

FP monthly

FP monthly - An internal news digest for all center members including industry supporters, researchers, students, and affiliated organizations.

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UPDATES

The Center's first annual meeting in Atlanta, Georgia was a huge success! Thank you to the nearly 100 faculty and students and 40 industry members who participated. The conference was an exciting forum to learn about the Center research. The event provided an atmosphere of bonding and collaboration among faculty, staff and students of all seven institutions, as well as industry member from all over the world. Graduate students and faculty working on projects and test beds within the Center presented their research during the two-day event. A panel discussion lead by members of the Industrial Advisory Board (IAB) gave insight as to their role and responsibilities. The audience was given an overview of education and outreach in which a primary goal is to "Change the FACE of Fluid Power". The second day was a beautiful one for campus and lab tours of the mechanical engineering department at the Georgia Institute of Technology. It could not have been better! Final congratulations to the students who presented over 50 posters of current research underway during the evening reception.

UPCOMING EVENTS

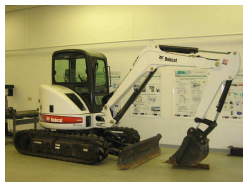
The Center for Compact and Efficient Fluid Power held its first annual meeting at Georgia Tech on April 11, 12 and 13, 2007. Thanks to all participants for helping make the meeting a success. The Center would like to particularly thank the students for excellent posters and presentations. We are interested in your feedback so we can improve future meetings. Please send suggestions to Alyssa Burger at aburger@me.umn.edu.

Save the date for future CCEFP meetings: CCEFP Second Site Visit October 2007: University of Minnesota; CCEFP Second Annual Meeting May 2008: Milwaukee School of Engineering; CCEFP Third Site Visit February 2009: University of Minnesota; CCEFP Third Annual Meeting May 2009: Purdue University.

RESEARCH

Test bed 1: Excavator

Chris Williamson, Purdue University



At the annual meeting in Atlanta this month, we heard updates on research projects such as multi-modal control interfaces, biomimetic nano-surface texturing, powertrain management, and throttleless actuation concepts, just to name a few. These projects (and many others) have the potential to dramatically change the face of fluid power technology. Of course, the ultimate measure of the Center's success will be how well the research is transferred to real world applications. This is where the test beds come in. The test beds

have three goals: to validate and demonstrate the technology developed by the Center, to integrate the work of diverse research projects, and to facilitate the transfer of knowledge from fundamental research to practical development.

Test bed I is a mini-excavator located at Purdue University. It's a Bobcat model 435H, a rubber-tracked excavator with a gross weight of just over five tons. This machine was provided through a generous donation from the Bobcat Company, a subsidiary of Ingersoll-Rand Corporation. This excavator was selected because it includes many of the features of larger machines (such as load-sensing hydraulics) with a size that is more manageable for transportation as well as modification and operation in a laboratory setting. The excavator also serves as a representative example of many other fluid power machines in construction, agriculture, and forestry. It is anticipated that the excavator will demonstrate improvements in fuel efficiency that can be applied to the thousands of machines currently in use in these applications. Further, advancements in actuator controls implemented on the excavator may open up new opportunities for machines that operate autonomously or by remote control.

Of the 19 active CCEFP research projects, 11 are slated for implementation to some degree on the excavator test bed. In the coming year, Purdue plans to replace cylinder control valves with variable displacement pumps to demonstrate energy savings through displacement-controlled actuation. Georgia Tech will implement haptic user interfaces for controlling the machine. Other projects will be demonstrated on the test bed over a longer term, as the research develops to a point where it can be reduced to a practical application. These projects include on/off valve based control (UM), new engineered fluids (MSOE), nano-textured hoses (UIUC), pumps and motors with advanced lubricated surfaces (Purdue), powertrain management (Purdue, UIUC), new sealing concepts (GT), and noise reduction techniques (Purdue, GT).

Integrating so many projects on the same machine will require a great deal of cooperation, and that's exactly the point. All of us—faculty, staff, students, industrial partners—will be working together to bring new ideas into reality. The relationships we build and the knowledge and experience we share with each other will move us toward our common goal: a bright future for fluid power.

INDUSTRY

We are very pleased to announce two new members who have informed us of their intent to join the Center...The International Fluid Power Society (IFPS) and The Lubrizol Corporation. IFPS is an organization specifically targeted for fluid power and related motion control professionals while Lubrizol is a recognized leader in the field of lubricant additives. Please join me in welcoming our newest members.

We have had truly outstanding response to our request for industry project champions as more than 50 volunteers have stepped forward to date! Please contact Mike Gust at mjgust@me.umn.edu or 612-624-4956 for further information on project champions or joining the Center as an industry member.

EDUCATION and OUTREACH

We are pleased to announce the Education Advisory Board (EAB) which serves as an external committee of representatives from industry, academia and education experts. The members of the EAB are: Linda Western, Chair, (NFPA Consultant), Bill Sicari (Festo), Joe Kovach (Parker Hannifin), Karl A. Smith (Purdue University), Stacy Klein (Vanderbilt University), Dwight Gourneau (NAMTech, Inc.), Michael Pastirik (Lakeside High School, GA).

The Center also has an internal cohort of faculty representatives serving on the Education Outreach Network (EON) who will serve as the catalyst for educational and outreach endeavors at each of the Center's seven partner institutions. The network includes: Shajan John (MSOE), Chris Paredis (GeorgiaTech), Eui Park (NCA&T), John Lumkes (Purdue), Andrew Alleyne (UIUC), Eric Barth (Vanderbilt), Will Durfee (UMN) and Alyssa Burger (UMN).

The Center would like to thank these individuals for their commitment to the mission and vision of its educational programs and outreach efforts.

GETTING TO KNOW US



Student

Andrew Fredrickson earned his undergraduate degree in engineering/physics from Taylor University in Indiana in 2006 and is now pursuing his master's in mechanical engineering at Purdue, working with Monika Ivantysynova. Andrew is researching pump components, specifically the piston and cylinder, and using a computer model to investigate areas of energy dissipation in order to design better axial piston machines. He is also making improvements to the current simulation model. This research will evaluate different surface design principles for pump components which will increase pump and motor efficiency over the entire range of operating parameters, such as pump speed and operating pressure. Andrew plans to graduate in May of 2008 and would like to pursue a career in industry within fluid power. Outside of the lab, Andrew is a self-proclaimed coffee lover, enjoys snowboarding in southwest Michigan in the winter and the beach in the summer.



Researcher

Eui H. Park earned his undergraduate degree in Physics from the Yonsei University in Korea and later completed both his masters and Ph.D. at Mississippi State University. He had worked for Boeing Commercial Airplane Company as a senior engineer for several years, and returned to school for his doctorate with a Boeing Fellowship. Eui had served as the Chairman for 16 years in the Department of Industrial Systems Engineering at North Carolina A & T State University. His area of focus within the Center is the Human Machine System Interface with Professor Steven Jjang. The interface design will be using in the Test bed 4: Compact Rescue Crawler, to improve productivity and efficiency. This research is imperative to determine if a user-friendly design is compatible when working with humans. Outside of the lab, Eui spends significant time being active in his church.



Leadership Team

Wayne Book earned his undergraduate degree in mechanical engineering from the University of Texas at Austin followed by his masters and Ph.D. from Massachusetts Institute of Technology. Dr. Book joined the faculty in mechanical engineering at the Georgia Institute of Technology in 1974. Dr. Book's interest in fluid power stems from his days as a young boy on the family farm in Texas. For Wayne, fluid power enabled labor saving devices! Now his research interests are user interface controls and vibration control. Wayne leads the Center's Thrust 3 effectiveness area and advises projects on user interface and noise control, seals, and cavitation. A goal of Thrust 3 is consistency in diverse projects and its pertinence to effectiveness. Outside of the lab, Wayne enjoys bicycling, hiking, running and being outdoors.

Please send comments, questions, or submissions to:
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