Greetings from the entire Pennsylvania Housing Research Center team! And Happy birthday, PHRC! This year marks the 30th year of operation for the PHRC with no signs of slowing down. To say that the PHRC has been busy over the past year would be a bit of an understatement. Starting in the fall of 2017 and running into the summer of 2018, our team has been enveloped in activities ranging from the 26th PHRC Housing Conference, 4th RBDCC, NAHB and DOE Race to Zero student competitions, teaching all across the Commonwealth, and of course, the October 1 code update. This magazine, formerly referred to as our newsletter, outlines some of the critical outcomes of our activities over the past year. It also looks ahead to the full slate of activities coming up in 2018 and 2019, including code-related training.

While summer is usually a time to catch up on program development and reporting, summer 2018 has been one of the busiest to date for the PHRC team. As you are aware, Pennsylvania has adopted the majority of code provisions contained in the 2015 International Code Council (ICC) Model Codes. These new code provisions take effect on October 1, 2018. Transitioning from the base 2009 codes to the 2015 versions means there will be a significant amount of changes in the enforceable code. This scale of code update has not been experienced since the early days of the PA Uniform Construction Code (PA UCC). Our team has been busy at work producing new training content and updating our menu of existing training programs. We are positioning the PHRC as the go-to resource as builders, contractors, and design professionals gear up for these changes.

On top of code update training, the PHRC team is also deep into the planning for the 27th PHRC Housing Conference. This event will be hosted on March 13-14, 2019 at the Penn Stater Hotel & Conference Center in State College. Once we reach this conference, the Commonwealth will be more than five months into the new residential code changes. We anticipate that this event will be a great opportunity to take a step back and look at what is working, what questions still need answers, and where do we go next. This two-day event will feature engaging speakers and timely content. More information will become available throughout the fall with early bird registration opening on December 3, 2018.

Save the date—March 13-14, 2019!

Finally, I wanted to take a moment to thank the individuals and companies that support the PHRC, including PHRC members, Industry Advisory Council members, the Hankin Family, and Penn State’s Department of Civil & Environmental Engineering and College of Engineering. We look forward to a productive year ahead!
SAVE THE DATE | The 27th Annual PHRC Housing Conference highlights best practices, regulation, research, and innovation in the residential construction industry.

- Early Bird Registration opens December 3, 2018
- Standard Registration opens January 14, 2019
- PHRC & PBA Members receive a registration discount
- Continuing education available for all sessions

MARCH 13—14, 2019 | THE PENN STATER HOTEL & CONFERENCE CENTER

This two-day event with multiple tracks such as codes, design application, construction management, land development, etc. provides information and updates on issues of interest to the residential construction industry. Invited speakers present on a wide-range of topics about regulation and best practices in the industry. Topics may include blower doors, air sealing best practices, the 2018 Pennsylvania Alternative Residential Energy Provisions, ventilation best practices, a UCC Q&A, and more!

“I am a better builder for having attended these conferences. My clients enjoy a home that not only looks great but is comfortable, cozy, safe, healthy, durable, and saves money. Less money spent on utilities and maintenance leaves more resources for the important features families most desire. My customers trust that I stay up to date on the latest home building technologies, PHRC helps me earn that trust.”

- John Holahan, president of Liberty Homes Custom Builders

“This was my first time attending [in 2018], and I was very impressed by the entire conference. The staff, venue, educational tracts, and food were first rate. I plan to make this an annual must do.”

- Robert De Vries, technical services manager of Nu-Wool

“One of the best run conferences I have ever attended either as an attendee or an exhibitor. I look forward to next year.”

- Reid Rowlands, partner of World Class Supply

2018 PENNSYLVANIA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS

The development of the 2018 Pennsylvania Alternative Residential Energy Provisions (PA-Alt) was led by the PHRC with guidance from a subcommittee of the PHRC Industry Advisory Council. Under the guidance of the PA Department of Labor and Industry, the PA-Alt was developed with the intent of being simpler to build to and easier to enforce; more rational and flexible; focused on Pennsylvania in terms of climatic and other conditions; and equivalent to the provisions of the IECC. It is important to note that a choice needs to be made by the builder or design professional between the 2018 PA-Alt, the 2015 IRC, and the 2015 IECC.

DOWNLOAD THE PA-ALT

and PDH continuing education credit for a $20 certificate. Past webinars are available to view on our website under "Industry.”

JOIN WEBINARS
phrc.psu.edu/Industry-Education/Webinar-Index.aspx

WEBINAR SCHEDULE | 2018-2019

Tune in every 2nd Tuesday of the month from 1:00-2:00 p.m. for free webinars! Live webinars are approved for AIA, ICC, L&I, NARI, and PDH continuing education credit for a $20 certificate. Past webinars are available to view on our website under “Industry.”

AUGUST 14
PA RESIDENTIAL CODE UPDATE OVERVIEW
New code provisions will take effect on October 1, 2018. Transitioning from the base 2009 codes to the 2015 versions means there will be a significant amount of changes in the enforceable code. While some of these changes are mostly administrative, some of them may warrant changes in building practices and design techniques and will have an impact on home performance, occupant safety, and affordability.

AUGUST 28
RESIDENTIAL ENERGY CODE UPDATE
This session will provide an overview of the changes to the energy-related provisions in the UCC that will become enforceable on October 1, 2018 as well as the overall impact on home performance and energy efficiency. There are significant differences between the current 2009 base energy code and the 2015 IRC Chapter 11 and the residential portion of the 2015 IECC.

SEPTEMBER 11
WHOLE HOUSE MECHANICAL VENTILATION
We will review the prescriptive requirements for mechanical ventilation, why mechanical ventilation is important, and some potential solutions for achieving this requirement.

SEPTEMBER 25
BLOWER DOORS FOR BUILDERS
Beyond visual inspection, Section R402.4.1.2 of the 2015 IECC requires testing and verification of the building’s air leakage rate to meet the mandatory 5 air changes per hour at 50 Pascals (5 ACH50) or less. Builders must have a third party approved by their local code jurisdiction complete a blower door test and submit the air leakage results. We will provide an overview of the general logistics of completing a blower door test for typical residential construction projects to assist builders in scheduling and planning for this mandatory requirement.

OCTOBER 9
PA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS (PA-ALT) UPDATE
With the adoption of the majority of code provisions contained in the 2015 ICC Model Codes, the PA-Alt was required to be updated, and we will review this update. It was developed with the intent of being simpler to build and easier to enforce; more rational and flexible; focused on Pennsylvania in terms of climatic and other conditions; and equivalent to the provisions of the IECC in terms of energy efficiency.

NOVEMBER 13
AIR SEALING FOR 5 ACH50
We will look at areas of concern for air leakage and review several techniques to potentially seal those areas. Pennsylvania’s prescriptive air leakage requirements have recently been changed from 7 ACH50 to 5 ACH50. Builders may have to modify their air sealing package to comply with the prescriptive air infiltration requirements.

DECEMBER 11
HERS AND THE ERI PATH
Through the Energy Rating Index (ERI) path on October 1, 2018, builders have the option of a new energy code compliance path under the PA UCC. This compliance option allows builders to utilize a HERS (Home Energy Rating System) score to demonstrate compliance with the enforceable energy code.

JANUARY 8
SOLAR PV IN PA: INTRO TO THE DESIGN OF NEW CONSTRUCTION AND RETROFIT RESIDENTIAL SYSTEMS
Building off our Energy Auditing 101 webinar in January 2018, we will provide an overview of how to design new construction and retrofit solar photovoltaic systems for Pennsylvania homes. This will include how to assess anticipated or actual home energy usage to evaluate sizing needs, how to conduct a solar site assessment for roof- or ground-mount applications, how to use tools like PV Watts for anticipated system output for grid-tied and off-grid systems, and how to place roof-mounted solar photovoltaic panels to comply with 2015 IRC 605.11 requirements.

FEBRUARY 12
FORCED AIR HVAC SYSTEMS: IT’S MORE THAN JUST HOT AIR
The design of an HVAC forced air system goes beyond just heat calculations. We will look at forced air distribution systems from the air handler to diffusion grill. We will discuss efficient use of duct work and understanding why choosing the correct diffuser is important to the distribution of conditioned air into a space.

MARCH 13-14
PHRC HOUSING CONFERENCE
No webinar in March due to conference.

APRIL 9
MANUFACTURED STONE VENEER: STICKING TO THE BASICS
We will take a closer look at the basics of wall performance and apply these concepts to manufactured stone veneer. Although aesthetics and cost tend to dominate the conversation, cladding performance in relation to moisture and durability should also be considered. While the challenges associated with exterior plaster in the form of stucco have been well documented, the conversation has not extended much toward manufactured stone veneer.

MAY 14
INTRO TO THE PASSIVE HOUSE STANDARD FOR THE PA RESIDENTIAL CONSTRUCTION INDUSTRY
This webinar will provide an introduction of this standard, including an overview of the international Passive House standard (PHI) and the Passive House Institute of the US (PHIUS) standard, the design principles behind each of them, and details on Pennsylvania case studies built to these standards. It will also include an overview of the certification process for the homes, as well as Passive House designers, builders, raters, and verifiers.
AVAILABLE WORKSHOPS

The PHRC annually offers various training workshops typically through the PA Construction Codes Academy (PCCA). Continuing education credits are awarded based upon the topic. If interested in offering a workshop, contact Tracy, tdorman@engr.psu.edu.

REGISTER FOR WORKSHOPS
phrc.psu.edu/Industry-Education/Workshop-Index.aspx

SEPTEMBER 12, 2018
IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE
Woodlands Inn in Wilkes-Barre, Luzerne County
This course will help prepare attendees for the 2015 IRC and will discuss the amendments specific to PA based on the results of the PA UCC Review & Advisory Council recommendations.

SEPTEMBER 13, 2018
IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE
Best Western in Bethlehem, Lehigh County

SEPTEMBER 26, 2018
IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE
Clarion Hotel in Exton, Chester County

SEPTEMBER 27, 2018
IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE
Clarion Hotel in New Cumberland, York County

OCTOBER 3, 2018
IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE
Holiday Inn in Williamsport, Lycoming County

OCTOBER 4, 2018
IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE
Holiday Inn Express in Meadville, Crawford County

SEPTEMBER 2018
RESIDENTIAL BUILDING ACADEMY
Clarion Hotel in New Cumberland, York County
This four-day program is a comprehensive review of the 2015 IRC, chapters 1-10. It includes examples, exercises, and case studies designed to illustrate daily practices performed by a Residential Building Inspector or Plans Examiner.

OCTOBER 2018
RESIDENTIAL PLUMBING ACADEMY
Clarion Hotel in New Cumberland, York County
This four-day program is a comprehensive review of the 2015 IRC Chapters 25-33. It includes examples, exercises, and case studies designed to illustrate daily practices performed by a Residential Plumbing Inspector or Plans Examiner.

OCTOBER 2018
RESIDENTIAL MECHANICAL ACADEMY
Clarion Hotel in New Cumberland, York County
This four-day program is a comprehensive review of the 2015 IRC Chapters 12-24. It includes examples, exercises, and case studies designed to illustrate daily practices performed by a Residential Mechanical Inspector or Plans Examiner.

OCTOBER 2018
RESIDENTIAL ENERGY ACADEMY
Clarion Hotel in New Cumberland, York County
This two-day program is a comprehensive review of the residential portion of Chapters 1-4 of the 2015 International Energy Conservation Code (IECC). It includes examples, exercises, and case studies designed to illustrate daily practices performed by a Residential Energy Inspector or Plans Examiner.

APRIL 2019
PCCA SYMPOSIA: EAST
Crowne Plaza in King of Prussia, Montgomery County

APRIL 2019
PCCA SYMPOSIA: WEST
Doubletree Hotel in Monroeville, Allegheny County

APRIL 2019
IECC 101: INTERNATIONAL ENERGY CONSERVATION CODE ESSENTIALS
Clarion Hotel in New Cumberland, York County
This two-day course provides a comprehensive overview of the commercial building provisions of the 2015 IECC. Practice exams are included at the end of each day to help attendees retain information and prepare to take the Commercial Energy Inspector or Commercial Energy Plans Examiner test.

APRIL 2019
PCCA SYMPOSIA: WEST
Doubletree Hotel in Monroeville, Allegheny County

MARCH 2019
PCCA SYMPOSIA: CENTRAL
The Penn Stater Hotel in State College, Centre County

MARCH 2019
PCCA SYMPOSIA: EAST
Crowne Plaza in King of Prussia, Montgomery County

MARCH 2019
PCCA SYMPOSIA: WEST
Doubletree Hotel in Monroeville, Allegheny County

MARCH 2019
RESIDENTIAL ELECTRICAL ACADEMY
Clarion Hotel in New Cumberland, York County
Join the PHRC as a member today! PHRC Membership Fees support the outreach activities of the PHRC, Penn State students involved in the NAHB Student Chapter, graduate students conducting research with the PHRC, and more.

**PLATINUM**  $5,000
**GOLD**  $2,000
**SILVER**  $1,000
**BRONZE**  $500
**ASSOCIATION**  $150
**INDIVIDUAL**  $100

AS A PHRC MEMBER, YOUR BENEFITS INCLUDE...

- Additional speaking engagement
- Annual conference discounts
- Workshop discounts
- Advertising in annual magazine, conference program, and on PHRC website

Benefits vary between Membership Levels

CONTACT TRACY, TDORMAN@ENGR.PSU.EDU, 814-865-2341, TO BECOME A PHRC MEMBER

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2018 MEMBERS

**GOLD**

DOW Building Solutions

Hankin Group

**SILVER**

PA Concrete Masonry Association
PA Housing Finance Agency
PA Manufactured Housing Association
S&A Homes

**BRONZE**

The Duck Harbor Company
Liberty Homes Custom Builders
Susanton Building Companies
Upstreet Architects, Inc.

**ASSOCIATION**

BIA of Lancaster County
BIA of Philadelphia
Blair- Bedford Builders Association
Builders Association of Central PA
Builders Association of Metro Pittsburgh
Builders Association of Northwest PA
Carbon Builders Association
HBA of Chester and Delaware Counties
HBA of Metro Harrisburg
Indiana-Armstrong Builders Association
Lebanon County Builders Association
Moon Township

Pocono Builders Association
Somerset County Builders Association
Township of Adams
Tri-County Builders Association
Wayne Pike BIA
West Branch Susquehanna Builders Association
Willistown Township
York Builders Association

**INDIVIDUAL**

Steve Balkey
John Brooks
Thomas Crean
Lee Golanski
Mark Grassi
Alan Hawman
Dean Hilliard
Richard Hotchkiss
Pete Houtz
Jon Hudak
Jon Kautz
Anthony Lawrence
Clem Malot
Thomas McCosby
Tim Palaski
Roy Pedersen
Bob Price
Lee Rackus
Hershel Ruhmel
Todd Smeigh
Tommy Songer
Frank Thompson
THE GLOBAL TRENDS SHAPING AMERICA’S FUTURE HOMEBUILDING | CARLOS MARTÍN

The demand for housing in the United States remains strong—and in some cases, the lack of housing has reached crisis proportions. Numerous factors shape the industry’s inability to supply that housing. Some of these factors also have far-reaching consequences beyond the industry and, in turn, are shaped by much broader social and economic change. Just in 2017 alone, national policies and global commerce have shaped the pace of homebuilding and the qualities of the homes that the industry produces. The 2018 Hankin Distinguished Lecture will focus on supply-side challenges that have seen particular turmoil in the past year, including labor markets and skills; material prices and availability; technological innovation; building and business regulations; and industry composition and firm capacity.

The Hankin Distinguished Lecture Series invites world-class speakers to Penn State to address students, faculty, staff, and industry professionals. The lecture is free and open to the public with a reception to follow. The lecture series was established in 2006 in honor of the late Bernard Hankin and his family for their continuous and dedicated support of the Residential Construction program at Penn State.

WEDNESDAY, NOVEMBER 7, 2018 @ 4:00 p.m. | HUB AUDITORIUM

HANKIN CHAIR UPDATE

Another highly successful year for our residential construction education and research program and PHRC outreach activities, thanks to the dedication of our PHRC staff, undergraduate and graduate students, sponsors of our program, and all those who help and support us in one way or another!

With an expanding education program offering multiple courses related to residential construction, an increasing number of students are enrolling in our Residential Construction minor, with 21 students who have been awarded it already. Our Residential Construction research program identifies some of the most important and timely issues of research need relevant to housing and residential construction. Currently, we have active research related to the retrofit of existing homes to passive house standards, development of infrared thermography approach to determine thermal resistance properties of building envelope systems, evaluation and retrofit design of existing homes for combined hurricane wind and flood effects, and application of 3D printing technology to concrete construction, including housing. Our students proudly took first place in two competitions this year. One student team brought the National Champion trophy back to Penn State by placing 1st out of 34 teams in the NAHB Student Competition during the International Builders Show. Another student team won first place in the Suburban Single-Family Housing Contest of the U.S. Department of Energy’s Race to Zero Student Design Competition. Besides students’ high level of effort, enthusiasm, and innovation to work on these two competitions, another factor for their impressive wins has been the dedication of our coaches, Brian Wolfgang and Chris Hine for the NAHB Student Competition and Sarah Klinetob Lowe and Chris Hazel for the Race to Zero team.

Our Hankin Distinguished Lecture was a highlight of the year, thanks to our speaker Peter Gluck, an architect, who is the founder and principal of GLUCK+, for his very interesting presentation on November 8, 2017 titled, “It’s all about context.” You can view his lecture online.

We are pleased with the outcome of the Inaugural PHRC Residential Construction Career Fair to support recruitment of students into the housing industry. This event created the opportunity for the leading industry professionals to meet some of the best and brightest students with an interest in the residential sector. Moving forward, the event will occur annually in November during the week of the Hankin Distinguished Lecture and NAHB Student Chapter Awards Banquet.

As a part of our outreach activities, PHRC organized and hosted the 26th Annual Housing Conference, which is one of the well-established trademarks of the program. The Residential Building Design and Construction (RBDC) Conference, continues to grow nationally and internationally. The 4th RBDC Conference with 109 abstracts submitted shows more than a 100 percent increase compared with abstracts submitted to the 3rd conference. About 50 papers were submitted for inclusion in the proceedings. This event brought researchers from 13 different countries to share their R&D efforts related to housing and residential construction. Besides the opportunity for exchange of ideas, this expertise forum assisted builders, designers, material manufacturers, and code officials to become more familiar with the latest developments and advancements in this field. The goal and hope continues to be that this conference series will impact the home building industry for improved health, safety, serviceability, sustainability, energy efficiency, resiliency, and cost-effectiveness.
The Penn State student chapter of the National Association of Home Builders (NAHB) won first place in the four-year program category of the NAHB Student Competition on January 10, 2018. Fifty-four teams representing universities, colleges, high schools, and career technical schools across the United States participated in the annual competition at the 2018 NAHB International Builders’ Show in Orlando, Florida. The competition challenges student teams to solve a real-life construction management problem and develop a proposal for a residential subdivision. The provided competition site was a 72-acre tract in Okemos, Michigan, directly outside of Lansing. The Penn State team developed a 96-page proposal for a 114-unit, single-family subdivision that included four different floor plans built to meet the gold rating from the National Green Building Standard. The proposal also included thoroughly vetted market, financial, and risk analyses and a land development plan.

The 2017-18 team presenters included: Giuseppe Ciotti, civil engineering, as the team leader and project manager; Emma Dickson, civil engineering and economics, as the land development specialist; Drew Kreamer, architectural engineering, as the chief architect; Delaney Padgett, civil engineering, as the sustainability specialist; Chris Sukonik, risk management – real estate option, as the sales and marketing specialist; and Emily Weiland, finance and Spanish, as the financial analyst. Additional team members included: Mike Hoysan, civil engineering; Josh Kappel, architectural engineering; Lauren Lesniakowski, architectural engineering; Weiyu Peng, architectural engineering; and Phil Zeffiro, actuarial science.

The student team was coached by staff of the PHRC: Brian Wolfgang, associate director, and Chris Hine, housing and land development specialist. “The success of this year’s team can be attributed to diversity of knowledge and skill sets, veteran leadership, and a determined, collaborative approach. These students are destined to be successful in their future careers,” said Wolfgang.

Team travel support was generously provided by the Toll Brothers IBS Travel Grant, the National Housing Endowment IBS Travel Award, and the University Park Allocation Committee.

The Penn State student team won first place in the Suburban Single-Family Housing Contest of the U.S. Department of Energy Race to Zero Student Design Competition on April 22. One of 40 teams representing 34 institutions and five countries, the Penn State team qualified as finalists to attend the competition at the National Renewable Energy Laboratory in Golden, Colorado on April 20-22, 2018. This year’s competition began with students from 84 teams, representing 68 collegiate institutions across nine countries before the selection of finalists.

Penn State partnered with a regional production builder, S&A Homes, to redesign their most popular single-family detached-home design to meet the Zero Energy Ready Home (ZERH) design standard. Over seven months, the student team periodically met with Bob Shoemaker, tech services construction manager of S&A Homes, to learn about the company’s process of design and construction and to review their competition project with him. In late September, students attended a site visit through an under-construction home at a local development with Tom Jacobs, land manager of S&A Homes, to better understand construction details for their home design. The students’ final ZERH design utilized two of S&A Homes’ top-selling home models to create a new, feasible, high performance home that is accessible and sustainable for home buyers throughout the south and central Pennsylvania regions.

Requiring an interdisciplinary team to produce a successful design, the project team consisted of students from architectural engineering, architecture, civil engineering, energy engineering, and mechanical engineering.

“Working with team members of different disciplines in the way that you would in the industry has made this competition an incredibly valuable experience,” said Carly Asadi, leader of the energy and solar PV analysis subteam.

Support for the competition was generously provided by the West Penn Power Sustainable Energy Fund and Brokloff Endowment for Innovations in the College of Engineering.
2ND ANNUAL RESIDENTIAL CONSTRUCTION CAREER FAIR

We are excited to continue the opportunity for the leading residential construction builders, designers, material manufacturers, code officials, and more to meet some of the best and brightest students with an interest in the residential sector through majors like architectural engineering, architecture, civil engineering, energy engineering, finance, etc. This mix and mingle style event is open to all Penn State students. Companies interested in participating, contact Tracy, tdorman@engr.psu.edu.

WEDNESDAY, NOVEMBER 7, 2018 @ 10:00 a.m. - 1:00 p.m. | HERITAGE HALL, HUB

Thank you to Berks Homes for sponsoring the new Student Lounge!

Attending companies include Benjamin Obdyke, Berks Homes, D.R. Horton, Inc., Lezzer Lumber, NVR, Toll Brothers, and more. Join these companies, and register today!

REGISTER | www.cvent.com/d/7gq5lf

The PHRC serves the home building industry and the residents of Pennsylvania by improving the quality and affordability of housing. We conduct applied research, foster the development and commercialization of innovative technologies, and transfer appropriate technologies to the housing community.

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