

the MEssenger

UNIVERSITY OF WASHINGTON
COLLEGE of ENGINEERING
A Community of Innovators

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Garbini Named First Morrison Chair

Professor Joe Garbini's passion for teaching and dedicated mentoring have inspired hundreds of students in their passage through the classrooms and labs of Mechanical Engineering. Far beyond ME's walls, Garbini and his research team are international leaders in developing revolutionary technology for a "molecular microscope" that promises to transform scientific research. In recognition of these achievements, Garbini was named the first holder of the James B. Morrison Endowed Chair in Mechanical Engineering.

"We are proud to honor one of our most exceptional faculty members," says ME Chair Mark Tuttle, "especially because Professor Garbini is a UW-educated mechanical engineer who is so devoted to nurturing the training and careers of students, as was Professor Morrison."

Garbini earned his BSME ('71) through PhD ('77) degrees at the UW and joined the faculty in 1979. He led development of the undergraduate curriculum in mechatronics, the



Professor Joseph Garbini in his laboratory.

integration of mechanical, electrical, and computer technologies into the design of complex products. Since 1996 ME has offered a guided curriculum in mechatronics, culminating in a senior-level capstone design course. He has published several papers on engineering education, and in 1991 received the UW College of Engineering Burlington Resources Foundation Faculty Achievement Award for Outstanding Teaching. He also won ME's Outstanding Faculty Award in 2002.

Continued on page 8



*L to r:
John Roundhill,
Franna Pitt,
Mark Tuttle,
Paul Anderson.*

Graduation 2005

ME's June 12 graduation awarded BSME degrees to 91 students, MSME degrees to 40, and the PhD degree to 7. ME Chair Mark Tuttle and retired

Boeing VP John Roundhill (BSME '67, MSME '73) offered welcoming remarks, doctoral recipient Franna Pitt delivered the student address, and Paul Anderson (BSME '67), Chairman & CEO of Duke Energy, gave an inspiring graduation address.



We need your stories!

Centennial
September 15,
2006

Photo History
pages 4-5.

Chair's Corner



Professor Mark Tuttle

One of the pleasures of academic life is the sense of constant renewal—the 2005–06 academic year is under way! We are welcoming 99 new undergraduate and 37 new graduate students into our program, which will bring our total enrollment to 228 undergraduate (junior and senior) and 151 graduate students. I fully expect these talented students to carry on the tradition of excellence forged

by the 9700 alumni of the ME department.

Our lead article announces Professor Joe Garbini's appointment to the Morrison Chair. Our entire ME community congratulates him for this highly deserved honor.

Last year the department conducted an international search to identify two new faculty members, and received applications from 368 qualified applicants. We welcome Drs. Jaehyun Chung and Jiangyu Li as new assistant professors. Both are experts in nanotechnology. Jaehyun, who arrived September 1, focuses on the use of carbon nanotubes both as reinforcements and sensors at the nanoscale. Jiangyu Li's appointment begins January 1. His research concentrates on active materials, ferroelectrics, and ferromagnetism. Their research specialties support different thrusts under ME's

strategic plan. Chung's work will support the department's thrust in health care and Li's work will strengthen our information technology thrust. Both are tremendous additions to the faculty and will play significant roles in the department's future. See page 7 for more information on their backgrounds.

Those of you who live within the greater Puget Sound area should consider attending the 2005 Engineering Lecture Series, which features three fascinating programs on topics of wide public interest (see below). ME alums will especially want to attend the November 8 presentation by Dr. Larry Anderson, who earned his bachelors through doctoral degrees from our department. Larry has forged an unusual career as an expert in fire and explosion investigation, hazardous waste handling, and hazard investigation and accident reconstruction. He is vice president of Exponent, a San Francisco company that specializes in failure analysis.

This newsletter offers you a glimpse of the diverse activities within the department: the selection of Joe Garbini as the first recipient of the Morrison Chair (pg 1), the student-initiated project to install solar panels to help power the ME building (pg 3), recognition of the outstanding career of Visiting Committee member Rod Kirkwood (pg 6), the successes of our SAE vehicle and Human-Powered Submarine student teams (pg 7), and the many activities planned for our centennial celebration (pgs 4–5). This is an exciting time to be part of the Mechanical Engineering department!

2005 Engineering Lecture Series: "Engineering the Unexpected"

Tuesday evening lectures, 7–8:30 pm, Kane Hall 110

For details and reservations: UW Alumni Association, www.UWalum.com, or 206.543.0540

November 1 ~ *Engineering Disaster Relief*

Engineering has a role in the logistics of relief efforts from African famines to the Southeast Asian tsunami, to hurricanes in the U.S. Presented by Technical Communication Professor Mark Haselkorn and UW alumna Kate Hulpke.

November 8

Engineering Detectives: Uncovering the Causes of Catastrophe

From the World Trade Center collapse to the Bellingham pipeline fire, to even the Seattle Monorail, alumnus Larry Anderson's team is often called to the scene to determine why failure occurred and how to engineer solutions. Presented by Larry W. Anderson (UW ME PhD '66), group vice president, Exponent (San Francisco).

November 15 ~ *Saving Soldiers: Robots to the Rescue*

Robot pods directed remotely by surgeons will save the lives of injured soldiers. Presented by Electrical Engineering Professor Blake Hannaford and Surgery Professor Mika Sinahan.



Student Initiative Leads to Green Power for ME Building

“One of the most exciting applications of mechanical engineering is the ability to harvest energy seemingly out of thin air with solar and wind power,” says Nathan Miller, BSME '04. As a result



Solar panels on MEB roof. Nate Miller at right.

of Miller's interest and initiative, a demonstration solar power system has been installed on the Mechanical Engineering Building (MEB). This system began producing electrical power for the building in January 2005, and has generated 1,792 kWh through August. Current and future students, inspired by this demonstration project, may well play important roles in the research needed to make solar power a viable energy source in the Pacific Northwest.

The project resulted from an assignment Miller completed for an environmental case studies class taught by mechanical engineering Professor Phil Malte. For the assignment, Miller surveyed potential campus locations for solar power installations. Impressed with the study, Seattle City Light (SCL) encouraged Miller to apply for a grant to build a demonstration solar power system on campus. In April 2003, SCL made a grant of \$20,000 for the solar panels, wiring, and inverters for a 3kW

photovoltaic system.

It was at this point that the real work began. A core design team of undergraduate students (see sidebar) formed to turn the concept into reality.

Their goals for the project were: demonstrate the integration of solar power into building design; promote increased use of renewable energy on and around campus; and improve the energy curriculum. This team, all volunteers who received no class credit for their efforts, spent countless hours designing the system and promoting the project in meetings with various groups

on campus. “We got pretty good at presenting, or more accurately, selling, our project to administrators, faculty, and even fellow students,” said Miller.

The team chose the MEB as the site for the project because it has a south-facing location with significant exposure to the sun, a broad, flat roof suitable for a solar installation, and a highly visible central campus location. The ME Department, which already offered courses focused on energy and the environment in its curriculum, readily agreed to back the project. “I was very happy to support this student-initiated effort,” said Professor Bruce Adey. “Mechanical Engineering was a natural location for this type of project.”

This project is a demonstration of the potential of solar power. A computer monitor in the lobby of the MEB provides details on the installation and information on solar power as an energy source. The cost of solar power

currently is much greater than that of electricity generated by other sources in the Pacific Northwest. Research focuses on improving the efficiency and decreasing the cost, so that solar power can play an important part in supplying this area's future demand for electricity. Miller might well be a part of this research. After graduation, he accepted a position with Keen Engineering in Seattle, a firm specializing in sustainable building design. “I am considering going back to graduate school,” he says. The focus of his studies and research would be renewable energy,

For current output data, go to <http://monitor.fatspaniel.com>

- Scroll to Seattle City Light
- Click on Mechanical Engineering Building

and he might well contribute to the advances that will move solar power from demonstration project to viable energy source.

Student Design Team

Core Members

Nathan Miller
Mechanical Engineering
Stephen Mordue
Mechanical Engineering
Sean Conner
Physics

Other Members

Jeff Schneble
Physics
Scott Siekawitch
Architecture
Chris Quam
Electrical Engineering
Brian Polagye
ME graduate student

Save the Date!
September 15, 2006
Centennial Celebration

Mechanical Engineering Centennial



MSCUA, UW Libraries

ME's Early Facilities: The Power House, built in 1902, housed the ME shops with classes in woodwork, pattern making, foundry, and machine work.



In 1909 Engineering Hall, a legacy of the 1909 Exposition, became the new home for the department.



Stability of Leadership

Just two men served as chair during Mechanical Engineering's first 58 years.

L: Everett Owen Eastwood, 1905–1947
 R: Bryan Towne McMinn, 1947–1963



MSCUA, UW Libraries

Early engineering drafting classes were held in the attic of the Administration Building (now Denny Hall). Note the female student in this 1909 photo.



ME faculty and students, Class of 1910, report their names on the center of the photo.

First BSME degrees granted to 5 students.

Three ME graduates are the first engineers to join William Boeing's new airplane company in 1917.

First MSME degree granted to Shinji Yonemote in 1921.

ME's chair, Everett Eastwood, in 1929 takes on the additional role of chairing the new Department of Aeronautical Engineering.

Husky eight-oar crew team, with six engineering students, including Gordon Adams and Roger Morris from ME, wins gold at the 1936 Olympics in Berlin — with Hitler watching.

Milestones in UW Mechanical Engineering

1906

1910

World War I

1920

1930

The Depression

1940

Advances & Noted Innovators in Mechanical Engineering

1904

Concept of Fixed Boundary Layer

Published in 1904 by Ludwig Prandtl, a German mechanical engineering professor and the father of fluid mechanics.

1906

Patent for Dew Point Control System

William Carrier devises a precise method for controlling humidity, allowing standardized manufacturing of air-conditioning systems.

1913

First Moving Assembly Line for Automobiles

Introduced by Ford Motor Company to mass produce the Model-T.



1920s ~ 1950s

Industrial Engineering and Time and Motion Studies

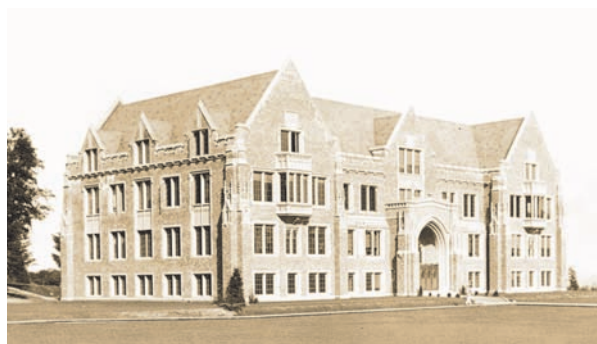
Lillian Gilbreth, a mechanical engineering professor, helped found the field of industrial engineering and was a pioneer in time and motion studies. She received many honors and was the first woman elected to the National Academy of Engineering.

The First Fifty Years 1906~1956



MSCUA, UW Libraries

of the Alaska-Yukon-Pacific
me for most ME activities.



MSCUA, UW Libraries

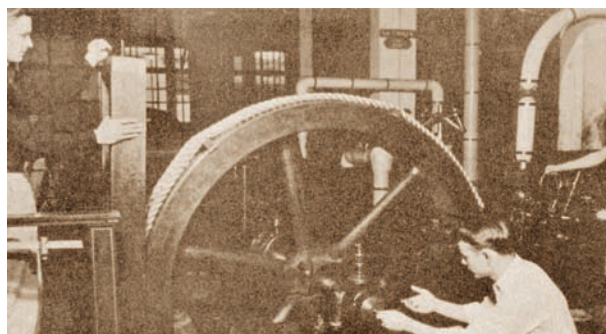
In 1929 ME gained classroom and office space in the new Guggenheim Hall, which also housed the Civil and Aeronautical departments, and the dean's office.

"We are honored to co-chair the celebration of 100 years of ME education at UW. The degrees we earned were foundational to our success."

CENTENNIAL HONORARY CHAIRS
SALLY AND WARREN JEWELL
BSME DEGREES 1978



of 1930. If you can identify any,
ennial website (see sidebar).



Who are these students testing the Murray Corliss engine
in 1949? Record your answer on the centennial website.



Sally Jewell is a UW Regent and CEO of REI, Inc. Warren has owned a computer software development company. Both are community volunteers.

After World War II, enrollment boomed and veterans made up more than 85% of engineering students.

During the 1950s, ME increased the number of graduate courses from 3 to 24 and granted 85 MSME degrees.

Centennial Decade Reunions

Reconnect with your ME friends and emeritus faculty at events honoring the classes and learn more about plans for the Centennial Celebration on September 15, 2006. Mark your calendar now! Invitations will be mailed.

Classes of 1930–1949: Wednesday, October 12, 2005, luncheon
Classes of 1950–1959: Thursday, October 27, 2005, luncheon
Classes of 1960–1969: Thursday, January 19, 2006, reception
Classes of 1970–1979: Thursday, February 23, 2006, reception
Classes of 1980–1989: Thursday, March 16, 2006, reception
Classes of 1990–2005: Thursday, April 6, 2006, reception

Your Story Is Our History

Your experiences and recollections of professors and classmates, and your achievements, are the history of Mechanical Engineering. Please send us your stories, photos (print or electronic), and memorabilia for display (e.g., design projects or tools). Thank you to those who have already done so. All items and print photos will be returned. *Send to:* Newsletter Editor, UW Mechanical Engineering, Box 352600, Seattle, WA 98195-2600
or by email: measstch@u.washington.edu
Centennial Website: www.me.washington.edu

1945

Patent for Speed Cruise Control for Autos

Invented by mechanical engineer Ralph Teeter; first used in a 1958 Chrysler.



1952

Area Rule of Aircraft Design

Mechanical engineer Richard Whitcomb discovers and verifies a revolutionary design concept to reduce drag and increase speed. He also invented the supercritical wing and winglets and was much honored for his major aviation advances.

Seattle's Icon Bears Rod Kirkwood's Imprint

Celebrating life's milestones at the Space Needle is a Seattle tradition, but rarely has the icon been a more fitting venue than for the 1998 retirement party for Rod Kirkwood, a UW-trained mechanical engineer who had a major hand in the Needle's design and construction as director of engineering for John Graham & Co. Architects and Engineers.

He is pictured with colleagues in a glossy 2002 book, *The Space Needle: Symbol of Seattle*, and is quoted on the engineering feats that ensured the 605-foot structure would stand through earthquakes and gale-force winds.

Another notable career achievement was Kirkwood's national leadership role in developing building design standards aimed at conserving energy. As president of ASHRAE in 1974, he initiated and led the development of ASHRAE Standard 90, which changed every facet of architectural, mechanical, and electrical design to achieve major reductions in building energy use. Standard 90 is now an ANSI standard providing savings throughout the world. "It has resulted in a 50% reduction in energy used in buildings and emissions

from buildings in the U.S.," Kirkwood notes. "This is an example of the exciting way in which engineers have been able to make life better for millions of people."

Over his 46-year career at Graham & Co., Kirkwood rode the elevator to the top management levels as director of operations, partner, and president. He has left his imprint all over Seattle: The Westin Hotel & Tower, Bank of California Building, Henry M. Jackson Federal Building, 1111 Third Avenue, Northgate Mall, and projects for Boeing and Nordstrom. He also worked on shopping malls, office buildings, and other facilities from New York to Alaska and Hawaii, and all across Canada.

Kirkwood's road led back to the UW when a model of the Needle was tested in the Aeronautics & Astronautics wind tunnel. "The top house rotated with high winds, so we made design changes," he says. For his work on the Needle he was honored as the 1963 "Engineer of the Year" by the Washington Society of Professional



Engineers and Puget Sound Engineering Council.

Growing up in Minnesota and Montana during the Depression, Kirkwood had no inkling of a future working with movers and shakers to transform a provincial Northwest outpost into one of the nation's showcase cities. Even his path through UW Mechanical Engineering had as many outs as ins: complete a couple of quarters, off to Montana or North Dakota to work full-time, back to the UW for few quarters, drop out again to earn money to pay tuition.

He was on his way to completing his degree when World War II sent him into the Army. By the time the war ended he had married and started a family. Returning to the UW full-time was not an option, so he enrolled part-time at Seattle University to complete the final courses for a BS degree. His ties that bind are with the UW, though, and he is a long-time member of the ME Visiting Committee and also serves on the ME Centennial History and Program Committee.

In reflecting on his career, Kirkwood says his greatest satisfaction is not the Space Needle, or any other edifice, but simply doing a good job for the client. "There are a lot of unfortunate buildings that don't do the job effectively because the aesthetics take over. Do a building right and it works well for people," asserts this engineer best known for the icon that turns all eyes skyward.

Alumni News & Notes

Adrian Gamboa (BSME '01, MSME '04) won the 2005 College Design Engineering Award administered by Design News and sponsored by ANSYS. He earned a \$20,000 cash prize for work based on his master's research, done under Professor Fred Forster, to optimize the shape of a nozzle diffuser and Tesla-type valves for micropumps. Gamboa now works for Lockheed-Martin.

Ralph Edwards (BSME '52, MSE-Industrial '69) has received a patent for his design of a modular, electronic riflescope for sport hunting and target shooting. He retired in 2000 after a 22 years as an industrial engineer at Leupold and Stevens in Beaverton, Ore. Earlier he worked at Boeing and at companies in Wisconsin and San Diego. He and wife, Anna, now live in Vancouver, Wash.

We'd like to hear from you. Send news about your professional or personal accomplishments and activities to: measstch@u.washington.edu or to Newsletter Editor, UW Mechanical Engineering, Box 352600, Seattle WA 98195-2600

Your support means a lot to ME!

Please designate your UW Annual Fund gift for Mechanical Engineering.

Thank you!

Faculty Honors

WEI LI received a Presidential Early Career Award at a ceremony held in June at the White House.

ANN MESCHER, ASHLEY EMERY, and HAYDEN REEVE, PhD '03, received a Best Paper Award from the ASME Heat Transfer Division for their paper entitled "Investigation of Polymer Optical Fiber Drawing Force and Heat Transfer."

ALBERT KOBAYASHI was elected an Honorary Fellow of the International Congress of Fracture.

ERIC SEIBEL received a \$2 million grant from the PENTAX Corporation, Tokyo, Japan, to develop ultrathin, flexible and disposable endoscopes.

Zeng Receives Technology Award



Dr. JIOU ZENG, MSME '88 (right), a senior scientist with Omax Corporation, received the Waterjet Technology Association's 2005 "Technology Award" from MOHAMED HASHISH, PhD, senior vice president at Flow International Corp. and UW affiliate professor of mechanical engineering.

SAE Car Places Fifth at Detroit

The 2004-2005 team finished fifth out of 140 teams, missing fourth place by 0.422 points out of 1000. This equalled last year's fifth place finish, establishing the UW among the elite top five for the second year in a row. The 2004-05 team concentrated on refining many details of the car, and it was a superbly engineered machine. The 2005-06 team is already hard at work and eagerly anticipating the 2006 competition.



Performing inertia test on the car in the SAE shop.

Human Powered Submarine Competition

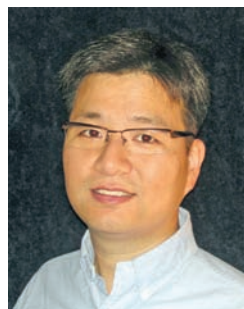


Dive Dawg, the 2004-2005 submarine (at left), competed in the 8th International Submarine Races last June. The UW team placed 6th of 22, with a top speed of 4.5 kts. The 2006 competition will be in Escondido, CA.

Experts in Nanotechnology Join the Faculty

Two new assistant professors will strengthen the department's teaching and research in the areas of nanotechnology and mechanics of materials.

JAEHYUN CHUNG arrived on September 1. His research focuses on extended DNA structures, modified carbon nanotubes, and nanoscale fabrication processes. Chung did his undergraduate work in Korea, received his PhD in mechanical engineering from Northwestern Univer-



Jaehyun Chung

sity in 2004, and was a postdoctoral fellow there.

JIANGYU LI arrives on January 1 from the University of Nebraska, where he has been a faculty member since 2001. His nanotechnology research concentrates in the fields of active materials, ferroelectrics, and ferromagnetism. Li completed his undergraduate work in China and earned his PhD from the University of Colorado in 1998. He completed postdoctoral assignments at the University of California-San Diego and at Cal Tech.

Morrison Chair

(Continued from page 1)

His research of the past 12 years has focused on the development of a special-purpose micro-electromechanical system: magnetic resonance force microscopy (MRFM). In principle, it will enable scientists to directly observe molecular structure in situ, in three dimensions, with atomic resolution. Such an imaging technology would address urgent needs in nanoscale engineering, materials science, molecular biology, and medicine. Garbini's team recently received a five-year, \$5 million federal grant to lead a multi-university research initiative to speed development and refinement of MRFM for practical application.

"I am pleased to hold a chair honoring Jim Morrison. He was a great help and inspiration to me when I was a new faculty member," Garbini says. "Support from the chair will enable me to improve ME courses and provide research opportunities to students in quantum systems engineering."

The Morrison Endowed Chair was established with a generous gift from Henry T. Schatz, BSME '64, president and CEO of General Plastics Manufacturing Company. Professor Morrison's emphasis on critical thinking and problem solving inspired Schatz during his undergraduate years. This endowed chair enables ME to attract or retain distinguished faculty.

ME Centennial History and Program Committee



L to R: committee members John Baxter BSME '62, Emmett Day, Bruce Adey, Dean McFeron, and Jim Morrison review UW ME archival material.

UWME Reception for Alumni and Friends at the 2005 ASME Conference

Wednesday, November 9, 2005

5:30 - 7:00 PM Three-Bay Hospitality Suite
Walt Disney World Dolphin Resort Hotel, Orlando

Light hors d'oeuvres & no-host bar

Brief program at 6 PM

Meet new department chair Mark Tuttle, renew friendships, hear about the department's activities, and say hello to some of your favorite faculty members. Additional information will be posted at the conference.

ME Website: www.me.washington.edu / ME Main Office: 206.543.5090

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Mechanical Engineering

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