Introduction: Rob Leicht

- Leadership Focus: Dr. Riley stepped down and Dr. Leicht took over, Focus Points:
  1. Increasing interaction among member companies and students as a working partnership, through site visits, guest lectures, and other initiatives.
  2. Bringing our students to the forefront of the industry in terms of integrated design and construction, virtual tools, and team competencies to prepare them to be future industry leaders.
  3. Finding opportunities to integrate research efforts with PACE members’ interests and projects to keep the AE Program at the cutting edge of the construction industry.

- Awards
  - Recognition of Dave Riley for 10 Years of Service
  - Hall of Fame – Steve Maruziewksi of OPP
  - Excellence Award – Dan Kerr – McClure Company
  - Hettema Leadership Awards:
    - 5th Years: Patrick Laninger, Christie Smith
    - 4th Years: Jeff Sopinski, Jenna Dumke

- Horman Memorial: opening this summer, will be complete by the second anniversary

- Placement of construction students: 28 students, 93% placed at graduation, 2 remaining students have interviews/prospects, 60% going to PACE firms
• Concerns on the AE cap-fewer students interested, 5 year program, sell job placement aspect, more students are completing their Masters in 5 years

![](chart.png)

• New in 2011-12: Roundtable-student interaction
  Comments: very helpful, students eager to bounce ideas off of industry, great networking, very efficient and effective getting feedback from what students are interested in.

• Also New: IPD/BIM Studio/Thesis updates-larger studio, upcoming thesis-5 teams of 8, 40% of 5th year class.
  Comments: enjoyed IPD/BIM better than individual.

**Working Group Update**

• Energy Efficient Buildings HUB
  Overview: -22 member organizations
  -The Navy Yard in Philadelphia, PA
    -Redevelop project of regional and national significance
    -Test bed for research and demo
    -270 buildings
  Construction Faculty Focus Areas:
  -Design tools and processes
  -BIM Enterprise Architecture and BIM server
  -Interactive workspaces
  -Energy Audit Process and Tools
  -Work Force Development
-Auditor training
-Continuing education

- Morning Star Research Group update
  - new series of solar design and construction courses are in progress
    - 400 level design and construction
    - 400 level design-build: solar installation over spring break
  - Energy focused summer programs at the PNY for students to engage in the HUB and energy centers

- Developing new online programs, Dave is running centers related to energy and design: GIS program—very popular high quality online programs, hired Amy McIntire over the last year

- Lean and Green Research Group update
  - Delivery methods – working with Penn State OPP on collaboration addendum/charter for projects to move toward “IPD-like” delivery
  - Energy Audit Process for Retrofit projects – collaborating with United Technologies to develop rapid assessment tool & process
  - High Performance Green Process
  - Performing Case Studies of High Performance Retrofits to study/improve integrated decision making for Deep / Energy Focused retrofits
  - Collaboration / Team Competencies – expanding Emotional Intelligence work with undergraduate curriculum, found notable areas differentiating “high performance teams and hard working teams based on EI scores.

- Constructability – Studying the use of Building Information models for improving constructability feedback during design
• Safety – recent studies have shown link between LEED points and safety concerns, expanding study to see if these risks have an aggregate impact at company level metrics based on revenue from Green Projects:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Injury Description</th>
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<tbody>
<tr>
<td>36%</td>
<td>Lacerations, strains and sprains from <strong>recycling</strong></td>
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<tr>
<td></td>
<td><strong>construction materials</strong></td>
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<tr>
<td>24%</td>
<td>Falls to lower level during roof work</td>
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<tr>
<td></td>
<td><strong>On-Site renewable energy (e.g. PV Panels)</strong></td>
</tr>
<tr>
<td>19%</td>
<td>Eye strain when installing <strong>reflective roof membranes</strong></td>
</tr>
<tr>
<td>14%</td>
<td>Exposure to harmful substances when installing</td>
</tr>
<tr>
<td></td>
<td><strong>innovative wastewater technologies</strong></td>
</tr>
</tbody>
</table>

• Computer Integrated Construction Research Update
  o Virtual Prototyping for Experienced Based Design Review
    • working with Hershey Medical Center-transition planning,
  o Integrated Design
    o Expanding the Integrated Building Process Model to develop system level processes
    o Identify Collaborative Process
    o Identify BIM exchange opportunities
  o Released BIM Guide for Facility Owners
    • Available at: Bim.psu.edu
  o Developed a second ICon Lab space at the Phila. Navy Yard

**Membership Update:**

• Have added Massaro Construction,
• Mortenson Construction is considering membership
• Hensel Phelps has decided to withdraw from Participation in PACE

**PACE Discussion Issues**

**Design**

• Members think that the students need to understand the design part of engineering more
• The integrative classes have seemed to be helpful, but what’s holding them back? Not enough faculty, so time-consuming.

• **Drawing, modeling, working drawings knowledge discussion**
  o The students already take a drawing class their second year to learn what they don’t know about reading drawings.
  o There’s a freshman drawing class that does more hand-sketching, but members think students are backing away from the sketching and want software.
Many members feel it is more helpful to be able to sketch on the field.

**Efficiency and Technology**

- Pick the best software to use for field use – Vela, Latista, other?
- Ipads->getting the model into the field – is that the right hardware? Kiosks, tablets, iPads, other…
- Figure out most efficient way to put technology in the field, as well as making sure the people on the field know how to use it, eliminating or minimizing rework because drawings are outdated
- How do we get the efficient innovative ideas out there? What is the right way to implement the technology, getting the right information and the right software closer to the field? Training and recruiting is important.
- Some members think the colleges need to start aligning with the companies and what software they are using-set up webinars?
- Students have a big opportunity to make an impact in the field right away – can facilitate field tool use, can gain field exposure by playing critical “information facilitator role” with Supers / Foreman
- Students are not being taught to use software in the field, or being taught a particular software because there are too many, it all depends on the company.
- Some students latch onto technology when doing research projects.
- Might be good to bring in people from different companies to talk about the tools used in the field, exercise these tools, student-awareness.
- ALL information needs to be brought to the field and the superintendents are the best people to have this information.
- Industry is getting more complex, new hires are catching on quick and jumping right into superintendent positions.
- Should have students sitting in on meetings to see the process.
- Some members believe that some students are too focused on BIM and technology and that they think it’s implemented more than it really is – make sure students have a “realistic” perspective of how often / how much BIM is currently utilized
- Field BIM Training test bed? Use Icon Lab ? Have students attend meetings

**Integrative Classes-IPD**

- Where things are really going-learning how to work with people
- Students need to understand contracts and how they work/what they do to people.
- Different contract types take different types of people-very hard to teach.
- Could do symposiums, workshops on contracts and interactions.
- Bringing people in from companies once a week to the thesis class.
- Roleplaying with contracts-help teach students.
• Look more at space utilization
• Renovation projects are more common-preliminary investigation, should focus on energy.
• Coordinate program and model and come up with an as-built model and then reconstruct.

**Modularization**

• Driven by cost, efficiency and technology

**Operator Training:**

• Training for people that run buildings-the need to know how to operate the building systems themselves
• Trying to make ventilation happen, huge operational savings, but people don’t know enough to do it.
• Funding can be an issue – government may not have funding for Operators yet, so not able to bring them into the project for handover/training
• John Messner – how should AE address this? Some discussion of whether Operations should be a 5th AE option…
  o Exposure to that side of industry is good for AE options
  o Ongoing Workforce Training, much for Operators, in EEB Hub workforce development task
  o Shift to more automated systems?
  o IFMA – operators typically not college workforce, blue collar
  o Certificate program in FM?
  o Jobs market for this option?
  o Align w/Owner – real estate, property, FM, capital planning content?
  o Need FM to get a four year degree or a certificate-sophisticated person-could be an option through the AE program.
  o High demand for FM’s
  o FM’s need to understand how the buildings work-data collection about energy, how much energy should a building use?
  o Need a shift in own perception-make them to energy retrofit, etc.- need to organize and communicate well, and justify added cost.

**Construction Modeling:**

• Efficiency – how do you get information closer to installation time/location?
• Where does the responsibility fall? Means and methods-contractor, Designers-savvy enough to understand, pushing BIM.
• Building databases the early the better-take smart design and convert it.
• Dimensions must be in right place-make process smoother.
• Teach a course in the fall on modeling at a construction site, research emphasized. First time truly invent a model, transition construction into operations.
• Need to understand the value of pre-fabrication.

Renovations:

• Large portion of work at the moment
• Various challenges
  o Preliminary investigation
  o Laser scanning – value/cost/timing
  o Coordination
  o Tricky – risks, what’s there/unforeseen
  o Energy?

Sustainability

• Well accepted
• Most projects LEED Silver or Gold
• Challenge is in operations
• We don’t do well at understanding how our buildings operate / collect data
• EEB Hub – trying to get to energy performance measure / standard comparisons (miles per gallon type comparison)
• UPenn team working on public policy / incentives

Upcoming Events

• Annual AE Career Fair: Sept. 25th, 2012
• Annual Roundtable Meeting: Nov. 5th-6th, 2012
• Bi-Annual AEI Conference: April 3rd-5th, 2013
• Annual Research Seminar: TBA
• Annual Awards Banquet: April 26th, 2013

Open Discussion

Career Fair

• Early timing is challenging
• Deadlines to students are early
• 4th years don’t have a good understanding of “what they want to do”
• Is there an assigned “adviser” for construction students
  o Yes, revised in 4th year based on options
  o Students tend to approach instructors before/after class rather than assigned “advisor”

• How is Architecture program taught “contract administration”?
  o Professional Practice class in final year, taught by Bob Holland
  o Opportunity to help students learn design management and integrate with Arch Contract Admin / Pro Practice class?
  o Exposure to real time / real life deliverables
    ▪ Contracts?

• Architecture / Design handling of BIM models
  o Design clash detection and sharing of models with subcontractors
  o Other option of design-assist/DB subs who develop models as CD’s
  o Right of Reliance on model for dimensions
  o Garbage-in garbage-out – skill level of designers with tools / means & methods requirements

• IPD
  o Delivery Model
  o May take a while to hit “home” but it’s coming
  o BIM Studio class – best form of learning how to work
  o Contracts
    ▪ How they work
    ▪ What do they do to behavior?
      • Certain contracts lead to certain modes of operation / behaviors
      • Can’t force firm/organization/person into DB / IPD mindset
    ▪ Industry symposium / workshop with students?
      • Hard to teach in class setting
  o Owner – entrepreneurship
  o Blue collar/foreman buy-in?

• Knowledge Management
  o Trickle down learning
  o Apprenticeship approach
  o Training classes – disconnect
    ▪ Young engrs / apm’s – “chained to computer”
  o Self-development & training of others

• Supply Chain
Old / broken
How do we develop, secure, build
Workforce is aging
Lack of “efficiency” improvement
Opportunities in prefabrication, sourcing, limiting labor on job sites
Prefab challenges, previously, tech wasn’t good enough to verify fit
  - Can be done (case studies)
  - KT student housing example – dropped in chunks
Currently – only done if there is a motivating reason
  - What can we prefab
  - Need shift to “this is what is needed, design for modular”

2012-2013 Agenda

- Efficiency-increasing through innovation
  - Cost efficiency
  - Energy efficiency
  - Modularization
  - Operations and Skill