THE PARTNERSHIP FOR ACHIEVING CONSTRUCTION EXCELLENCE

# PACE

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APRIL 2014

Inside this issue:



The PACE Newsletter highlights activities and noteworthy events in the PACE program.
For more information or to submit prospective articles, contact the PACE Program Team at:

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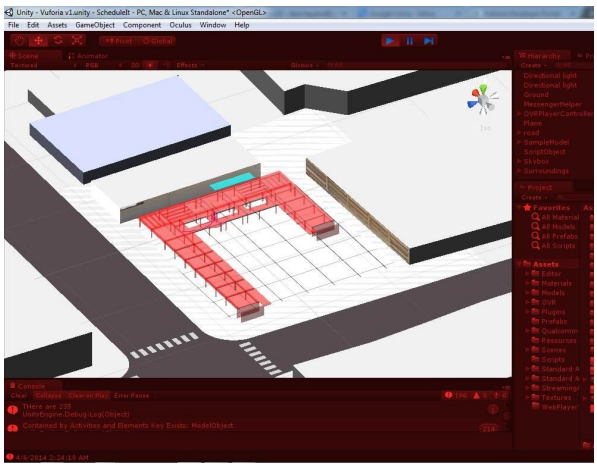
## AE Graduate Students Hack the AEC Industry


On Friday March 14th, Fadi Castronovo, Yifan Liu, and Jennifer Lather, three graduate stduents from the AE Computer Integrated Construction (CIC) Research Group entered the Facebook Headquarters in Menlo Park, CA, with one goal: hack the AEC industry! The event was the AEC Hackathon 1.1, a non-profit event that creates on-the-spot teams of technologists and industry stakeholders to shape the future of our built environment. The teams developed around interest in specific challenges related to the AEC industry and developed solutions for it. Our three hackers were able to meet with leaders in the Industry, as well as discover new technology and discuss current research being conducted by the CIC Research Group.

The CIC hackers formed a team together with Amir Tasbihi and Daniel Clayson, from STV Group Inc, and Robin Torres from Lean Consulting LLC, with the goal of developing an easier way to visualize schedule data. The group leveraged the CIC Research Group's knowledge in design reviews, virtual prototyping, and serious gaming, together with STV's expert knowledge in construction and programming, and developed a "hack" to improve scheduling utilizing visualization tools. The result—*ScheduleIt*, an immersive construction site, developed in the Unity3D game engine, where the user could visualize and interact with the construction site of a 3D model, developed in Revit, and schedule data, exported from Navisworks. The "hack" had several applications such as using Oculus Rift, a head mounted display system, to immerse the user directly while dynamically visualizing the site and the building construction schedule. The AEC Hackathon concluded on Sunday March 16th, when the team presented their solution to the other participants and received feedback.

Our hackers, joined by Sonali Kumar, PhD a recent graduate , added to the educational track of the event by presenting current research on emerging applications and technology conducted at Penn State. The group received strong interest and feedback from the community on future applications, current trends, and educational goals for current and future students. The source code and snapshots of the *ScheduleIt* project can be found on the CIC BIM Wikispaces website.

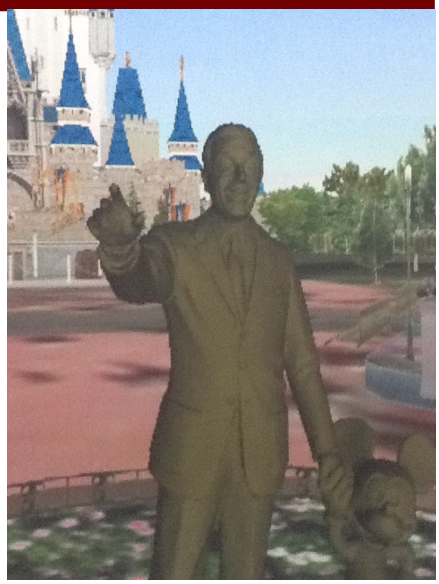


For more information on this please contact Fadi Castronovo at:
fxc175@psu.edu

## BIM in the Curriculum

On Friday February 21st, Dr. John Messner and Dr. Robert Leicht were invited to present to Disney Imagineering regarding the implementation of Building Information Modeling into the AE curriculum. This half hour presentation featured the evolution of BIM over the past 10 years. Highlighted by the Integrated Studio course and the Team BIM supported Capstone experience, the presentation also highlighted some of the recent research into BIM Implementation Planning and the Organizational adoption of BIM. Following the IPD Summit Event, the faculty members were invited to visit Disney's VR Facility.

For more information on this please contact either John Messner at jmessner@engr.psu.edu or Robert Leicht at rmleicht@engr.psu.edu .



*"When one has finished building one's house, one suddenly realizes that in the process one has learned something that one really needed to know in the worst way - before one began."*

*- Friedrich Nietzsche*

## S:PACE Trip—2013

This year's trip offered a diverse selection of projects ranging from a more traditional Turkish Mosque and community center to highly technical data center projects. The trip first made a stop in Millersville, PA to see the new Dormitories being built at Millersville University by Benchmark Construction. The project was rather unique in that it used a combination of steel and wood in the structural system as well as precast stair towers. The next stop on the trip was in Baltimore, MD at Coppin State University where Barton Malow is constructing the university's new Science and Technology Center. The project included the removal of 210 Row homes allowing for the expansion of the university, when S:PACE visited the cast in place concrete structure was actively being constructed. S:PACE stopped to visit Balfour Beatty's Turkish American Community Center on its next stop in Lanham, MD. The project featured cast in place concrete domes requiring some very elaborate formwork to be constructed. The project also featured some very high finishes shipped in from Turkey. Friday ended with a stop at the James G. Davis Construction headquarters in Rockville, MD. At Davis the students were given a tour of the headquarters and able to meet with some of the professionals at Davis over dinner. Saturday morning started out with a trip to The Woodley, a new high end apartment building being constructed by Clark Construction. The apartment building will offer tenants a high end living space in the heart of Washington D.C.'s Woodley park neighborhood. Next we visited a data center being built by Forrester Construction in Reston, VA. The project was in the excavation and foundations phase where the students were able to observe the shoring system used on the project. The final stop on the trip was to another data center project being built by DPR Construction in Ashburn, VA. The rough in work was just ramping up on this project allowing the students to see the complexity of the MEP systems usually included in such projects. As you can see this year's trip offered a plethora of projects with different types, scopes, and materials making this trip one of the more unique years for the trip. So again to our dedicated sponsors at PACE we sincerely thank you for your continued support and we look forward to the Fall 2014 trip.

For more information on this or other S:PACE Activities, please contact Kevin Barth at : kmb5903@psu.edu

*Welcome to returning PACE member*

SKANSKA

# OWNER'S GUIDE TO MAXIMIZING SUCCESS IN INTEGRATED PROJECTS

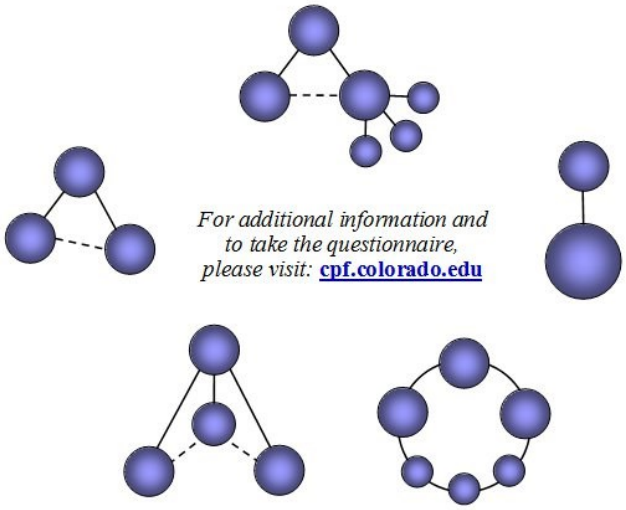
**Dr. Keith Molenaar**, *University of Colorado at Boulder* **Dr. John Messner** and **Dr. Robert Leicht**, *Pennsylvania State University*

## Purpose and Goal

There is a growing need among building owners for evidence that compares the performance differences of various project delivery methods. Due to restrictive procurement requirements and the lack of objective project data to support decision-making, owners often select delivery methods based on their personal preference or comfort level. The goal of this research study is to produce an empirical guide of successful owner practices that considers how project performance is impacted by the owner's role, degree of system integration, team behaviors and delivery method in the building design and construction industry.

## Relevance to Industry

With a research team led by the University of Colorado at Boulder and Pennsylvania State University, this study will collect detailed project performance data using a survey questionnaire to build a project delivery database. The database will become the engine that informs industry deliverables, including owner's guides written for various industry sectors and owner experience levels that offer how-to guidance for setting up and participating in a successful building project. A copy of the guides will be made available to study participants on request.




*If you have any questions about the study, contact:*

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Campus Box 428

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104 Engineering Unit A

## Participation

Participation in this research study consists of completing either a web or paper-based survey for at least one building project finished within the last 5 years. The respondent filling out the survey should be a member of the team who actively participated in the project. Prior to starting the questionnaire, which should take between 20-30 minutes, respondents are encouraged to have the following project information available:

- Project size *(gross square-footage, number of floors)*
- Overall project and construction costs *(initial and final contracted costs)*
- Project schedule *(initial and final design, construction and operation dates)*
- Primary sustainability and safety metrics

Following completion of the questionnaire, participants will be contacted be a member of the research team. The purpose of this follow-up effort is to confirm key data points, discuss any unique conditions contributing to the project's performance and collect lessons learned related to the success of the project.

## Advisory Board and Industry Contributors

# AE Construction Faculty


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## Upcoming Activities

Advisory Board Meeting — June 6

AE Social and Career Fair — September 22-23

PACE Roundtable — November 5-6
At Beaver Stadium

S:PACE Trip — Fall 2014
If you are interested in hosting the students, please contact the S:PACE Vice President Donald Stahlnecker at: donaldstahlnecker@gmail.com

## Upcoming PACE Events

Advisory Board Meeting — **June 6, 2014**
Representatives from PACE Member companies meet to discuss key issues facing the building industry, and establish a research agenda for the next year.

PACE Roundtable Meeting — **November 5-6, 2014**
An open forum discussion in which key topics selected by the advisory board are discussed by students and industry practitioners. Specific and target research topics are defined to be pursued by research teams.

## We would like to thank the following companies for their support of PACE

Thank you for your support of PACE's 2013-2014 activities!

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