It is a real pleasure for me to highlight recent activities and events of the K-State Department of Mechanical and Nuclear Engineering in this first issue of the MNE newsletter. Our faculty continue to obtain many research grants, conduct first class research, publish numerous technical articles in conference proceedings and archival journals, and excel in teaching and course development. The energetic and dedicated staff continue to provide excellent service to the department and are an integral part of our department team. We are most proud of our students who continue to excel academically and in professional competitions. Let me share with you some of the exciting news.

**Students:**

Jared Madden was selected to receive one of the three 2001/2002 SAE Long-Term Member-Sponsored Scholarships. Joseph Pacey was one of the 16 in the nation selected for the Washington Internships for Students of Engineering (WISE) program. He spent 10 weeks in Washington D.C. during the summer of 2001.

Scott Hammack, project manager, and members of the solar car team raced their entry, CATalyst, this summer. Kansas State University’s solar car-racing team finished fifth out of 30 teams in the American Solar Challenge, a 2,247-mile race that began July 15 in Chicago, followed historic Route 66, and ended in Los Angeles July 25, 2001.

Brian Seaholm and members of the SAE Aero Design Team placed 19th overall out of 43 entries in the SAE 2001 Aero East R/C Model Airplane Design Competition.

Mike Anness and Loren Roberts were recipients of the American Nuclear Society Scholarship.

Ryan Keller received the John and Elsa Gracik Scholarship from the American Society of Mechanical Engineers.

**Faculty:**

Dr. Kevin Lease has been chosen to receive the 2002 SAE Ralph R. Teetor Educational Award. He is among only nine recipients being honored with this distinction for the 2002 award. Seven recipients were chosen from the ground vehicle field and two from the aerospace field. He is the recipient of one of the two awards in the aerospace field.

Dr. Kirby Chapman was honored by the American Society of Heating, Refrigerating, Air-Conditioning Engineers with the ASHRAE Symposium Paper Award.

Dr. Mo Hosni was the recipient of the College of Engineering 2001 Research Excellence Award.

Dr. David Pacey received the College of Engineering 2001 Advisor of the Year Award.

**Department:**

The summer of 2001 brought many exciting changes to the MNE Department on the third floor of Rathbone Hall.

A student lounge has been added to the third floor so students can go there to meet, relax, or study.

The PC lab has been renovated with better computers and faster network connections. A laptop station has been added for students’ convenience as well.

A help desk with a technical staff member has been added to the PC lab to help students and provide tech support.

The MNE network administrator moved to third floor of Rathbone Hall to be more readily available to support computing needs.

An anonymous suggestion box was added to the MNE Webpage for students’ to communicate directly with the department head.

The main MNE office was renovated and decorated with a display to highlight student activities (solar car, Mini Baja, aero, formula one, etc.). It also showcases pictures of our graduating seniors.

The conference room received a total makeover to better receive students, their parents and department visitors.

A professional staff member was hired as undergraduate/graduate student coordinator to help students with their inquiries.

Dr. David Pacey and Dr. Kevin Lease have been appointed as the Undergraduate program director and the graduate program director, respectively, to enhance our excellent programs.

We are very excited about the activities in the MNE department, and we hope to continue with the improvements. Staying in touch with our alumni and friends is important to us so please feel free to contact me for any suggestions for advancement of our excellent program. Thank you.

M. H. Hosni, Ph.D.
Professor and Interim Head
Dr. Liang-Wu Cai: Kinematics and Dynamics

Dr. Liang-Wu Cai is a new faculty member in the mechanical engineering department. As an undergraduate student, he attended the University of Science and Technology of China, which is in the Anhui Province of China. After receiving his bachelor's degree, Dr. Cai moved into a graduate degree program at the Chinese Academy of Sciences, Institute of Mechanics. At the academy he received his master of engineering in solid mechanics in 1988.

Following two years of work in China, Dr. Cai decided to pursue his doctorate degree and moved to America. Upon arriving, he attended the University of Tennessee for a year before transferring to MIT. At MIT he worked as a teaching assistant for dynamics classes, as well as a recitation instructor for Mechanics of Materials. He received his Ph. D. in mechanical engineering, in 1998.

In Dr. Cai’s post-doctorate days at MIT he was involved in several research experiments. His main area of research was an extensive study of the internal characteristics of composite materials.

Today, Dr. Cai calls Manhattan his home and K-State his place of work. He is currently teaching ME 512 Dynamics, but plans to teach other courses as well in the future. He says that he enjoys the student interaction and teaching the future engineers.

Eric Slocombe

Dr. Douglas McGregor: Fabrication Laboratory

Dr. Douglas McGregor will join the MNE faculty this semester. He comes from the University of Michigan where he has built and managed a fabrication laboratory facility dedicated to the production of radiation detection materials and devices.

Dr. McGregor completed both a bachelor's degree in 1985 and a master's in 1989 in Electrical Engineering at Texas A&M University in his home state. He then went to the University of Michigan and completed both a master's degree in 1992, and a PhD in 1993 in Nuclear Engineering. Dr. McGregor has been responsible for numerous research projects at both universities and at the Sandia National Laboratories and the Los Alamos National Laboratory.

Enthusiastically fascinated with solid-state radiation detectors, he has tailored his education towards becoming competent in the field of radiation detection and measurement. He continues to work on solid-state neutron detectors, room-temperature-operated gamma-ray detectors and spectrometers, gas-filled detectors, radiation imaging arrays and basic research on gamma-ray detector materials. His research interests include the design, fabrication, characterization and deployment of semiconductor based radiation detection devices.

Sherry Donahev
Dr. Dale Schinstock: Electromechanical Systems and Controls

One of the new faces in the mechanical engineering department this fall is that of Dr. Dale Schinstock. Dr. Schinstock is originally from Kinsley, KS and attended college at the University of Kansas, where he earned his undergraduate, master’s, and Ph.D. degrees.

Dr. Schinstock taught at the University of Alabama for four years and the University of Tulsa for three years before joining the faculty at Kansas State University. While much of his time is taken up by teaching and getting acquainted with the university, he is serving as the American Society of Mechanical Engineers chapter faculty adviser and is involved with other committees, as well as research contracts. Dr. Schinstock’s major interest is electromechanical systems and controls in aircraft and machine tools. He is currently teaching Mechanical System Dynamics. He is happy to be at Kansas State and is looking forward to continuing a great year.

Jake Stucky

Dr. Charlie Zheng: Fluids and Heat Transfer

Dr. Charlie Zheng, a new assistant professor at K-State, has already had a long and accomplished career considering he only completed his education less than nine years ago. He is a specialist in computational fluid dynamics and heat transfer, as well as aerodynamic studies such as vortex dynamics, turbulent flows, and aero acoustics.

Originally from China, he completed a bachelor’s degree in 1984 and a master’s in 1987, both at Shanghai Jiao Tong University in Shanghai. After teaching a fluid mechanics course and lecturing at the Shanghai Institute of Mechanical Engineering, he came to the United States in 1988 to pursue a doctorate degree at Old Dominion University in Norfolk, VA.

While there, he conducted research at NASA’s Langley Research Center and earned his Ph.D. in May of 1993. Upon receiving his degree, he continued his research at the Langley Center as well as teaching applied mathematics at Hampton University and serving as an advisor to students from the Virginia Space Grant Consortium.

In 1996, he began teaching at the University of Southern Alabama, where he also served as campus director of the Alabama Space Grant Consortium and also as director of the computational mechanics laboratory. He taught a variety of undergraduate and graduate courses including Fluid Dynamics, Thermodynamics, and Mechanical Engineering Systems and Analysis.

During his time teaching, he has been involved with a variety of research projects, working with the National Center for Physical Acoustics, the U.S. Environmental Protection Agency, Sun Microsystems Inc., Oak Ridge Associated Universities, and the U.S. Comprehensive Sickle Cell Center, to name a few. He also has served as visiting professor and researcher for projects in Japan and France. Prior to his arrival this year, he spent the summer at the NASA Langley Research Center, completing a project on initialization and simulations of three-dimensional aircraft wake vortices. He is a member of the American Institute of Aeronautics and Astronautics, American Society of Mechanical Engineers, and the American Physical Society.

Paul Woods
General Richard Myers was named the highest-ranking military official, chairman of the Joint Chiefs of Staff, on October 1, 2001. Myers graduated from Kansas State University in 1965 with a B.S. in mechanical engineering, and received his master's degree in business administration from Auburn University in Alabama. He started his military career by joining the ROTC program while attending K-State, and has held many leadership positions in the Air Force. He has been head of the U.S. Space Command, commander of U.S. forces in Japan, commander of U.S. Forces in the Pacific, and vice chairman of the Joint Chiefs of Staff. General Myers returned to Manhattan to attend the K-State vs. KU football game on October 27. His main concern as chairman will be to protect the public from future terrorist attacks and to "plug the seams and gaps" in our national security.

This article is based on "Nation's new top soldier takes on down-to-earth threat" an Associated Press article, and "Joint chiefs chairman visits K-State" by Sarah Bahari, which was printed in the Kansas State Collegian.

Luellen Mullin

ME graduate heads Joint Chiefs of Staff

The National Gas Machinery Laboratory (NGML) is a research lab that focuses on turbocharger testing, engine software, and continuing education. The turbocharger test and research facility (TTRF) is a uniquely designed open-loop test stand that has the ability to test all turbochargers using large-bore engines. T-RECS (Turbomachinery - Reciprocating Engine Computer Simulation) simulates what occurs on the inside of an engine during combustion. The NGML hands-on continuing education program disseminates research results and teaches attendees how to keep turbochargers and engines operating at peak efficiency.

The courses are intended for managers, engineers, engine analysts, technicians and sales managers. Recent classes have included: turbocharger preventive maintenance, airflow management through large-bore engines, and turbocharger performance measurement. The NGML director is Dr. Kirby Chapman, who is also a professor in mechanical and nuclear engineering. The NGML employs five graduate students and 12 undergraduate students. The lab offers K-State students an opportunity to gain engineering and project experience while attending classes. For additional information, visit the NGML web site at www.ngml.ksu.edu or call (785) 532-3747.

Luellen Mullin

NGML turbo-charger test and research facility.
The KSU solar-car racing team continued its tradition of improvement this summer, racing the new car, “CATalyst,” to fifth place in the American Solar Challenge. This is an improvement upon the 24th place finish in 1997 and the ninth place finish in 1999. The American Solar Challenge was a 2300-mile, solar-car race along Route 66 from Chicago to Los Angeles. The K-State team finished with an elapsed time of 65:22:55. KSU was the highest finisher among Big 12 teams and defeated archrival Iowa State by over 23 hours. MIT, a perennial favorite, finished six hours behind KSU in tenth place.

CATalyst was produced over a two-year span of designing, building, and testing. Many major improvements were achieved by the design team that invested more time and effort in the design process than ever before on solar car projects at K-State. The team thoroughly examined the factors governing solar car performance and designed accordingly. The results were numerous improvements compared to the previous car: a 51% weight reduction, 30% aerodynamic drag reduction, a more efficient suspension, and a much stiffer chassis. The team extensively used mechanical simulation tools such as Pro/E, Pro/Mechanica, Fluent and Ansys to model and improve the design.

The team has more improvement planned for the 2001-2002 school year. It has been recruiting heavily while trying to grow the business group within the team. Performance modeling and systems improvement will take place during the school year. Finally, in the spring, the team will prepare CATalyst and the 1999 car, Apollo, for track racing in the summer of 2002.

CATalyst and Apollo will see race action in the Formula Sun Grand Prix at Heartland Park Topeka, May 13-17, 2002. All alumni are welcome to attend and see KSU students and cars in action. For more information and progress reports, visit the team’s web site: www.engg.ksu.edu/solarcar. The team’s e-mail address is solarcar@ksu.edu.

Scott Hammack
American Institute of Aeronautics and Astronautics

The KSU student chapter of the American Institute of Aeronautics and Astronautics (AIAA) has become actively involved in designing and building a jet model aircraft. To help get started on the project, members took a trip to Metropolis, IL, on Oct. 5, 2001, to an annual jet model aircraft rally. During this event many pictures were taken and many ideas observed. On October 27, team members had a chance to meet with Tom Cook, owner of Jet Model Products, in Belton, Mo. They learned about his process of purchasing RC model kits to construct a plane from last year’s competition.

AIAA is currently in the process of purchasing RC model kits to construct and learn more about the model building process. Also, a tour of Raytheon Aircraft Composite Manufacturing facility was planned for November. Those interested in becoming involved with AIAA can contact Jenny Chinn at jch3914@ksu.edu.

Jenny Chinn

Alpha Nu Sigma

Alpha Nu Sigma is an honorary society at Kansas State University for nuclear option students that demonstrate high scholarship, integrity and potential achievement in applied nuclear science and nuclear engineering. The motto of Alpha Nu Sigma is, “ΑΛΚΗ ΝΕΤΡΙΓΟΝΗΣ ΔΙΑ ΣΟΦΑ” meaning, “Energy Newly Born through Wisdom.” This encompasses the ideals of peaceful uses of the atom as taught at Kansas State University.

Ryan Hagler

Pi Tau Sigma

Pi Tau Sigma recently wrapped up the Fundamentals of Engineering review sessions. In these sessions, a faculty member reviews a specific subject on the F.E. exam (there are over 11 different subjects). The chapter is currently in the process of initiating new members. Pledge project ideas include departmental T-shirts or constructing a display for the third-floor hallway (either P.T.S. specific, or class specific).

Pi Tau Sigma hopes to complete two major items this semester. The first is a revision of the “how to” folder that details P.T.S. operations and practices. The goal of this revision is to update the topics so that they are in line with the current best practice procedure. The second goal is to increase awareness of P.T.S. around the department. Here, members hope to arrange an activity or display that introduces underclassmen to the organization before they receive an invitation to the smoker. The chapter wants mechanical engineers to know about their honorary, have the desire to become part of it, and ask, “How do I become a member?”

Nathan George

American Nuclear Society

The KSU branch of the American Nuclear Society (ANS) has nearly quadrupled its membership this semester. Many activities are planned for the upcoming year. Including tours of KSU’s TRIGA reactor and J.R. Macdonald Laboratories. Member have enjoyed technical presentations from guest speakers, including representatives from Westinghouse Electric Co., Knolls Atomic Power Laboratory and NOVA Scientific. Topics have ranged from neutron radiography techniques to advanced fuel cycles for power plants. ANS hopes to provide more opportunities for students to learn about the fields of nuclear science and engineering throughout the year.

Mike Anness

American Society of Mechanical Engineers

The American Society of Mechanical Engineers started the 2001–2002 school year in full swing. To welcome students back to school, an ice cream social featuring Call Hall ice cream was held on August 31.

The fall semester has been busy for the organization in many ways. Wildcats on Weird Science (WOWS) has been reinstated. WOWS is a group of members that conduct physics and chemistry experiments for local fifth grade students. The presentations are aimed at encouraging younger students to become more interested in science by demonstrating simple experiments such as the concept behind weight distribution on a bed of nails and making a miniature volcano by mixing baking soda and vinegar.

To encourage participation and group involvement, at the October meeting a paper airplane contest was held. Students had five minutes to design and make a paper airplane and then were allowed to launch their planes off the third floor balcony into the atrium below.

The last social for the semester was a tailgate party before the Texas A&M football game. Officers grilled hamburgers and hotdogs for students and faculty.

The November meeting featured a guest speaker, alum Mike Kennedy, who is currently a test engineer for John Deere. He presented information about his current project, spline wear in drive trains.

This year’s officers are as follows: Katie Malm, president; Tom Ball, vice-president; Jessica Kail, secretary; and Ryan Swenson, treasurer.

Katie Malm
Society of Automotive Engineers

The Society of Automotive Engineers started off the 2001–02 year with a bang. During the first technical presentation, the number of new members in attendance was outstanding. These numbers were repeated again in two general meetings as well. The SAE teams are well on their way to having designs drawn up and acquiring sponsorship from local and national companies to fund their individual projects.

The aero design team competed in the East Event this past April and placed an outstanding 19th place out of 43 teams. This is the first year for the team to compete and they were able to outperform such teams as Embry-Riddle Aeronautical University, University of Kansas and University of Missouri-Rolla, to name a few. They have goals of a top-five finish this year. Design strategies this year include investigating different types of carbon fiber for lightening and strengthening the plane.

The Baja team, composed of two sub-teams, Baja 1 and Baja 2, competed in both the west event and the mid-west event this year. By retiring a car from the Baja 1 team and restructuring the current car from the Baja 2 team, team members are getting great exposure to both design and fabrication of a Baja car.

All of the teams are well into the design process and in some cases already into production of those designs. They all have goals of success and hope to place very well in this year’s upcoming events.

Doug Miller

The K-State’s SAE mini Maja vehicle on display during the competition.

The formula team is well underway on building what could be the lightest car ever to compete in a formula competition. Built out of a heat-treated aluminum, the car is expected to weigh in at just over 250 lbs.