering in 1943.

The award will be presented at the annual meeting of the Minerals, Metals, and Materials Society, March 2004 in Charlotte, North Carolina. Trivedi is a past recipient of the David R. Boylan Eminent Faculty Award for Research from Iowa State and the Henry Marion Howe Medal from ASM International, among many other awards and honors.

Trivedi has been with the Iowa State MSE department since 1966, when he received his Ph.D. in metallurgy and materials science from Carnegie Mellon University. His research in the structure of materials has focused primarily on the areas of solidification, solid-solid phase transformation, and surface properties. For the past several years he has studied the solidification of microstructures, particularly as it applies to materials. His work with the Ames Laboratory is supported by the Basic Energy Sciences Division of the Department of Energy.

Additional awards

Associate Professor Brian Gleeson, Lee Hsun Lecture Series Award, invited lecture, "Effects of Pt on Oxidation and Interdiffusion in the Ni-Pt-Al System," October 16, 2003, Institute of Metal Research, China Academy of Science

Best Poster, "Interdiffusion in Ni-rich Ni-Al-Pt Alloys at 1150 C," Gordon Research Conference on High Temperature Corrosion, July 2003, New London, New Hampshire (with colleagues S. Hayashi, W. Wang, and **Adjunct Assistant Professor D. Sordelet**); also elected chair, 2005 Gordon Research Conference on High Temperature Corrosion

Distinguished Professor Karl Gschneidner and **Professor Vitalij Pecharsky**, 2003 Innovative Housing Technology Awards: Coming of Age Award for the Magnetic Refrigerator, by the National Association of Home Builders, Atlanta, Georgia (one of six innovations worldwide to be recognized)

Amber Schneeweis, BS/MS Student, Second Place, "Most Artistic Image," Second Annual Cornell University Microscopy Image Competition "Images in the Material World" *(Visit www.mse.cornell.edu/imagescontest/index.htm to see image.)*

John Snyder, Adjunct Assistant Professor, *Who's Who in America*; FJUS Sailing Class National Championship

Materials Science and Engineering Department
Iowa State University
2220 Hoover Hall
Ames, IA 50011-2300

New MSE conference room

Send comments, questions, and news items to our NEW location :

Alan Russell
MSE Department
Iowa State University
2220 Hoover Hall
Ames, IA 50011-2300

Phone: (515) 294-1214
Fax: (515) 294-5444
E-mail: mse@iastate.edu
Web site: http://www.mse.iastate.edu/

MSE sends large contingent to ASM

Twenty-five undergraduate MSE students from Iowa State University attended the ASM Materials Conference, sponsored by the American Society for Materials, October 13–17 in Pittsburgh, Pennsylvania. This was the largest student contingent the department has ever sent to an ASM conference. Participation in the conference gives the students a chance to meet other professionals in their field and learn about the latest developments in materials research.

The conference's plenary session examined opportunities for materials R & D, and featured representatives from the Department of Energy and the National Energy Technology Laboratory, as well as industry reps from firms such as GM, Alcoa, and Allegheny Technologies. Other conference sessions focused on fuel cells, cemented carbides and related hard materials, and advances in powder metallurgy.

In addition to their own fundraising efforts, the students' travel expenses were underwritten with support from the MSE department, as well as faculty members **David Jiles, Karl Gschneidner, Brian Gleeson, Ralph Napolitano,** and **Bruce Thompson.**

IOWA STATE UNIVERSITY