

Tech Topics

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Michigan Tech's Faculty-Staff Newsletter

Published weekly by University Relations

SBE Launches New Education Program

By Laura Walikainen

Michigan Tech is now offering a certification program in business education.

"We'll be graduating teachers who are full business majors," said **Brad Wagner**, coordinator of academic services for the School of Business and Economics. "This sets our graduates apart from students in other schools."

The new certification is geared toward a variety of students—or potential students.

"This program is ideal for those who already have completed a business degree and would like to be certified to teach, for students who are close to graduating and would like to add a teaching certification and for students who are just beginning their study of business," Wagner said.

The University graduates teachers who earn a bachelor's degree in their teaching specialty, plus a state certification. These programs help assure that America's secondary school teachers have a solid foundation of knowledge in their subject area.

"Michigan Tech has graduated some great teachers in the last few years," Wagner said. "Our students are going to be highly qualified, well-prepared professionals who want to contribute to our society by becoming teachers."

"I think that the future of high school business education is a bright one."

Summertime . . .

and we go home early

Starting Sunday, May 12, the University shifts to its summer schedule. The general hours of operation will be 8 a.m. to 4 p.m. All offices must be staffed during those hours.

Employees are expected to fulfill their usual full-time or part-time obligations. Regular office hours resume Monday, August 19, but let's not think about that now.

Learn from the mistakes of others—you can never live long enough to make them all yourself.

—JOHN LUTHER

Friedrich: Milling a Lens that Goes Straight to the Heart

An ultrasound device that features a lens only one millimeter across could help prevent coronary arteries from re-blocking following bypass surgery.

The lens, milled by Associate Professor **Craig Friedrich** (ME-EM), is an essential part of an ultrasound system developed in cooperation with Professor Robert Keynton of the University of Louisville. The integrated miniature acoustical lens-transducer system, as it is called, measures the dragging force of blood against the walls of arteries as it surges by.

"For instance, when surgeons do a graft, they could use it to make sure the blood is flowing by smoothly, with no turbulence," Friedrich said. Turbulence may cause inflammation on the inside of arteries, which can result in more plaque build-up and subsequent blockage.

The lens focuses intense ultrasound waves on the interior walls of blood vessels to measure the "shear stress" of the blood flow. Currently, the system is being used to determine if this shear stress causes arterial re-

blockage following coronary bypass surgery.

What makes this lens special is not only its size—it's as thick as two strands of human hair—but also how it's made. Using micro-machining techniques to make tiny lenses is nothing new, but keeping them in shape is.

Most errors occur when the lens is attached to the transducer, the part of the system that changes sound waves to electrical energy. This time, the researchers managed to create the perfect lens by milling it out after the system was assembled.

The device holds promise in a number of different areas, including detecting small tumors. And Friedrich says more breakthroughs are in the wings.

"This project started about six years ago, and we've made a lot of progress on tiny acoustic devices since then," he said.

Their work will be featured in an upcoming edition of Biophotonics International and appears on the BBC Web site http://news.bbc.co.uk/hi/english/health/newsid_1892000/1892273.stm.

HARDNESS TESTING MADE EASY

Army Labs Licensed to Use Subhash's Invention

If you've ever played around with Silly Putty, you know a little about the difference between statics and dynamics. Pull a blob slowly and it stretches; pull it quickly and it breaks.

Measuring how materials behave under a static, slow pull is simple. Measuring the effect of dynamic yank is another matter entirely, involving a lot more math than the average technician is up to. At least until now.

Five years ago, Associate Professor **Ghatu Subhash** (MEEM) developed a prototype of his dynamic hardness tester, the first device to easily and quickly measure how materials respond to dynamic forces. He recently returned from the U.S. Army's Aberdeen Proving Grounds, in Maryland, where he set up his newly patented tester. For \$40,000, the army became the first organization to purchase a license for the device.

At first blush, it doesn't look like \$40,000 worth of machine. There's a long bar with a power source at one end, a point at the other, and a weight in the middle.

Nevertheless, says Subhash, looks can be deceiving. "We developed a lot of science and published a lot of papers on this, my students and I," he notes. "It's more complicated than it seems."

"It's like firing a bullet, making it kiss the target and come back."

Dynamic hardness testing has been around for a while, but it wasn't easy. Subhash's tester has taken the difficulty out of the process. "Now you don't need a PhD to do it," he said. "Any high school student or machinist can use this."

In time, dynamic hardness testers will be evaluating materials in labs and machine shops all over the country, Subhash predicts. Anyone researching or manufacturing materials in areas as diverse as bullet-proof clothing, automotive crash-worthiness and precision grinding can learn a lot from a dynamic hardness tester. And if the device were to be licensed and manufactured, then the price could be affordable for the average machine shop, he said.

Jim Baker, director of technology partnerships, agreed. "The equipment isn't so exotic that only the army can have one," he said. "It's inexpensive enough so that any machine shop that wanted it could have it."

The University has applied for a Canadian patent on the dynamic hardness tester and is also working with another company to license it.

New Grad Program Makes Students of Teachers

By Laura Walikainen

Math and science teachers are heading back to school at Michigan Tech as they work toward a master's degree in applied science education.

"The concept is to use engineering applications as a way of helping educators teach math and science courses," said **Brad Baltensperger**, chair of the education department.

Less than one year after its initiation, the program is already winning the praises of many of its students.

"The courses I've taken this year have been absolutely fabulous," said Hancock High School biology teacher **Kristen Shourek**, who enrolled in the program last summer. "After 29 years of teaching, I find there is still much more to be learned. The courses are demanding, but at the same time exciting and energizing."

Students can take a combination of three two-week intensive courses in the summer, plus 6 credits of graduate courses via distance education.

The program fills a regional demand for more-advanced teacher education.

"I think there is a need for professional development opportunities in science and math, particularly in the UP and northern Wisconsin," Baltensperger said. "There is clearly a push nationally to improve science and math education. These are really dedicated teachers who want professional development that's going to enable them in the classroom."

Isle Royale Institute Has Summer Job for Grad Student

The Isle Royale Institute has a half-time, summer job for a grad student interested in public relations.

The student worker will improve the institute's Web site, create several pamphlets and make several trips to Isle Royale.

For more information, contact Mark Gleason, 487-2086, gleason@mtu.edu.

MichiganTech

Bill Curnow, executive director, University Relations
Marcia Goodrich, *Tech Topics* editor
Tech Topics Web site: www.mtu.edu/news/ttopics/

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- By e-mail to tttopics@mtu.edu
- By campus mail, send typed copies to *Tech Topics*, University Relations.

Each week, the deadline for submitting information is **Friday at 5 p.m.** for publication the following Friday.

The Goals of General Education

Center for Teaching, Learning,
and Faculty Development



By William Kennedy, director

In 1998, the NCA visiting team was unable to review MTU's general education program, since it was

undergoing a complete redesign in preparation for the move from quarters to semesters. In the final report, the NCA required that MTU conduct a self-study of our new general education program and issue a report to them by February 1, 2003.

The key to any successful self-study is to show that students completing the program are achieving its goals. The goals of our gen ed program include developing students' 1) scholastic habits of careful reading, reasoning, analysis and argument, 2) habit of applying multiple perspectives in interpretation, analysis and creative problem solving, 3) respect for diversity and awareness of complex contexts of their study and their work and 4) knowledge of a broad range of topics and disciplines complementary to the major.

The general education core course coordinators are presently completing pilot assessment projects and refining assessment procedures to measure the degree of achievement of student learning outcomes in the four gen ed core courses taken by all students. Next fall, we will be establishing a process to periodically examine if and how the 200-plus courses in the distribution list contribute to the achievement of the goals, as well. It is our hope that the NCA reviewers will view these activities as a good faith effort to assess student learning in the new program.

Perhaps no issue across the academy evokes more passionate discussion and persistent tinkering than general education. In the broadest terms, general education is designed to 1) help undergraduates with widely varying levels of high-school preparation develop the skills and interests they need to make the most of their college studies, and 2) develop the habits of the mind students need to meaningfully engage issues, think

critically and learn independently.*

Across the academy, general education programs take one of three general forms: 1) true core, 2) a distributional approach or 3) a "major-dominated" approach. Programs vary depending on whether they include courses on contemporary issues, options for individualized work, interdisciplinary study opportunities and the degree of structure in the distributional phase of the program. The new MTU general education program is a hybrid with a common core emphasizing interdisciplinary understandings and a distributional component that allows students to pursue subjects of personal interest in depth.

In the early nineties, Sandy Astin, Allan Murray Cartter Professor and director of the Higher Education Research Institute at UCLA, conducted a large, multi-institutional research program that found that only the true core-course approach to general education resulted in improvements in student performance. Students completing core-type gen ed programs were more predisposed to take interdisciplinary courses, to appreciate the gen ed experience, to have higher regard for faculty, to get involved on campus and to evaluate their undergraduate instruction more highly than students in distributional or major-dominated programs. With the exception of true core systems, Astin found that the format of most gen ed programs had little effect on student development. Ironically, true core-course systems account for less than 5 percent of gen ed programs across the country; with over 90 percent emphasizing a distributional approach.

Astin found that the degree to which a gen ed program encourages students to work together and with faculty also shapes their educational development and satisfaction. He concludes that schools would do better to stop endlessly tinkering with the distributional mix of gen ed programs and begin to think about increasing opportunities for student/faculty and student/student interaction and to provide opportunities for students to employ what they are learning.

*Peter Stearns, "General Education Revisited, Again," *Liberal Education*, Winter 2002 pp. 42-47.

*"What Really Matters in College: Four Critical Years Revisited," Jossey-Bass, 1993, p. 425.

Employee Excellence Award Committee Members Announced

The Staff Council constituency has elected three new members of the Employee Excellence Award Selection Committee. Building Attendant **Al Olson** (M&M Building) was chosen from the Crafts/Maintenance/Food Service/Technical category. Administrative Aide **Diane Nakkula** (Accounting Services) was elected in the Clerical/Secretarial category, and Recreation Manager **Mike Abbott** (Auxiliary Services) was selected in the Administrative/Professional category.

Staff Council is seeking nominees for the Employee Excellence Award, which recognizes exemplary staff in three job categories. Nomination forms are available at the Staff Council Web site, www.admin.mtu.edu/staff_council/nomination. Nominations can either be submitted at the site or by printing out a copy of the form and returning it through campus mail. The deadline for submitting nominations is 5 p.m. Tuesday, May 7.

If you have any questions, contact Becky Christianson (487-2416, rwchrist@mtu.edu) or Bev Auel (487-3539, blauel@mtu.edu).

Bonnie Scotland Locale for Next Club Indigo

By Joe Kirkish

The Calumet Theatre and Mu Beta Psi music fraternity celebrate National Humor Month (April) with "Local Hero."

Quixotic characters with tongue-in-cheek humor, improbable situations and a barren Scottish seacoast provide the setting for Club Indigo on Friday, April 26.

"Local Hero" is a genial fantasy. Writer/director Bill Forsyth created this not-quite fairy tale, populated by colorful inhabitants including a mermaid-like marine biologist, a clergyman who is an African native, a bartender who triples as cook, landlord and local accountant (never hampered by his romantic escapades), a mysterious biker and a hermit astronomer, all of whom clash with a businessman's "normal" American ways.

American critics unanimously applauded all of Forsyth's comedies, especially cheering this movie with one critic acclaiming, "It has become my favorite movie of all time," and another, "It is possibly one of the best 10 films of the 1980s."

The movie will be preceded by an appropriate buffet of Scottish delicacies created by Chef Eric Karvonen.

The buffet begins at 6 p.m. with reservations made by calling the Calumet Theatre at 337-2610 during regular weekday hours. The combination of food and film is \$13, with a substantial discount for children. The movie can be seen at 7:15 p.m.; admission is \$3.50, discounted for children.

"Local Hero" is made possible by a grant from the Isle Royale Ferry Service of Copper Harbor (289-4437).

The next presentation, on May 17, is a comedy about life in an Italian village: the 1989 Academy Award winner "Cinema Paradiso."

In Print

Associate Professor **Ulrich Hansmann** (Physics) published "Numerical Comparison of Two Approaches for the Study of Phase Transitions in Small Systems," coauthored with N. A. Alves and J. P. N. Ferrite (FFCLRP, University of Sao Paulo, Brazil) in "Physical Review E," vol. 65 (2002); "Structural Transitions in Biomolecules, A Numerical Comparison of Two Methods for the Study of Phase Transitions in Small Systems," coauthored with Alves and grad student **Y. Peng** (Physics), in the International Journal for Molecular Science, vol. 3 (2002); and "X-Ray Structure Determination of Organic Molecules from Diffraction Data by Simulated Annealing," coauthored with H. P. Hsu and S. C. Lin (Academia Sinica, Taiwan) and "Proteinlike Behavior of a Spin System Near the Transition between Ferromagnet and Spin Glass," coauthored with C. Y. Lin and C. K. Hu (Academia Sinica, Taiwan), in "Physical Review E," vol. 64 (2001).

Cho Named to Korean Academy of Engineering

Peck Cho has been inducted into the National Academy of Engineering in Korea.

At 45, he is the youngest person to be elected to the academy and one of only 22 overseas members. This is the latest in a series of honors he has received from engineering societies, including the Outstanding Teaching Award from the American Society of Engineering Education, the Teetor Educational Award from the Society of Automotive Engineering and the Outstanding Service Award from the Korean Society of Engineering Education.

Cho, Michigan Tech's ombudsperson and a professor of mechanical engineering, was honored for his efforts in the field of education. For the last decade, he has consulted, cajoled and cheered for educational reform in his native Korea, with the goal of instituting the best practices in American education while sidestepping its mistakes.

Among his efforts, he has brought more than 100 Korean engineering students to MTU, developed an exchange program for student groups and provided opportunities for a dozen Michigan Tech faculty to deliver seminars and mini-courses in Korea.

"Asia's universities are waking up from deep, deep slumber and are trying to reform," Cho said. "They are now struggling to stay competitive and relevant to the national interest."

Ten years ago, Cho predicted the recession that struck Asian economies in the mid-1990s, blaming an educational system that stifled creativity and initiative. Their respective higher-ed establishments have recognized the need for change, Cho said, but their typical response reinforces old social and educational hierarchies and will do little to boost Asian economies to a position of international leadership.

"The strategy they usually adopt is to stress graduate research at the expense of undergraduate education, exactly when societal changes demand that institutions of higher learning provide quality education."

In addition to writing four books on the subject, including "Seven Reasons for Korean Revival: Educational Reform" (coauthored with his wife) and "New Teaching Techniques," Cho has been featured on several Korean radio and television talk shows, written newspaper columns and spoken before dozens of conferences. He has lobbied for the creation of learning centers, better teacher training and the abandonment of

the memorize-what's-on-the-board style of teaching. And his weekly e-mail newsletter on teaching reaches more than 7,000 subscribers.

These efforts have met with some success. About 30 Korean universities are considering establishing centers for teaching, and for many teacher training is now a requirement for new faculty.

"What I've been able to do is articulate why we must invest in quality education and then show them how it can be done," Cho said.

Jang Gyu Lee is chair of foreign affairs for the Korean National Academy of Engineering and a professor at Seoul National University's School of Electrical Engineering and Computer Science, where Cho has been a frequent guest lecturer.

"Dr. Cho has made so many contributions to Korean academic society that I'm afraid I can only describe his work partially," Lee said. "With the e-letters, he strongly influences the Korean academic community to strengthen education."

"You know, Korea tends to follow American universities in which faculty members put research in front of education," Lee noted. "College education has steadily deteriorated. Many Korean professors tell me that they follow the suggestions made by Dr. Cho and

improve the quality of their teaching.

"I deeply appreciate Dr. Cho's contributions for that."

Now his message is beginning to spread beyond the borders of Korea.

Cho has been invited to present at international conferences in Australia and Singapore, as well as to serve on the editorial board of the Engineering Education Journal, published by the Association of Engineering Education for South East Asia and the Pacific.

"Change takes a long time here in the U.S.," Cho said. "Over there, everything is moving so fast. . . . I expect to see big changes in the next five or 10 years."

Asian nations have been immensely successful in developing industrial economies, Cho said. If they can re-tool their educational systems for the Information Age, the West could find its economic preeminence challenged once again.

If Asia is roused out of this "deep, deep slumber," American universities could be in for an awakening of their own.

Asia's universities are waking up from a deep, deep slumber.

In the News

An article on genetic engineering in Scientific American, "Designing Trees" by Naomi Lubick, mentions Professor **Vincent Chiang** (SFWP) and Michigan Tech.

Michigan Tech and last November's bombing attempt were included in a story about terrorism in the April 7 New York Times Magazine.

Squonk at Tech Arts Festival

Submitted by University Cultural Enrichment

The Memorial Union Board presents Squonk as the main event for this year's Tech Arts Festival. Squonk! It's fun to say and even funnier to watch, but what is it? Squonk is an amazing company of extraordinarily inventive, entertaining, multi-talented people appearing at the Rozsa on Saturday, April 20, at 8 p.m. A Squonk performance is "... the most fun theatrical nonsense you'll ever see—a positive celebration of silliness... a musical frolic that's meant to confront and shake up the senses" (New York Times). Tickets are available at the Rozsa Center Box Office at 487-3200 (Monday-Friday, 11:30 a.m.-5 p.m.) or online at <http://www.ticket.mtu.edu>.

They're the proud winners of the highly prestigious American Theatre Wing Design Award 2000 for Outstanding Unusual Effects, one of the hallmarks of their performance.

MTU POSITIONS AVAILABLE

Job descriptions will be available at 1:00 p.m. on Friday, or by e-mail at <JOBS@MTU.EDU>.

The following position will be posted Friday, April 19, 2002, at 1 p.m. through noon, Friday, April 26, 2002, in the Human Resources Office.

Web Application Developer—J. R. Van Pelt Library

Reference and Research Services

Librarian—J. R. Van Pelt Library

Catalog Librarian—J. R. Van Pelt Library

Residence Hall Coordinator—Residence Life (Regular, 10-month, live-in position; apartment and meals furnished as compensation in kind)

Clinical Counselor—University Counseling Services (Regular, nine-month position)

Secretary II (N4)—Occupational Safety and Health Services and Facilities Management (UAW internal and external posting; regular, part-time position; 20 hours per week)

University employees are reminded to apply in writing prior to noon, Friday, April 26, 2002, to be considered as internal candidates for bargaining unit positions only. Applicants from the recall pool will be given first consideration for non-bargaining-unit positions only. Vacancy announcements are normally posted every Friday at 1:00 p.m. in the Human Resources Office. Complete job descriptions are available in the Human Resources Office or by calling 487-2280. More information regarding employment opportunities is available by calling the Job Line at 487-2895. Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.

Using original music, humor, startling visual effects, dance, puppetry and mime, Squonk creates an extraordinary variety of myths and moods. Monsters, machines, even a mechanical horse stalk the stage conjuring up images that are by turns, beautiful and wacky, humorous and strange, and always wondrously creative.

Squonk gives us accessible performance art, not the kind that is so off-the-wall that it's incomprehensible, but music, dance, theater, much humor and weird, wonderful and extraordinary props that the Monty Python crew would covet. Their puppetry is not like any traditional puppetry you may have seen. One spectacular puppet is a giant head divided into four, with a large mouth and a huge tongue that leaps out, sweeping objects in its path out of the way.

The music, performed by the cast and sung by the ethereal Jana Losey, is a rich brew of Irish techno-folk and Indian melodies, laced with strong dashes of Philip Glass, heavy metal, and industrial noise. Assorted forms of percussion and wind instruments are used along with a double bass, keyboards and an accordion. The Washington Post describes their music as "Debussy meets Godzilla" and the Chicago Reader finds "traces of Laurie Anderson, Kurt Weill, Debussy, Ravi Shankar, medieval chant and rap."

Squonk's visit to the Rozsa is presented by the Memorial Union Board for Tech Arts Festival and is funded by student activity fees, the MTU Committee for Campus Enrichment and the James and Margaret Black Endowment. For further information, contact University Cultural Enrichment, 487-2844.

Concert Choir Sings "Music of the Americas" Sunday

The 90-voice Concert Choir unveils a program selected for its upcoming tour of Brazil in its spring concert, "Music of the Americas," on Sunday, April 21, at 3 p.m. in the Rozsa Center. **Milton Olsson**, chair of the fine arts department, conducts the choir in a variety of choral music from the U.S., Canada, Mexico and Brazil, including jazz, spirituals and folk songs.

Highlights include "Silverly" by Canadian composer Bruce Ruddell, which Olsson describes as "a lush array of vocal colors with a magical piano part, producing an enchanting sound picture." Mexico is represented by 16th-century composer Juan de Lienas. Brazilian songs include music by leading modern composers C. A. Pinta Fonseca ("Muié Rendera," based on Brazilian folk songs) and Ernani Aguiar ("Salmo 150," or Psalm 150), plus "The Girl from Ipanema" in an arrangement by Olsson. Pinta Fonseca directs Brazil's internationally recognized choir, the Ars Nova Coral, which will host the Michigan Tech choir in a joint performance during this summer's tour.

The United States is celebrated with music by Virgil Thomson, Randall Thompson, Vincent Persichetti, William Dawson, Hall Johnson, Jack Halloran and Olsson, including a selection by student jazz singers and the premiere of Olsson's setting of Ben Johnson's poem "Drink to Me Only with Thine Eyes." Pianist Neil Paynter will perform "Vano Empeno," a dance for solo piano by Puerto Rican composer Juan Morel Campos.

The Concert Choir's August 2002 tour of Brazil will be its first visit to South America. They are one of a handful of U.S. choirs to tour Brazil, so interest in the visit is high, according to tour organizers.

Tickets for "Music of the Americas" are available from Rozsa Center Ticketing Services (487-3200), the SDC Central Ticket Office, Memorial Union Tech Express, and www.tickets.mtu.edu for \$8 general, \$4 students (\$1 more at the door).

April

Fair Housing Month

- 18 Thursday**
all day—84th Annual Conference and silent auction, U.P. Section of SME—Memorial Union Ballroom
noon—Latino Week Lunch 'n' Learn: "A Taste of Latin Music" with Ciro Sandoval—M&M U113
8 p.m.—"Arsenic and Old Lace"—McArdle Theatre
- 19 Friday**
noon—Latino Week Lunch 'n' Learn: "Bedazzled by Brazil"—M&M U113
6 p.m.—Black Student Organizations award banquet—Northern Lights
8 p.m.—"Arsenic and Old Lace"—McArdle Theatre
- 20 Saturday**
8 p.m.—"Arsenic and Old Lace"—McArdle Theatre
8 p.m.—Squonk—Rozsa Center
- 21 Sunday**
3 p.m.—Concert Choir, "Music of the Americas"—Rozsa Center
- 22 Monday**
noon—Weight Watchers meeting—Memorial Union Ballroom B1
- 25 Thursday**
all day—Take Our Daughters to Work Day
- 26 Friday**
6/7:15 p.m.—Club Indigo dinner/movie, "Local Hero"—Calumet Theatre

Weight Watchers Meet Monday

Weight Watchers will hold their regular meeting on Monday, April 22, at noon in Memorial Union Ballroom B1. New members are welcome. For more information, call 487-2517.