Remarks
from the Interim Chair,
Trilochan Singh

I am delighted to share this message with the alumni and friends of the Department of Mechanical Engineering (ME), College of Engineering, at WSU. Dr. Ronald F. Gibson stepped down as interim chair in August 2005. He did a wonderful job in leading the department during the year 2004-2005. The ME department appreciates his work and thanks him. I was honored to accept the nomination of my faculty colleagues to become interim chair.

A team of ABET (Accreditation Board for Engineering and Technology) evaluators will visit the College of Engineering in the fall semester of 2006 to examine BS programs for accreditation. The last ABET visit was in fall 2000, and ME was accredited for six years (the maximum possible period). Preparing for ABET visits requires so much work that we tend to build an entire cycle of activities around the ABET visit. Prof. Jerry Ku, director, Undergraduate Studies, is leading the efforts, and the department is thankful to him for his leadership and dedication in this regard.

A self-study report has been prepared and was submitted to ABET on July 1, 2006, for review by the visitors before they come to the campus. This includes a summary of the department’s accomplishments and improvements during the last six years based on assessment and feedback of the constituents (students, faculty, alumni, employers) and the Industrial Advisory Committee (IAC).

Prof. Alan Whitman retired in May 2006 after serving Wayne State University for 38 years. We are thankful to him for his services to the department and the university and wish him and his family the best during his retirement.

A search committee of the ME faculty has been formed to recruit a new faculty member to replace Dr. Alan Whitman. More than 50 applications have been received. We are trying to recruit a person in the area of acoustics or computational mechanics to supplement the existing strengths in the department.

Finally, on behalf of all faculty, staff and students of Mechanical Engineering, I want to thank all of you for the support you have given us over the years. With your financial support, we have been able to cover costs for students going to professional society meetings to present papers, and costs to develop engineering prototypes. As you well know, State of Michigan funding has been reduced over the last few years, so your continued support will be more important than ever.

2006 Board of Governors Faculty Recognition Award

Prof. Raouf Ibrahim was selected to receive one of the five 2006 WSU Board of Governors Faculty Recognition Awards for his text, Liquid Sloshing Dynamics, published by Cambridge Press. Congratulations to Raouf for an honor well deserved.
ABET Visit Preparation

Learning objectives, strategic plans examined

A set of learning objectives has been defined for required undergraduate courses and 5000-level elective courses. At the end of every fall semester, a survey of the students is conducted to determine the extent to which learning objectives for the course were achieved. This is followed by a course instructor assessment report outlining the extent to which the course learning objectives were achieved and suggestions for improvements based on feedback from the survey of the students. This report is discussed at a meeting of the course group faculty for recommendations and actions, if any. This is a major part of the ABET self-study report summarizing the improvements and changes implemented in various courses and the overall curriculum in the last six years.

The assessment also is done to determine to what extent the ME program outcomes and objectives are achieved. This is based on the survey of students (in ME 2210, 4300 and 4500), IAC members, practicing engineers and alumni.

Samples (representing grades of A, B, C and D) of student homework, quizzes, tests, project reports, term papers, lab reports, etc. have been collected for every required undergraduate course and 5000-level elective course for the fall term 2005 and winter term 2006. These are arranged in a binder (one for each course, each term). Each binder also includes a summary of the changes made to the course in the last six years (based on student assessment surveys) to improve the learning of the students. These folders are inspected by the ABET visitors.

The members of the IAC and student advisory committee have reviewed the ABET assessment cycle and strategic plans of the ME department and helped to finalize these at off-campus retreats and on-campus meetings. These documents are reviewed and fine-tuned periodically. The current ME strategic plan was reviewed at the IAC-faculty retreat in September 2004 and finalized at the ME faculty meeting in February 2005.

We are very grateful to the faculty, students, staff, Diane Grimord of the university co-op office, members of the IAC, alumni and others for their help and contributions in preparing for this ABET visit.
Town Hall Meeting with BSME Students and ASME Student Chapter

On Thursday, Nov. 17, 2005, a combination student section chapter of ASME (American Society of Mechanical Engineers) and Town Hall was held in the Engineering Hall of Fame. Interim chair Trilochan Singh welcomed the students. He presented some relevant facts relating to research, project activities and student activities for the department. He encouraged undergraduate students to do research with the faculty, for which they can receive credit.

Prof. Howard Shapiro, associate vice president for Undergraduate Programs and General Education, discussed the issue of general education at the university level, and the importance of the ABET process and how it is improving the program. He stressed the importance of being a well-rounded person. The General Education courses help to broaden the perspective of a person.

Prof. Jerry Ku made a presentation about ABET preparation and asked students to participate in the advisory committee.

One of the concerns raised by the students was the lack of fluid courses at the 5000 level. Prof. Singh commented that the department has not been able to offer the course because of lack of faculty expertise after Prof. John Yu left Wayne State. Prof. Joon S. Lee has joined the department. The hope is that he will be able to offer ME 5300 once every two years.

One student commented that ME 4250 does not cover design methodology. It emphasizes the technical aspects of design for components/subassemblies. But another student of ME 4500 said that those issues are covered in ME 4500.

There was discussion about the use of computer technology in the classroom and whether this helps in the understanding of the fundamentals. Technology should be used as a tool, but basic concepts must be emphasized. Some students prefer that instructors write on the blackboard when they make PowerPoint presentations. It is hard to follow the lecture when only a PowerPoint presentation is made.

Junior and senior students in the design courses indicated that the use of CAD software is a great help for the design process.

The question was raised of whether incoming freshmen would be required to buy or lease a laptop starting in fall 2006. The consensus was that if the software needed for the courses is loaded onto laptops, this would be helpful. If student versions of software cannot be loaded onto the laptops due to licensing issues, then laptops are not much use. A straw vote showed that the majority were in favor of it. The College of Engineering has decided that incoming students would be required to lease a laptop from the college for three years starting fall 2006. Software packages available in the college computer center would be included in the laptops. This arrangement will avoid any licensing issues.

Some students raised the concern that there is very little informal interaction between faculty and students. Very few faculty participated in Welcome Back Week. Activities such as a faculty/student softball game should be arranged. Ways should be found to involve more freshman and sophomore students in these meetings.

Prof. Singh suggested that he will try to arrange an informal pizza lunch for the students and faculty once a semester so students can discuss their concerns with the faculty freely.

The question was again raised about the policy of not allowing students to take ME 4300 and ME 4500 in the same semester. Prof. Ku explained that it is based on the survey of graduating seniors, alumni and input of design faculty. Teamwork (a major component of both courses) suffers when a person is taking both courses at the same time.

Some students asked the question of whether the design of the subsystem of the SAE formula car can be taken as a part of the capstone design course, ME 4500. The answer was affirmative, as long as this team satisfies all the details of design methodology and analysis as done by other teams in ME 4500 and is approved by the course instructor.

Dissatisfaction was expressed about the performance of GTA for ME 3300. The department has decided to appoint another GTA for the course starting in the 2006 winter term. The current GTA is wellqualified and has a PhD from Ukraine.

The meeting concluded with the arrival of lunch.
Welcome to New Visiting Faculty Member

Dr. Marcis Jansons

Marcis Jansons began work this summer with the Center for Automotive Research under the direction of professors Naeim Henein and Dinu Taraza. Jansons’ project will utilize the unique low-temperature facilities at Wayne State to experimentally validate diesel spray combustion models using high-speed imaging and laser-based techniques.

Jansons was born in New York City and grew up in nearby Leonia, New Jersey. He attended Rutgers University and graduated in 1990, majoring in mechanical engineering. He subsequently received a master of science degree from the New Jersey Institute of Technology in 1992. His professional career began upon joining New York-based Baltec Associates Inc. as a project engineer designing soil and water treatment systems for the petroleum industry. There he had the opportunity to apply novel soil vapor extraction and bioremediation techniques developed by the Environmental Protection Agency to hydrocarbon-contaminated sites domestically as well as in Europe. He returned to Rutgers University where he worked as research assistant in the Internal Combustion Engine Laboratory and as a teaching assistant for various undergraduate courses. He defended his PhD dissertation in 2005 on the topic of infrared imaging of engine combustion and the modeling of infrared spectra of combustion gases. Joining the Engineering Department of the US Coast Guard Academy for the 2005-6 academic year, he instructed cadets in courses such as Experimental Methods in Fluids and Thermal Sciences, and Advanced Engineering Mathematics and served as the faculty advisor for the USCGA SAE Mini-Baja team.

On behalf of the Department of Mechanical Engineering, we extend a warm welcome to Dr. Jansons and look forward to working with him.
University plans to build Engineering Development Center

By David Reich
College of Engineering Development Office

Plans have been approved by the Michigan Legislature to build an Engineering Development Center that will accommodate educational programs, research and development in the growth fields of biotechnology, nanoscience and alternative energy technology.

Groundbreaking for the $27.3 million Marvin Danto Engineering Development Center is expected to take place next spring. The four-story, 80,000-square-foot structure with a basement will adjoin the existing main College of Engineering building at Wayne State’s Detroit campus.

A recent $3 million donation toward the building by Troy businessman Marvin Danto boosts the total financial support thus far for the new center to $21.3 million. The state Legislature has appropriated $15 million for the project, College of Engineering alumnus Yousif Ghafari has pledged $1.5 million, and Ford Motor Company has committed $1.8 million. “I see the people of Michigan as the direct beneficiaries of this new engineering center,” said Danto, 89, a former WSU engineering student. “I see this endeavor helping create alternative fuels and more efficient automotive engines in America with subsequent growth in industries, new jobs and a sustainable society.”

With the WSU Engineering Development Center, the college looks to create a unique environment to strengthen research concepts from its laboratories for development and commercialization as well as for the classroom, said Ralph Kummer, dean, College of Engineering. “Our vision is that our graduates will be on the leading edge of the workforce in Michigan and the world, and promotes an entrepreneurial attitude that results in spin-off innovations and companies from faculty and student research.”

Six pivotal engineering programs expected to gain the most from the new center are the Advanced Propulsion Alternative Energy Lab, which is advancing fuels, emissions and vehicle wear automotive systems; the Smart Sensors and Integrated Microsystems Lab, which is developing microsystems for artificial vision, real-time cancer detection, and other types of biological and neurological implants and smart sensors for automotive fields; the Nanotechnology Lab, which focuses on advanced research in surface science, tissue engineering, drug delivery and biomaterials; the Urban Infrastructure Research Lab, which concentrates on infrastructure and transportation systems; the Interdisciplinary MEMS/NEMS Lab, dedicated to interdisciplinary research on micro/nanoelectromechanical systems; and the team-based Student Project Lab dedicated to national collegiate projects such as Formula SAE and alternative-energy-powered vehicle competitions.
Faculty Honors and Awards

Professor Sean Wu

The achievements of the Department of Mechanical Engineering are due to the efforts of its faculty and students. We have distinguished faculty members who are recognized internally and externally for their work. Some examples are cited here:

President Irvin D. Reid and Wayne State University Board of Governors named seven faculty members (including Sean Wu of the ME department) to the rank of Distinguished Professor during the 2005 fall term. The Distinguished Professor appointment is the highest of academic achievements, and each of the individuals is chosen as an academic leader in his or her chosen field. The 2005 honorees bring the total of Distinguished Professors at the university to 27.

The university will provide a stipend of $5,000 annually for each faculty holding the rank of Distinguished Professor. The stipend recognizes the significant scholarly contributions of Distinguished Professors. The following is reproduced from the university press release, dated Dec. 1, 2005.

Professor Sean Wu of the ME Department was appointed Distinguished Professor.

Wu, of Troy, came to Wayne State University in 1988. He was appointed as the Charles DeVlieg Professor of Mechanical Engineering in 2002. He holds the rank of fellow in both the Acoustical Society of America and the American Society of Mechanical Engineers. He serves as associate editor for the Journal of the Acoustical Society of America, and he is the editor of the Journal of Computational Acoustics. He holds eight US patents, which led to the creation of a company, SenSound LLC, with Wu as the chief technical officer. Dr. Wu and his colleagues have won 32 grants and contracts totaling more than $3 million from the National Science Foundation, Office of Naval Research, General Motors Corporation, Ford Motor Company and other organizations. He has published more than 40 refereed journal articles.

Inventor of the Year Award

Wu, his research team and his colleagues at SenSound have been selected to receive Wayne State University highest honor for Technological commercialization: Inventor of the Year.

This honor is in recognition of his work in the area of sound and noise analysis and amelioration and his efforts to commercialize his discoveries through SenSound.

The ESD (Engineering Society of Detroit) Alpha Award for innovation in Engineering and Technology 2006

Wu was honored by the Engineering Society of Detroit with the First Annual Alpha Award in June 2006. He developed technology that creates images of a 3-D sound field with very high spatial resolution and accuracy.

Heartiest congratulations to Sean Wu for an honor well deserved.
Faculty Highlights and Accomplishments

Professor

Ron Gibson

Prof. Ron Gibson, who finished a one-year stint as interim chair of the Department of Mechanical Engineering in August 2005, has returned to teaching, research and service in his specialty areas of solid mechanics and materials. His teaching responsibilities include ME/CE 2400, Statics and Mechanics of Materials; ME 5720, Mechanics of Composite Materials; and ME 7720, Advanced Mechanics of Composite Materials. The first edition of his textbook, *Principles of Composite Material Mechanics*, is used in ME 5720 and ME 7720, and he is currently working on a second edition of the book, which he hopes will be published next year.

For most of his academic career, Gibson's research has focused on experimental and analytical studies of dynamic mechanical behavior of advanced materials and structures. For example, during the last decade or so, he, his colleagues and students have conducted research on the use of vibration test methods to characterize mechanical properties of composites, energy absorption in composite grid structures and engineered cellular structures, vibration-assisted liquid composite molding, mixed mode fracture of adhesively bonded joints, the effects of vibration on viscoelastic relaxation in bolted composite joints, the effects of low temperature on fatigue of composite sandwich structures, the effects of freeze-thaw conditions on mechanical behavior of composite bridge deck materials, and weld zone properties in welded lightweight metallic structures.

In addition, over the last few years, Gibson has initiated new research projects in dynamic behavior of materials and structures at the micromechanical and nanomechanical levels. One project involves experimental and numerical studies of vibrations of MEMS (microelectromechanical systems). In this project, the vibration characteristics of a new ultrasonic sensor based on piezoelectric micromembranes and related MEMS components are being investigated in collaboration with personnel from the WSU Smart Sensors and Integrated Microsystems Laboratory in the Department of Electrical and Computer Engineering. A new 3-D nanoimager instrument is being developed to study dynamic behavior of nanomechanical systems.

Another project focuses on vibrations of carbon nanotubes and their composites. Prof. Gibson feels very fortunate to have been able to collaborate with many excellent WSU faculty in his research. His most recent research collaborators include professors Raouf Ibrahim, Golam Newaz, Emmanuel Ayorinde, Xin Wu and Sheng Liu of Mechanical Engineering; Gongkang Fu and HC Wu of Civil and Environmental Engineering; and Greg Auner and Soma Perooly of Electrical and Computer Engineering. Gibson also feels very fortunate to have many excellent graduate students to help him with his research. His current graduate students include PhD students Aurodhya Jyoti and Srini Thoppul, and MS students Varun Garg, Samir Soni and Maninder Singh.

And, of course, he is grateful to the funding agencies that have supported his research. His current research is funded by Ford Motor Company, the National Science Foundation, the Air Force Office of Scientific Research, the Office of Naval Research and the WSU Institute for Manufacturing Research.

In the area of professional service, in December 2005 Prof. Gibson finished a two-year stint as president of the American Society for Composites (ASC), having served previously for two years as vice president. He has recently taken on the task of serving as technical co-chair of the fall 2008 conference of the Society for the Advancement of Material and Process Engineering (SAMPE), and he was recently elected vice chair of the SAMPE Michigan chapter. This year, he and his colleagues and students will be presenting technical papers at the Society for Experimental Mechanics Annual Conference, the American Society for Composites Annual Technical Conference, the US-Japan Conference on Composite Materials and the ASME International Mechanical Engineering Congress.

**Accomplishments 2005-6**

“Micromechanical/Macromechanical Characterization of Welds in H5 Steel, Aluminum and Magnesium by a Combined Experimental/Numerical Approach,” Ford University Research Program, received $40,000 in July 2005 and $40,000 in March 2006.
Alumni — we want to hear from you!

We’re interested in sharing news about our alumni in this newsletter. Please fill out the following and send it to us by mail, fax or e-mail.

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