The Pennsylvania Housing Resource/Research Center (PHRC) serves the home building and remodeling industries and the citizens of Pennsylvania by improving the quality and affordability of housing. The PHRC conducts applied research, fosters the development and commercialization of innovative technologies, and transfers appropriate technologies to the housing community.

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• Upcoming Meetings

On February 23 & 24, the PHRC will hold its 19th annual conference in York County, PA. The conference strives to be the premier technical conference for housing and land development issues in Pennsylvania. This 2-day conference provides the latest information on emerging technologies and how to resolve problems facing the industry.

February 23th is intended for all sectors of the housing industry including builders, remodelers, code officials, educators, design professionals and modular and HUD-code builders.

February 24th — Land Development — will offer multiple training events:
• Residential Fire Sprinklers
• Advanced Framing
• Energy Incentives for New Homes
• Solar Electric Systems, Installation, & Inspection

Please visit www.engr.psu.edu/phrc for more information and to register.
Mark Fortney resigned his position with the PHRC effective July 23, 2010. He has spent the last five months traveling around North America with his wife Marianne. Mark plans to stay involved in related fields including applied building science, energy efficiency, green buildings, building codes, energy codes, and technology transfer.

Mike Turns was hired internally as the Associate Director of the PHRC to replace Mark. Mike began working at the PHRC as a Housing Program Development Specialist in 2005. His previous work has included assessing the impact of the Uniform Construction Code in rural Pennsylvania (funded by The Center for Rural Pennsylvania, a Legislative Agency of the Pennsylvania General Assembly); the development of a residential mechanical training program focused on common code violations; estimating the potential impacts of residential energy efficiency programs in Pennsylvania (funded by the West Penn Power Sustainable Energy Fund); and implementing an energy code technical assistance program and compliance assessment (funded by the U.S. Department of Energy). Mike is an NAHB Certified Green Professional and was certified as a Home Energy Rating System (HERS) Rater in 2006. He has been an invited speaker at numerous state and national conferences, as well as a variety of professional association meetings. Mike holds a B.S. from the College of William & Mary and an M.S. from Penn State.

Bo Kasal was named Director of Fraunhofer Institute: Bo Kasal, the former Bernard and Henrietta Hankin Chair of Residential Building Construction and Director of Research at the Pennsylvania Housing Research Center, resigned from his position effective October 2, 2010. He has accepted a position in Germany. He will hold a Professorship at the Carolo-Wilhelmina University of Braunschweig, and was appointed Director of the Fraunhofer Wilhelm-Klauditz Institute.

Andy Scanlon has been appointed as the Hankin Chair, beginning October 3, 2010, for a one-year term. An international search for a new Hankin Chair will be conducted this fall to fill the chair beginning in the fall of 2011, or as soon as possible thereafter.

Brian Wolfgang graduated in May 2010 with a Master of Science degree in Architectural Engineering and is working for former Glunt Fellow, Brennan Glantz as a Staff Engineer for Engineering Projects, Inc. in State College, PA. Using the results from his research, Brian produced three PHRC Builder Briefs, Basement Wall Insulation Strategies: Parts 1, 2, and 3.

Katie Blansett, a former Glunt Fellow has begun working part time on land development-related activities for the PHRC. Currently, Katie is finishing her Ph.D. in Ag & Bio Engineering (research topic: data analysis and modeling of storm water flow and quality in karst watersheds) and teaching the undergraduate course, Sustainable Residential Subdivision Design for the PHRC. She has both an academic and professional background, having worked as a consulting engineer, and is a registered professional civil engineer in PA. Katie is currently working part-time for the PHRC as she develops a strategic plan for PHRC land development activities, and assembles a Land Development Subcommittee of the PHRC Industry Advisory Council. Katie plans to begin working full-time in the spring.
The PHRC updated and expanded several of its existing training programs to create four-day, academy-style programs delivered through the Pennsylvania Construction Codes Academy (PCCA). These programs provide a comprehensive overview of the 2009 International Residential Code (IRC) with separate programs for each building trade, including building, mechanical, plumbing, and electrical. Programs include examples, exercises and case studies designed to illustrate how to achieve code compliance along with best practices for inspectors and plans examiners. The intent is to initiate those with limited or no experience into the realm of the UCC, and specifically the IRC. The following programs are offered twice per year.

**Basic Blueprint Reading** – This introduction to understanding house plans is offered in conjunction with the IRC Building Essentials program described below. The ability to read construction blueprints is a foundational skill in the code enforcement and construction industries. This one-day program is designed to provide an introduction to the fundamentals of blueprint reading. Participants will gain an elementary knowledge of blueprint reading as it relates to residential construction projects; be able to find trade information using blueprints; be able to answer basic construction questions relating to the layout and installation of materials at the job site; be exposed to different types of blueprints from construction, floor framing, roof framing, elevations, HVAC layouts, and electrical; and various construction details.

**Building Essentials** – This program, launched in February 2010, provides a comprehensive overview of Chapters 1-10 of the International Residential Code (IRC). Topics include: administration; building planning; townhouses and two family dwellings; emergency escape and egress; foundation systems; floor systems; deck requirements; wall systems and coverings; wall bracing; roof and ceiling systems; and chimneys and fireplaces.

**Plumbing Essentials** – First taught in May 2010, this program covers Chapters 25-33 of the IRC. Topics include: general plumbing requirements; protection, testing, trenching and workmanship, plumbing fixtures; water supply systems; backflow prevention; water and waste drainage systems; traps and vents; sumps and sub-soil drains; on-lot septic systems and water/sewer laterals; and fire sprinkler systems.

**Mechanical Essentials** – This program had its initial offering in June 2010. It provides a comprehensive overview of Chapters 12-24 of the IRC. Topics include: general requirements; heating and cooling systems; dryer and kitchen exhaust systems; duct sealing and insulation; combustion air; vents and chimney connectors; water heaters and boilers; oil storage; solar systems; radiant floor heating; fuel gas appliances; and fuel gas piping.

**Electrical Essentials** – Debuting in September 2010, this program marked the PHRC’s first major undertaking in the electrical trade. The program covers Chapters 34-43 of the IRC with topics including: general electrical requirements; residential services; branch circuits and feeders; wiring methods; bonding and grounding; power and lighting distribution; devices and luminaires, appliance installation; swimming pools, spas and hot tubs; and power-limited circuits.

For more information or to schedule a program—please contact PCCA at [www.paconstructioncodesacademy.org](http://www.paconstructioncodesacademy.org).
Residential fire sprinkler requirements contained in the IRC went into effect in Pennsylvania for townhouses on January 1, 2010, and for one-and two-family dwellings on January 1, 2011. This PHRC training program will be offered either as a one-day or a two-day program. The two-day program is intended more for residential plan reviewers and inspectors, while the one-day program is geared more toward contractors or other interested parties. Both sessions will help participants to: understand the scope of installation standards NFPA 13R, NFPA 13D and IRC P2904; identify and evaluate residential sprinkler system water supply components; identify and evaluate residential sprinkler system pipe, valves and trim components; identify residential sprinkler system overhead pipe and sprinklers and evaluate the components and design for compliance with either IRC or NFPA 13D; perform hydraulic calculations for compliance with NFPA 13D.

For more information or to schedule a program—please contact Tracy Dorman at tsd5@psu.edu.

Wall Bracing

The interest in this program continues to grow as builders and code officials struggle to implement the new requirement of the 2009 IRC. So far, four programs have been delivered with over 100 people trained. This workshop is designed to provide an overview of the 2009 IRC wall bracing requirements. The program provides a general understanding of structural principals of wood frame buildings as well as wind and seismic loading. The program also provides an emphasis on prescriptive design using the IRC versus when a building is exceeding the limits of this approach requiring a design professional. Determining whether plans are in compliance with IRC wall bracing provisions is also emphasized.

A second day has been added to this program with several exercises that put into practice the lessons learned during the first day of the program. The PHRC will be offering the program as either a one- or two-day program.

For more information or to schedule a program—please contact Tracy Dorman at tsd5@psu.edu.

Advanced Framing

With increased competition between builders and a green building movement that is here to stay, advanced framing provides a means to cut costs while improving energy efficiency and reducing waste. The full title of this program will be, Advanced Framing: Increasing Performance While Reducing Costs. This half-day program will provide an overview of advanced framing techniques, including, framing 24 inches on center, stacked framing with single top plates, two-stud corners, ladder framing at partition wall intersections, let-in bracing and more. The program will discuss potential benefits to builders and homeowners, as well as potential pitfalls to be avoided. Code acceptance of these techniques will also be covered.

Webinars

The PHRC is continuing the popular webinar series. These web-based training programs meet participants’ demand for free interactive training that is available both live and archived for future viewing.

The following are some of the topics that are offered as web-based training:

December 14, 2010 - Understanding Barriers - vapor, air, water resistive, etc.

January 11, 2011 - Wall Bracing Overview (2009 IRC)

March 8, 2011 - Performing inspections using the IECC insulation and air sealing checklist

April 12, 2011 - Sprinkler head selection

May 10, 2011 - Bringing the ducts inside: unvented attics, conditioned basements and crawl spaces, and avoiding exterior walls.
This project, partially funded by the Center for Rural Pennsylvania, provides a clearer picture of the UCC’s impact on Pennsylvania municipalities, builders and developers. The report includes an assessment of which municipalities are enforcing the UCC and how they are enforcing it, as well as an estimate of the average and range of building permit fees. Average fees in rural and urban municipalities were also compared.

The final report entitled, Impact of the Uniform Construction Code in Rural Pennsylvania, was approved by the Center for Rural Pennsylvania on April 15, 2010, and the report was delivered to the legislature September 20, 2010. It is now available on the PHRC website at: http://www.engr.psu.edu/phrc.

For more information contact Mike Turns at 814-863-2366 or mat289@psu.edu.

Land development activities are returning to the PHRC! This fall we wrote a strategic plan that addresses emerging issues in field of land development. The plan outlines both technical and educational approaches in which the PHRC can assist the design and development communities in tackling these issues. A draft of the Strategic Plan was presented to the Operations Committee and the Industry Advisory Council at the October 2010 meetings. We are in the process of forming a Land Development-specific subcommittee of Industrial Advisory Council to review the plan and help guide the direction and set priorities for future projects. The PHRC will begin to implement the plan in the Spring of 2011 with the first meeting of the Land Development subcommittee in March to finalize the draft version of the plan and make project priority recommendations for the April 2011 Industry Advisory Council meeting. Be sure to check the next newsletter for details on the new land development projects!

As part of the implementation of the Land Development Strategic Plan we are bringing back the Land Development Day to the 2011 Conference. Topics to be addressed in this exciting return to the conference include the Chesapeake Bay TMDL and impact of the TMDL on the development community, Chapter 102 updates, operation and maintenance and legal issues related to post construction storm water management, and performance data from actual BMPs. See the newsletter insert or website for more information about the conference.

For information about Land Development at the PHRC or to join the Land Development subcommittee, contact Katie Blansett at 814-863-2990 or kblansett@engr.psu.edu.
Within the past year, eight graduate students were involved in various research projects. A few of these projects are highlighted in the section below.

**Experimental investigation of beam-to-column connections of laminated wood frames under cyclic loadings (Kyle Karschner, Student; Bo Kasal, Advisor)**

This project involves laboratory experiments and research investigating the effectiveness of new beam-to-column moment connections in laminated wood frames. Different connections were tested under cyclic loading because the connections will be used in a three-dimensional space frame subject to seismic loadings. Under seismic loadings these types of frames are subject to cyclic loads in the connection zones and have a cyclic response to the loading. Currently the data is being analyzed to determine maximum moments, rotations, and energy dissipation in the connections. The results will be evaluated to justify the use of laminated wood frame moment connections in medium-rise buildings in seismic areas.

**Experimental and analytical investigation of crack development in composite reinforced laminated arches (Robert Blass, Student; Bo Kasal, Advisor)**

This project is currently investigating the use of glass-fiber composites in arresting crack growth in wood. The objective is to test reinforced and unreinforced laminated arches in a laboratory setting, and compare the effects of the composite reinforcement. An analytical model will serve as a deterministic means of comparison as well. This research is practical as wood is very weak in tension perpendicular to the grain, and reinforcement may provide additional strength where perpendicular stresses cannot be avoided (connections, arches, notched sections). This is exploratory, cutting-edge research that may results in significant improvement in application of laminated wood in medium-rise buildings.

**Reliability Assessment of Roof Sheathing Performance in Light Wood Frame Structures Subjected to Wind Pressure (Maral Amini, Student; Bo Kasal, Advisor)**

Low-rise buildings encompass the majority of the residential structures in the United States. Predominantly, this category of structures is constructed with dimension lumber. Investigations after natural disasters report that during high intensity wind pressures, low-rise buildings with wood-frame construction are at immense risks of damage with the first sign of damage initiated from the roofs. More particularly, surveys have shown that typical roof damages include roof sheathing nail withdrawal and loss of roof sheathing panels due to failure to comply with the required nail spacing. The developed methodology can be used as a tool to evaluate roof-sheathing performance subjected to wind load for a given inventory of low-rise structures or a single structure. The research has applications in risk assessment of residential structures and/or in the insurance industry.

**Fiber Reinforcement of Wood Moment Connections (Emma Leitner, Student; Bo Kasal, Advisor)**

Under seismic loading, wood connections are subjected to moments which are not typically designed for within the constraints of the current standards. The addition of reinforcement to these connections allows for higher strength and better performance of the connections under seismic loading. Following laboratory tests upon small-scale connections, the results are compared to those of a numerical model, developed using the finite element method. The completed numerical model should allow for the prediction of the behavior of connections of differing configurations, eliminating the need for expensive and time-consuming laboratory tests. The optimum connection configuration may also be studied.
## TRAINING SCHEDULE

### Upcoming PHRC/PCCA Training Programs

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<tr>
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<th>Course Title</th>
<th>Location</th>
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<tbody>
<tr>
<td>December 13-16, 2010</td>
<td>Mechanical Academy</td>
<td>PSATS Educational Ctr., Enola, PA</td>
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<tr>
<td>December 14-15, 2010</td>
<td>Wall Bracing</td>
<td>Southeast PA</td>
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<tr>
<td>January 12-13, 2011</td>
<td>Wall Bracing</td>
<td>South Central PA</td>
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<td>January 19, 2011</td>
<td>Mechanical Compliance</td>
<td>Northeast PA</td>
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<td>February 1, 2011</td>
<td>Mechanical Compliance</td>
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<td>February 14, 2011</td>
<td>Blueprint Reading</td>
<td>PSATS Educational Ctr., Enola, PA</td>
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<tr>
<td>February 15-18, 2011</td>
<td>Residential Building Academy</td>
<td>PSATS Educational Ctr., Enola, PA</td>
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<tr>
<td>March 1-2, 2011</td>
<td>Wall Bracing Program</td>
<td>Lehigh Valley</td>
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<td>March 15, 2011</td>
<td>Decks</td>
<td>Northeast PA</td>
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<tr>
<td>March 22-25, 2011</td>
<td>Electrical Academy</td>
<td>PSATS Educational Ctr., Enola, PA</td>
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<tr>
<td>April 5-6, 2011</td>
<td>Residential Energy Academy</td>
<td>PSATS Educational Ctr., Enola, PA</td>
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<tr>
<td>April 28, 2011</td>
<td>Multi-Family</td>
<td>Southeast PA</td>
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<tr>
<td>May 4, 2011</td>
<td>Residential Decks</td>
<td>South Central PA</td>
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<td>May 17-20, 2011</td>
<td>Plumbing Academy</td>
<td>PSATS Educational Ctr., Enola, PA</td>
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<td>May 24, 2011</td>
<td>Multi-Family</td>
<td>South Central PA</td>
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<tr>
<td>June 7-10, 2011</td>
<td>Mechanical Academy</td>
<td>PSATS Educational Ctr., Enola, PA</td>
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For more information visit: [www.paconstructioncodesacademy.org](http://www.paconstructioncodesacademy.org)

### Additional PHRC Training Programs

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<th>Date</th>
<th>Course Title</th>
<th>Location</th>
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<tbody>
<tr>
<td>February 24, 2011</td>
<td>Residential Fire Sprinklers</td>
<td>York, PA</td>
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<tr>
<td>February 24, 2011</td>
<td>Solar Electric System Installation and Inspection</td>
<td>York, PA</td>
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<tr>
<td>February 24, 2011</td>
<td>Building Energy Efficient New Homes (and Getting Paid To Do It)</td>
<td>York, PA</td>
</tr>
<tr>
<td>February 24, 2011</td>
<td>Advanced Framing: Reducing Costs and Improving Energy Performance</td>
<td>York, PA</td>
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To register visit: [www.engr.psu.edu/phrc](http://www.engr.psu.edu/phrc)
Leadership

BIA of Lancaster
Builders Association of Northwestern PA
Cannon Simply Beautiful
CertainTeed Corporation
City of Philadelphia
CMX
Curtis E. Schneck, Inc.
Department of Community and Economic Development
Dow Chemical Company
DuPont Building Innovations
Electra-Save, Inc.
Glunt Development Co., Inc.
Governor’s Center for Local Government Service
Hankin Group
Harmony Home Builders
iLevel by Weyerhaeuser
J.E. Greishober Plumbing Hydronics
JHW C/M Consultant
JRG Advisors
Kreitzer Construction
Laskey Properties
Lebanon County Builders Association
Liberty Homes Custom Builders
Modular Building Systems Association
PA Department of Community & Economic Development
PA Manufactured Housing Association
PennBOC
Pennsylvania Association of Bldg. Code Officials
Pennsylvania Builders Association
Pennsylvania College of Technology
Sota Construction Services, Inc.
Start-Living Homes
Target Homes
Tepes Construction Company, Inc.
The Housing Alliance of Pennsylvania
Tri-County COG-IBC Inspector
Upper Darby Township

Supporting

BA of Central PA
Central Susquehanna Builders Assoc.
City of Uniontown
Comfort Home Corporation
Commonwealth Code Inspection Service
Indiana-Armstrong Builders Association
Lackawanna HBA
Muncy Homes, Inc.
Pennsylvania Concrete Masonry Association
Pennsylvania Housing Finance Agency
Pulte Homes Corporation
S&A Homes
West Penn Power Sustainable Energy
York County Builders Association

Patron

Adams Township
Alan Hawman Architect
Avignon Homes, Inc.
Benchmark Civil Engineering
Benjamin Olsdyke Inc.
BIA of Northeastern PA
Borough of Fox Chapel
Borough of Frackville
Bozutto Development Co.
Bursch Associates, Inc.
Cedar Knoll Builders
Coealio Properties Inc.
Columbus Property Management & Dev., Inc.
CZOP/Specter, Inc.
DeLuca Homes
Design Build by Robert P. Baney, LLC
E&M Engineers and Surveyors, P.C.
East Petersburg Borough
Engineering Projects Incorporated
Fine Line Homes, Inc.
Franklin County Builders Association
GAI Consultants
Gluszko Architects, P.C.
Greater Dubois Area Builders Association

Not a member?
Join the PHRC today!

Name
Address
Phone

Method of Payment:
☐ Check

Total: 

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Corporate or Trade Associations:
- Leadership $2,500
- Supporting $1,000
- Patron $500

Local Associations:
- Leadership $1,000
- Supporting $500
- Patron $250

Individuals:
- Leadership $500
- Supporting $250
- Patron $100

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Gutters Insulation & More
Independent Quality Alliance
Jack Gaughon ERA
James Wentling/Architect
Jenkintown Associates
Joy Beck Custom Builders, Inc.
Kuhns Bros. Log Homes, Inc.
Lancaster County Code Association
Lobar Properties
Local 95 Training Fund
Lower Swatara Township
LTS Builders, LLC
McGann Associates
Mesa Wood, Ltd.
Morrisey Holdings, L.P.
NHR Real Estate Services
Nittany Homes
Old Lycoming Township
Paul Kearney Inspections
Paul Macht Architects, LLC
Penn Terra Engineering, Inc.
Perry L. Cisney Custom Builder
Peter Joseph Brown
Peters Township
Projects in Progress
Pure Energy
Queen Engineering
Redevelopment Authority of Washington Co.
Residential Technology Services
Rettew Associates, Inc.
Richmond Township
River Rock Creative Group
Riverview Homes, Inc.
Schumacher Homes Greensburg
Sleighter Engineering, Inc.
Somerset County Builders Association
Sparkle Construction-SPP, Inc.
Sweatland Engineering & Assoc., Inc.
T&T Realty Acquisition Associates
Thomas Cornitta Associates, Inc.
Thomas J. Wasilowski A. LA. Architects
Tim Myers Contracting
UpStreet Architects, Inc.
Vertex Mechanical Inc.
Wagner Construction
Watkins Architect, Ltd.
Wayne County Builders Association
Weaver Precast, Inc.
Whitehall Township
Woodloch Builders, Inc.
### Upcoming Meetings

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<th>Date</th>
<th>Event</th>
<th>Time</th>
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<tbody>
<tr>
<td>February 23, 2011</td>
<td>PA Housing and Land Development Conference Day 1 – York</td>
<td>8:30 – 4:30 p.m.</td>
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<tr>
<td>February 23, 2011</td>
<td>PHRC Leadership Reception - York</td>
<td>6:00 – 9:00 p.m.</td>
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<tr>
<td>February 24, 2011</td>
<td>PA Housing and Land Development Conference Day 2 – York</td>
<td>8:30 – 4:30 p.m.</td>
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<tr>
<td>April 13, 2011</td>
<td>Operations Committee Meeting – State College</td>
<td>6:00 – 9:00 p.m.</td>
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<tr>
<td>April 14, 2011</td>
<td>Industry Advisory Council Meeting – State College</td>
<td>9:30 – 2:00 p.m.</td>
</tr>
<tr>
<td>October 5, 2011</td>
<td>Operations Committee Meeting – Harrisburg</td>
<td>6:00 – 9:00 p.m.</td>
</tr>
<tr>
<td>October 6, 2011</td>
<td>Industry Advisory Council – Harrisburg</td>
<td>9:30 – 2:00 p.m.</td>
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For additional details on training programs, visit [www.engr.psu.edu/phrc](http://www.engr.psu.edu/phrc)