Welcome to the 2006 PACE Roundtable Meeting. Held annually, this event is a forum for interaction and exchange of ideas between industry, students, and faculty. We are delighted that you could join us this year.

This year our theme is “Building Respect.” Our Advisory Board has selected several areas of interest for discussion; these are listed in the agenda. We will have three sessions of breakout discussion and one final discussion session as a group. We have quite a bit of moving between rooms, so please try to move quickly to keep the program active and on schedule.

Throughout the roundtable you will also have several opportunities to interact with graduate students and the senior class. In this program book you will also find a comprehensive set of the resumes from the senior class.

At the conclusion of the roundtable please complete the evaluation form that can be found at the back of this book. Please make sure to suggest an idea for student research from today’s discussion that is critical to your business.

Please check out PACE on the Web at www.engr.psu.edu/pace. Shortly after the conclusion of the Roundtable we will post summaries of the discussion and the selected research topics. This site is also used to share information regarding our activities as well as to conduct research.

Thank you for supporting our program.

David Riley
Director, PACE
OVERVIEW

The PACE Roundtable meeting provides a forum for building industry professionals and students to share perspectives on the current challenges facing the industry. The morning discussion sessions will be focused on: (1) Technical Building Issues; (2) Building Information Modeling Issues. After lunch we will conduct a Teambuilding workshop. Our afternoon sessions will focus on Building Respect between key members of building project teams.

Objective: To provide an environment for the industry and faculty and students of Penn State to discuss critical topics and problems facing the construction industry. The product of the Roundtable is a research agenda for our students who will work with PACE members throughout the academic year to develop these subjects. Results of the students’ research will be presented at the PACE Research Seminar on April 24-25, 2007 at the Nittany Lion Inn.

Format: PACE members and other industry leaders have identified critical topics that currently challenge the industry. Throughout the day we will form breakout groups, with separate tracks, to have small group discussion on these topics to allow participants to exchange ideas, opinions, and questions.

Deliverables: We envision several products in the upcoming year:

1. We will conclude the Roundtable with a list of the top issues generated by each discussion area.
2. We will forward a list of topics to you and identify the topics that research teams will pursue.
3. We will present the results of the work to you at our PACE Research Seminar (April 24-25, 2007 at the Nittany Lion Inn).
# AGENDA

## WEDNESDAY OCTOBER 11, 2006

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>6:00 PM</td>
<td>Registration</td>
<td>Presidents Hall 2</td>
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<tr>
<td>6:00 – 8:30</td>
<td>Industry Reception/ Dinner</td>
<td>Presidents Hall 2</td>
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## THURSDAY OCTOBER 12, 2006

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>7:30 AM</td>
<td>Registration &amp; Continental Breakfast/Advisory Board Meeting</td>
<td>Conference Room 113</td>
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<tr>
<td>8:00</td>
<td>Welcome &amp; Introduction</td>
<td>Assembly Room 206</td>
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<tr>
<td></td>
<td>Plenary Presentation/ PACE Working Group Progress Reports and Announcements</td>
<td>Assembly Room 206</td>
</tr>
<tr>
<td>8:15</td>
<td>1-A: Structural Building Systems - <em>Constructability and construction loads</em></td>
<td>Conference Room 113</td>
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<td></td>
<td>1-B: Mechanical and Electrical Building Systems - <em>Design coordination and constructability in MEP</em></td>
<td>Conference Room 114</td>
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<td></td>
<td>1-C: Green Building Materials - <em>Specialty materials and systems</em></td>
<td>Conference Room 115</td>
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<td></td>
<td>1-D: Operations and Maintenance - <em>In-house Teams and Business Development</em></td>
<td>Conference Room 116</td>
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<tr>
<td>10:00</td>
<td>Break</td>
<td>Break Area</td>
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## NOTE:
Each session will be introduced in **Assembly Room 206** and then move to breakout rooms.

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>10:30</td>
<td>2-A: BIM: Model Development Responsibility - <em>Contract and risk issues of BIM</em></td>
<td>Conference Room 113</td>
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<td></td>
<td>2-B: BIM: Education and Workforce Development - <em>Who will lead BIM teams</em></td>
<td>Conference Room 114</td>
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<td></td>
<td>2-C: BIM: Implementation Challenges - <em>Weaving BIM and project delivery</em></td>
<td>Conference Room 115</td>
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<td></td>
<td>2-D: BIM: Team dynamics and Communication - <em>Building respect with BIM</em></td>
<td>Conference Room 116</td>
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<tr>
<td>11:45 PM</td>
<td>Lunch</td>
<td>Gardens Restaurant</td>
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<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
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</tr>
<tr>
<td>11:45 PM</td>
<td>Lunch</td>
<td>Gardens Restaurant</td>
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<tr>
<td>1:15</td>
<td><strong>Team Building Workshop</strong></td>
<td><em>Assembly Room 206</em></td>
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<tr>
<td></td>
<td>“Building Towers in the Sky”</td>
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<tr>
<td>3:00</td>
<td><strong>Break</strong></td>
<td><em>Break Area</em></td>
</tr>
<tr>
<td>3:15</td>
<td><strong>Roundtable Summary: Building Respect</strong></td>
<td><em>Assembly Room 206</em></td>
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<tr>
<td>3:30</td>
<td>Adjourn</td>
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<tr>
<td>2:30</td>
<td><strong>Brainstorming: Building Respect</strong></td>
<td><em>Conference Room</em></td>
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<td></td>
<td>3 - A with owners and operators</td>
<td>113</td>
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<tr>
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<td>3 - B with design professionals</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>3 - C with specialty contractors</td>
<td>115</td>
</tr>
<tr>
<td>3:30</td>
<td><strong>Adjourn</strong></td>
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SESSION 1: BUILDING SYSTEMS CHALLENGES

1A – Structural Building Systems

• What are some recent trends in the construction of concrete structures?
• What are some recent trends in the construction of steel structures?
• What are the key challenges resulting from these trends?
• How are construction loads identified and incorporated into engineering and design?
• How can constructability of structural systems be improved?

1B – Mechanical and Electrical Building Systems

• What are some recent trends in the construction of MEP systems?
• What are the key challenges resulting from these trends?
• Simulations and modeling are increasingly used in the design of facilities to estimate system performance (e.g. energy use, day-lighting) How can the project team make the most of this?
• How do simulations of building performance relate to actual performance?
• For complex facilities, such as hospitals and labs, what types of process innovations help to address the added challenges of these buildings? E.g., early trade coordination, use of design-build subcontractors

1C – Green Building Materials

• What recent trends exist in the design and specification of green building materials
• What procurement challenges exist in green building materials and systems?
• What are the common secondary or unexpected outcomes of green building materials and systems compared to the initial goals of the project – beyond cost and level of LEED rating
• To whom should key green consultants, e.g., commissioning agent, be contracted?
• What are the key lessons learned on recent green building projects?

1D – Start-up, Operations and Maintenance

• What are the most common forms of call-backs and maintenance problems in recently completed buildings
• What best practices can be applied during project start-up?
• How can owners best prepare O and M teams on new building projects?
DISCUSSION QUESTIONS

SESSION START:
10:30AM

SESSION 2: BUILDING INFORMATION MODELING TECHNOLOGY

2A - Model Development & Responsibilities

• Who should take the lead in initiating the use of BIM?
• Who should develop the models, and how should responsibility shift throughout the project?
• Who should maintain and oversee the model once it is developed?
• What new risks or liabilities does BIM present? How should these be addressed in the contracts?
• What level of detail should the model include?

2B - Education and Workforce Issues for BIM

• How do we educate the current workforce to allow them to adopt BIM, and how drastically should our current training programs change?
• What should graduates from the AE Program and other programs know about BIM?
• What opportunities does BIM provide to new students entering the job market?
• Should modeling be performed inhouse, or should they be outsourced (or offshored)?
• How could BIM be used as a training tool within the company?
• What opportunities does BIM create for knowledge management?

2C - Modeling Implementation and Challenges

• What are the technical challenges faced by companies during implementation?
• How should the BIM be used during the construction phase of a project?
• How can a BIM save time or money? Where is the greatest payback?
• When does it create extra work?
• What opportunities does BIM present?
• Is it a significant change to shift toward BIM?
• What delivery methods are most appropriate?
• What part of projects should or should not use BIM?
• How do we ensure use throughout the entire project?
• How well are current models used? Why?
• What would make BIM more practical & appealing?

2D - Team Dynamics and Communication with BIM

• How does BIM affect the team dynamics, roles and responsibilities?
• How does project delivery need to be modified to allow for BIM?
• What are the contractual and risk sharing impacts of implementing BIM?
• How will BIM implementation affect subcontractors?
• How does BIM change the designer/contractor relationship?
• How might BIM change the owner’s roles and responsibilities?
• Who should lead the use of BIM at various stages in a project?
DISCUSSION QUESTIONS

SESSION 3: BUILDING RESPECT...

3A - . . . with Owners and Operators

• How can builders best earn the respect of building owners and operators?
• What are the indicators of respect by an owner? How does this affect projects?
• What are the most common ways to lose respect of owners?

3B - . . . with Design Professionals

• How can builders best earn the respect of design professionals?
• What are the indicators of respect by design professionals? How does this affect projects?
• What are the most common ways to lose respect of design professionals?

3C - . . . with Specialty Contractors

• How can builders best earn the respect of specialty contractors?
• What are the indicators of respect by specialty contractors? How does this affect projects?
• What are the most common ways to lose respect of specialty contractors?