Teaching Challenges:
Team Building and Leadership Development Take a Front Seat

In June 2003 the PACE Advisory Board sent a clear message to the Construction Management faculty at Penn State: Students need to be better prepared to interact as team members when they graduate. In August 2003, a new program called “Building Construction Competencies” was created to formalize professional development for 4th and 5th year construction management students in the Architectural Engineering program. Still in its infancy, this program will help students and faculty assess and evaluate the development of “soft skills” among students by cultivating the attitudes and behavior that contribute to successful teams and leadership. In the coming years, plans have been made to introduce more formal leadership development activities for students both in and outside the classroom. New metrics like emotional quotient and personality typing will also be explored to help match students with companies and career paths that suit their individual skills. We look forward to working closely with PACE members on this continuing effort, and hope to maintain Penn State’s prominence as a premier provider of future leaders in the construction industry.

--David Riley, PACE Director

Students Inspired by Glimpse of the Future
Penn State AE Students Visit Firms and Construction Sites in DC

How do you develop the best Architectural Engineering Students? Inspire them to see the potential for great futures available in the AEC industry. On March 19-21, over 40 third-year students visited Washington, D.C. and took part in the continuing tradition of touring active construction sites for a variety of projects, discussion with a design firm, and touring significant structures in our nation’s capital.

Thanks to the continued dedication and support of teams from The Clark Construction Group, Centex Construction, Summer Consultants Group and Potomac Crossing Consultants the students had three days packed with seeing the possibilities that lie ahead. Under the guidance of Penn State professors John Messner and Moses Ling, the students visited projects ranging from the Strathmore Concert Hall to the National Capital Visitors Center followed by background presentations on examples of creative design work performed in the D.C. area.
Integrated Design Roundtable Summary

In response to the growing interest in green or sustainable buildings, a roundtable meeting of key industry and academic players in the building industry was assembled by the Partnership for Achieving Construction Excellence (PACE) at Penn State University. Following in the footsteps of the U.S Green Building Council and the developers of the Leadership for Environmental and Energy Design (LEED™) rating system, the group met for two days at the Pocantico Conference Center to examine the definition and implementation of the integrated building design process.

Integrated design is critical to the conceptualization and realization of high performance sustainable buildings. The goal of the meeting was to develop a shared understanding of the integrated design process and produce a research agenda supporting a transformation of the building industry. Participants engaged in discussions concerning the barriers, key components and core competencies of the process throughout project delivery. The roundtable resulted in a map that assembles lessons learned from industry experts and provided a clear method for achieving high performance sustainable buildings.

Results of the Roundtable meeting are already being implemented in a research project with the Toyota Motor Corporation, and will play a key role in future research projects taken on by the PACE Lean and Green Working Group.

Virtual Facility Prototyping Research

Current research on virtual facility prototypes is gaining momentum at Penn State. Dr. John Messner recently received a CAREER grant from the National Science Foundation titled ‘Fostering Innovation and Learning in the AEC Industry through Immersive Virtual Facility Prototypes.’ This research will explore the development and assessment of virtual prototyping tools and their implementation in large scale, immersive display systems.

Results of the Roundtable meeting are already being implemented in a research project with the Toyota Motor Corporation, and will play a key role in future research projects taken on by the PACE Lean and Green Working Group.

Welcome! New PACE Member:

Toyota Motor Sales Real Estate and Facilities
www.toyota.com

With over 1,000,000 SF of facilities in the US, Toyota is a large facility owner and operator. We look forward to working with this prestigious organization on key issues facing the building industry.

Visit the new PACE Website!

Find out information about current research projects, upcoming events and more!

http://www.engr.psu.edu/pace
**S:PACE Takes On Challenge of Professional Development**

Led by newly elected officers, the student organization supporting PACE (S:PACE) has made the development of leadership and management skills a main goal of the S:PACE organization. Three key activities are planned for 2004-2005:

- S:PACE has initiated talks with the Undergraduate Student Leaders (USL) through Penn State’s AT&T Center for Service Leadership. USL helps to facilitate leadership workshops, teambuilding exercises, and presentations for Penn State organizations such as S:PACE.
- New resources will be developed for students to support the development of leadership and management skills, such as online courses, web-based tutorials, and tips on interpersonal skills and professional interaction.
- A new website will be developed as a focal point for activities and resources. The site will include tips on interviews and job hunting, a calendar of events and student activities, and links to the resources described above.

This student effort will be supported by the PACE Leadership in Construction Working Group.

---

**New Course**

**Virtual Design and Construction**

Virtual reality applications will help transform the processes we use to design and construct buildings in the future. A key to propagating these technologies into the AEC industry is through students.

A new course (AE 497E/Arch 497E) is being offered focusing on the development and implementation of virtual design and construction. Topics include virtual design and construction seminars, guest lectures, site visits to VR facilities, and a semester project. Examples of student projects include the development of a virtual model for a strawbale technology center and the historic construction of the Santa Maria Novella. Other projects explore the benefits of 4D CAD in immersive display systems, the development of interactivity in immersive virtual models, and the value of virtual reality in education.

The course is co-taught by John Messner (AE), Loukas Kalisperis (Arch), George Otto (ITS) and Katsu Muramoto (Arch).

---

**Students take Hands-on Role in Green Construction**

For the last three years Professors David Riley (AE) and Scott Wing (Arch) have organized hands-on design-build experiences for students. This summer over 30 Penn State students and faculty from AE, Architecture and many other disciplines will take part in the construction of a 2,500 SF Sustainable Construction Technology Building in Lame Deer Montana. This project will feature green technologies including strawbale construction, panelized roofing, low-flow water fixtures, and active solar heating. This project is a part of the American Indian Housing Initiative (AIHI) course series (AE 497H).

After spring semester preparations including lab testing of straw walls, design analysis, and detailed construction planning, students will help lead the two-week “blitz-build” in Montana.

AIHI is seeking interested alumni and industry members to join the class as mentors, or to support this project through student travel sponsorships.

If you are interested in learning more, please contact us at AIHI@enr.psu.edu.

---

**Upcoming Events:**

- June 8, 2004-PACE Advisory Council Meeting, Washington Dulles Airport Marriott
- October 12-13, 2004-PACE Roundtable, The Penn Stater Conference Center Hotel

---

**The PACE Photo Contest is BACK!**

Enter pictures of your construction projects in progress published in the PACE Calendar and other PACE promotional materials.

**2003 Winner: Centex Construction**

All images (300 dpi) can be emailed to Annie Grochmal, PACE Program Assistant at aug104@psu.edu
**Interested in helping us advance the building industry?**

Please contact us if you would like to become involved in a research project, or learn more about our research programs and results.

### Faculty Research Programs

**Michael Horman, PhD - mjhorman@engr.psu.edu**
- Integrating constructability information into design
- Lean production applications in construction, part the delivery of green projects
- Project development and delivery methods

**John Messner, PhD - jmessner@engr.psu.edu**
- Using virtual reality and 4D CAD to improve construction planning and education
- Improving knowledge management and strategic planning in the construction industry
- Evaluating the impact of procurement methods on project success

**David Riley, PhD - driley@engr.psu.edu**
- Procurement and organizational strategies for green building projects
- The Deployment of Sustainable Construction Methods and Technologies
- Educational Strategies Cultivating Leadership Skills in Engineering

### Graduate Student Research

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Integrating Sustainability and Constructability”</td>
<td>Michael Pulaski</td>
<td><a href="mailto:mhp110@psu.edu">mhp110@psu.edu</a></td>
</tr>
<tr>
<td>“Entry Strategies for International Construction Projects”</td>
<td>Victor Chen</td>
<td><a href="mailto:vchen@engr.psu.edu">vchen@engr.psu.edu</a></td>
</tr>
<tr>
<td>“Cross Functional Assessment of the Building Design Process”</td>
<td>Chris Magent</td>
<td><a href="mailto:cxm209@psu.edu">cxm209@psu.edu</a></td>
</tr>
<tr>
<td>“Sustainability: Housing Needs in Rural American and Lessons Learned from Native Cultures”</td>
<td>Amy Grommes</td>
<td><a href="mailto:avg102@psu.edu">avg102@psu.edu</a></td>
</tr>
<tr>
<td>“Comparing Design-Build Procurement Methods”</td>
<td>Marwa El Wardani</td>
<td><a href="mailto:mae197@psu.edu">mae197@psu.edu</a></td>
</tr>
<tr>
<td>“Air Quality Control During Hospital Renovation”</td>
<td>Zaruhi Karapetyan</td>
<td><a href="mailto:zxk106@psu.edu">zxk106@psu.edu</a></td>
</tr>
<tr>
<td>“Strategies and Techniques for the Energy Modeling of Strawbale Buildings in the Northern Plains of US”</td>
<td>Priya Premchandran</td>
<td><a href="mailto:pxp912@psu.edu">pxp912@psu.edu</a></td>
</tr>
<tr>
<td>“A Housing Model for the Northern Cheyenne Tribe”</td>
<td>Noah Shaltes</td>
<td><a href="mailto:nds109@psu.edu">nds109@psu.edu</a></td>
</tr>
<tr>
<td>“Strategies for implementing 3D CAD Technology in Construction Organizations”</td>
<td>Amar Babu Nutalapati</td>
<td><a href="mailto:axb190@psu.edu">axb190@psu.edu</a></td>
</tr>
<tr>
<td>“Constructability of Straw Wall Systems”</td>
<td>Vivian Liu</td>
<td><a href="mailto:yzl119@psu.edu">yzl119@psu.edu</a></td>
</tr>
<tr>
<td>“Assessing the Use of Virtual Facility Prototyping for Construction Planning and Knowledge Extraction”</td>
<td>Rajitha Gopinath</td>
<td><a href="mailto:rajitha@psu.edu">rajitha@psu.edu</a></td>
</tr>
<tr>
<td>“Construction Trade Working Space Planning and Evaluation with Visualization Technology”</td>
<td>Chris Bo Tan</td>
<td><a href="mailto:btan@psu.edu">btan@psu.edu</a></td>
</tr>
<tr>
<td>“Defining the Synergies between Lean and Sustainable Principles”</td>
<td>Tony Lapinski</td>
<td><a href="mailto:arl148@psu.edu">arl148@psu.edu</a></td>
</tr>
<tr>
<td>“Developing a Framework for Global Engineering Workforce Strategy”</td>
<td>George Joseph</td>
<td><a href="mailto:gxj131@psu.edu">gxj131@psu.edu</a></td>
</tr>
</tbody>
</table>