

PENNSYLVANIA HOUSING RESEARCH CENTER MAGAZINE

PHRC.PSU.EDU



FALL 2019

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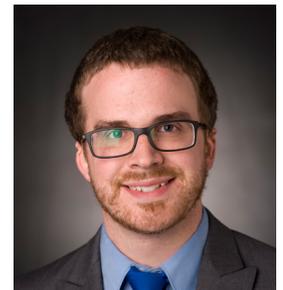
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PHRC LOOKS FORWARD TO 2020

From the entire team at the Pennsylvania Housing Research Center, we hope 2019 has been a safe and successful year so far. The past 18 months have been intense yet rewarding for our staff as we have been on the road training professionals in the residential construction industry across Pennsylvania. Over the past year alone, we have provided training to more than 4,800 individuals at over 95 different events. The level of interest in professional development is sky-high, which is a fantastic sign for residential construction in the Commonwealth. Also, we continue our focus on empowering the next generation of residential construction industry leaders by speaking in schools, giving laboratory tours, and attending events like PA Build My Future at Penn College.



Brian Wolfgang, associate director



PHRC staff exhibiting at PA Build My Future at Penn College

While the pace for our team has returned to normal, our support of the industry in adapting to industry challenges and code updates continues onward. Are you a builder who is still evaluating mechanical ventilation options to both meet code and provide a healthy environment for your clients? Are you a contractor who struggles to sift through the multitude of moisture management products and strategies on the market? Are you a code official that gets peppered with questions about blower door testing? The PHRC can help!

Over the next year, the PHRC will be rolling out a mix of traditional and new, innovative programs to try to address many of these ongoing needs. This magazine outlines some of these initiatives, including in-person workshops hosted by the PHRC and PCCA; new on-demand webinar content that will be eligible for continuing education; and the PHRC Conference Week featuring the 28th Annual PHRC Housing Conference and the 2020 Residential Building Design and Construction Conference (RBDCC).

If you've been a long-time supporter of the PHRC, we value your ongoing dedication to our mission to better our industry. If you're new to the PHRC, welcome! We're confident that you will find it worth your time to attend some of our events or read through our publications. We look forward to continuing to serve the residential construction industry in Pennsylvania and beyond!



PHRC staff presenting to the Building Industry Association of Philadelphia

PHRC CONFERENCE WEEK

PHRC HOUSING CONFERENCE

SAVE THE DATE | The 28th Annual PHRC Housing Conference highlights best practices, regulation, and innovation in the housing industry.

- Early Bird Registration opens in October 2019.
- Hotel discount with code, *PHRC20A*, through February 1.
- PHRC and PBA Members, code officials, nonprofits, and students receive a registration discount.
- Continuing education available for sessions.

MARCH 4-5, 2020 | THE PENN STATER



TOPICS & TESTIMONIALS

Invited speakers present on a wide-range of topics about regulation and best practices in the industry. Sessions will focus on high performance housing, construction, codes, land development, and more. Confirmed topics include:

High-performance homes
Panelized construction
Manufactured homes

Modular homes
PA Uniform Construction Code
Innovative technologies

"The PHRC staff are knowledgeable, passionate, and engaging. Their conferences are a great opportunity to catch up with the newest code updates while networking with others in the industry. Highly recommended!"

- Brian Hillard

"I have been attending the PHRC Housing Conference for many years. Each year it gets better, more engaging, and more informative. It is a 'must attend' education conference and well worth the travel, time, and cost! The continuing education credits are greatly appreciated!"

- Amy Martino



SPONSORSHIP OPPORTUNITIES FOR PHRC

SPONSORSHIP LEVELS

- Lunch (*plus Exhibitor and Advertiser benefits*): two available
- Exhibitor (*plus Advertiser benefits*): 20 available*
- Advertiser

**Limited, nonprofit Exhibitor rates available*

LUNCH | \$1,500—only two available!

- All Exhibitor and Advertiser benefits PLUS ...
- Exclusive lunch naming rights for Wednesday or Thursday
- Your company name and logo on all lunch tables
- One additional full, two-day PHRC Housing Conference registration OR \$400 off one full, three-day RBDCC registration

2 TO SPONSOR, CONTACT RACHEL, RJF5092@PSU.EDU, LIMITED SPACE!

2020 RESIDENTIAL BUILDING DESIGN & CONSTRUCTION CONFERENCE (RBDCC)

The 2020 RBDCC is a paper submission-based research conference that provides a forum for researchers, architects, engineers, other design professionals, product manufacturers, builders, developers, and code officials to discuss challenges to sustainable, energy efficient, healthy, environmentally friendly, natural hazard resistant, and affordable residential construction, and share recent research findings, state-of-the-art technologies, and innovative projects and approaches in the field. The RBDCC has been held in 2013, 2014, 2016, and 2018.

- Three nights of networking opportunities included in three-day registration!
- Early Bird Registration opens in October 2019. Presenters must be registered prior to January 13, 2020.
- Hotel discount with code, RBDC20A, through February 1. Free parking and shuttles to the airport available.

MARCH 4-6, 2020 | THE PENN STATER

KEYNOTE SPEAKERS

David O. Prevatt, Ph.D., P.E., F.A.S.C.E.

Associate Professor of Civil & Coastal Engineering, Associate Director NSF - NHERI Experimental Facility, University of Florida
Wind Hazard Resilient Residential Communities — When Engineering Isn't Enough

Lois B. Arena, P.E.

Director, Passive House Services, Steven Winter Associates, Inc.
Passive House: A Proven Path Toward Resilient, Affordable, and Energy Efficient Housing

PAPERS + PRESENTATION TOPICS

The only conference in the United States of its kind, the RBDCC is the premier research conference for the residential construction industry. Around 140 abstracts from nine different countries have been submitted. Topics represented include:

Disaster Resilient Design
Building Envelope
Passive House Design
Prefabrication and Modular Construction
3D Printing of Residential Buildings
Innovations in Design and Delivery
Affordable High Performance Housing

Building Information Modeling (BIM)
Aging-in-Place and Senior Housing
Advances in Construction Quality
Deep Energy Retrofits
HVAC and Electrical Systems
Education in Residential Construction and Building Science
Building Information Modeling

CONFERENCE WEEK | MARCH 2020

EXHIBITOR | \$800

- All Advertiser benefits PLUS ...
- 6' table display at Happy Hour on the Exhibit Floor (2.5 hour event)
- One full, two-day PHRC Housing Conference registration OR \$400 off one full, three-day RBDCC registration
- Two passes to Happy Hour on the Exhibit Floor
- Company logo placed on PHRC website

ADVERTISER | \$300

- Verbal recognition during Opening Remarks
- Company name placed on PHRC website
- Company name, logo, and website published in conference programs

**DON'T FORGET YOUR
PHRC MEMBER DISCOUNT!**

BECOME A MEMBER

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, and more.

PLATINUM	\$5,000
GOLD	\$2,000
SILVER	\$1,000
BRONZE	\$500
ASSOCIATION	\$200
INDIVIDUAL	\$125

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, TSD5@PSU.EDU, 814-865-2341, TO BECOME A 2020 PHRC MEMBER

2019 MEMBERS

GOLD



DuPont



Hankin Group

SILVER

PA Concrete Masonry Association

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

BRONZE

Ai Restoration
The Duck Harbor Company
Liberty Homes Custom Builders
Parksite
Simpson Strong-Tie
Sukonik Building Companies
The Torron Group
Upstreet Architects, Inc.

ASSOCIATION

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

NARI DelChester
PA Municipal Code Alliance
Pocono Builders Association
Township of Adams
Wayne Pike BIA
West Branch Susquehanna Builders Association
Westmoreland Professional Builders Association
York Builders Association

INDIVIDUAL

Thomas Crean
Mark Grassi
Alan Hawman
Dean Hilliard
Richard Hotchkiss
John Hudak
Jon Kautz
Gary Lenker
Thomas McCosby
Timothy Palaski
Roy Pedersen
Joe Peterson
Justin Parry
Todd Smeigh
Frank Thompson
Ed Tiernan
Michael Weida
Joseph Young

WEBINAR SCHEDULE | 2019-2020

Tune in every second 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."

JOIN WEBINARS

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



SEPTEMBER 10

REDUCING THERMAL BRIDGING WITH CONTINUOUS EXTERIOR INSULATION

The desire to build more efficient buildings along with current energy codes has driven the construction industry toward new and modified construction practices over the past two decades. As buildings have become more efficient, the strategies for reducing energy consumption have become more detailed and increasingly complex. This webinar will take a look at how much of an effect thermal bridging has on energy efficiency, and then review how Chapter 11 in the 2015 IRC prescriptively requires the installation of continuous insulation in climate zone 6. We will conclude by taking a look into installation details along with specific code requirements for compliance.

OCTOBER 8

WALL BRACING IN THE UNIFORM CONSTRUCTION CODE (UCC)

Act 1 of 2011 changed many things for the PA UCC, including that "the wall bracing requirements of sections R602.10 through R602.11.3 of the 2006 International Residential Code shall be part of the Uniform Construction Code." Many builders have questions regarding the relationship between 2006 requirements and the provisions in the 2015 IRC, including the revised wind speed requirements. We will revisit some of the core 2006 wall bracing provisions and discuss the role of these requirements in the current PA UCC.

NOVEMBER 12

PENNSYLVANIA'S MS4 PROGRAM AND ITS IMPACT ON DEVELOPMENT

Stormwater flowing through separate storm sewer systems is untreated prior to being discharged to surface waters, which means that pollutants like sediment, chemicals, oils, and pet waste that interact with stormwater are carried right to our waterways. Consequently, Pennsylvania's Municipal Separate Storm Sewer (MS4) program requires municipalities within urbanized areas having separate storm sewer

systems to obtain a permit to discharge stormwater into local streams and rivers with the goal of improving water quality. This webinar will discuss stormwater issues in Pennsylvania and MS4 permit requirements with a focus on portions of the Stormwater Management Programs that are likely to affect development.

DECEMBER 10

HIGH PERFORMANCE WALLS IN PENNSYLVANIA

A primary area to influence the energy performance of a home is through a climate zone-appropriate wall system. We will provide an overview of common high-performance, opaque wall systems that can work in Pennsylvania, including walls with continuous exterior insulation and extended plate and beam (EP&B) walls. You will have a better understanding of how to scale up current code-level wall systems to be prepared for future code changes or explore above-code performance standards, such as ENERGY STAR, Zero Energy Ready Home, and Passive House standards.

JANUARY 14

DUCTWORK IN ATTICS, ONE OF THE LAST HOLDOUTS OF INEFFICIENT HOME DESIGN

While energy codes have continued to improve the thermal performance of homes, ductwork located in attics have remained a large source of inefficiency. This session will build off a discussion on the fundamentals of good duct design and consider recent code changes with regards to burying ductwork in attic insulation as an alternative to bringing ductwork into conditioned space. Burying ductwork introduces several performance and durability concerns including the risk of condensation. Several strategies will be discussed along with challenges and solutions.

FEBRUARY 11

BUILDING SCIENCE 101 FOR RESIDENTIAL BUILDINGS

We will break down residential building science by introducing the "house as a system" approach to construction, and

show how each part of a home should work together with all other parts to create an effective and efficient design. When most people hear the term "home performance," energy is what comes to mind. However, there are additional and often more important benefits that result from having a high-performance home. We will cover the diagnostic testing involved that ensures building enclosures and duct systems are correctly installed and sealed. This includes a crash course on blower door and duct leakage testing using calibrated fans and high-precision manometers, including the proper way to set up a house and include items to watch out for before starting a test.

MARCH 4-5

PHRC HOUSING CONFERENCE

No webinar in March due to conference.

APRIL 14

THE DO'S AND DON'TS OF CRAWLSPACE DESIGN AND CONSTRUCTION REVISITED

Starting with the design and looking through the compliance paths listed in Section 408 of the 2015 IRC, we will compile a list of items necessary for the design and construction of a durable crawlspace. We will take a look at some simulated examples of a poorly designed crawlspace and reveal the potential risks of non-compliance. Also, we will look at some above code options to the design and construction of a crawlspace. This will provide a range of options so an informed and educated decision for the design and construction of your next crawlspace can be achieved.

MAY 12

INTRODUCTION TO ENERGY STAR FOR NEW HOMES IN PA

The ENERGY STAR for New Homes program started in 1995 as a way to improve the energy efficiency of homes. This webinar will share insight on how the ENERGY STAR for New Homes program is doing in Pennsylvania and how builders interested in this program can get involved.

AVAILABLE PCCA 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, tsd5@psu.edu.

REGISTER FOR PCCA WORKSHOPS

phrc.psu.edu/Industry-Education/Workshop-Index.aspx

OCTOBER 31, 2019

IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE

Red Lion Hotel, Dauphin County

This workshop 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 and Advisory Council recommendations.

NOVEMBER 11-14, 2019

RA 201: RESIDENTIAL ELECTRICAL ACADEMY

Radisson Camp Hill, Cumberland County

This four-day program is a comprehensive review of the 2015 IRC, chapters 34-43. It includes examples, exercises, and case studies designed to illustrate daily practices performed by a residential electrical inspector or plans examiner.

NOVEMBER 13, 2019

IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE

Hilton Garden Inn Pittsburgh Airport, Allegheny County

DECEMBER 2-5, 2019

RA 101: RESIDENTIAL BUILDING ACADEMY

Radisson Camp Hill, Cumberland County

This four-day program is a comprehensive review of the 2015 International Residential Code (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.

DECEMBER 11, 2019

IRC 101T: INTERNATIONAL RESIDENTIAL CODE UPDATE

Holiday Inn Lansdale, Montgomery County

DECEMBER 17, 2019

RA 102: BASIC BLUEPRINT READING & UNDERSTANDING HOUSE PLANS

Clarion Hotel Exton, Chester County

This one-day program is designed to provide an introduction to the fundamentals of blueprint reading through lecture and interactive learning exercises to test your skill level and knowledge.

JANUARY 13-16, 2020

RA 501: RESIDENTIAL PLUMBING ACADEMY

Radisson Camp Hill, Cumberland 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.

JANUARY 14, 2020

IRC 105: RESIDENTIAL DECK DESIGN & CONSTRUCTION

Holiday Inn Williamsport, Lycoming County

This one-day workshop will review the new prescriptive design requirements for joists, beams, and post sizing along with stairs and stair illumination. Learn to apply the prescriptive requirements to several design examples.

FEBRUARY 13, 2020

IRC 105: RESIDENTIAL DECK DESIGN & CONSTRUCTION

Best Western Bethlehem, Lehigh County

FEBRUARY 17-20, 2020

RA 401: RESIDENTIAL MECHANICAL ACADEMY

Radisson Camp Hill, Cumberland 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.

FEBRUARY 20, 2020

IRC 105: RESIDENTIAL DECK DESIGN & CONSTRUCTION

Concordville Hotel, Delaware County

MARCH 10-11, 2020

IECC 101: INTERNATIONAL ENERGY CONSERVATION CODE ESSENTIALS

Best Western Bethlehem, Lehigh County

This two-day program provides a comprehensive overview of the commercial building provisions of the 2015 IECC, including practice exams in preparation to take the Commercial Energy Inspector or Commercial Energy Plans Examiner test.

MARCH 17-18, 2020

RA 301: RESIDENTIAL ENERGY ACADEMY

Radisson Camp Hill, Cumberland 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 exercises and case studies designed to illustrate daily practices performed by a residential energy inspector or plans examiner.

MARCH 25, 2020

PCCA SYMPOSIA: WEST

Doubletree Hotel in Monroeville, Allegheny County

APRIL 2, 2020

PCCA SYMPOSIA: EAST

Crowne Plaza Philadelphia - King of Prussia, Montgomery County

AVAILABLE PHRC WORKSHOPS

The PHRC currently has more than 25 available programs for delivery, including basic blueprint reading, fundamentals of exterior plaster and thin stone veneer assemblies, and IRC framing design and code compliance that are up to date in response to any code changes. Continuing education credits are awarded based upon the topic. Workshops are an excellent way to offer value to your Builders Association membership and provide local educational opportunities. PHRC does all of the setup work for you! You simply have to promote it to your members.

CONTACT TRACY, TSD5@PSU.EDU, 814-865-2341, TO HOST A WORKSHOP

REGISTER FOR PHRC WORKSHOPS

phrc.psu.edu/Industry-Education/Workshop-Index.aspx

SEPTEMBER 24, 2019

BUILDING ENVELOPE DESIGN & CODE COMPLIANCE

HBA of Metro Harrisburg, Dauphin County

This one-day workshop is designed to provide builders, designers, and code officials with an introduction to building science principles and practices as they relate to the building envelope and current ICC code provisions.

Hosted by HBA of Metro Harrisburg

OCTOBER 10, 2019

STUCCO & THIN STONE VENEER DESIGN & INSTALLATION

Hilton Garden Inn Exton/West Chester, Chester County

This workshop will explore core building science principles, relevant exterior plaster code requirements, review proper flashing techniques, lath requirements, treatment of joints between dissimilar materials, and installation guidelines and details. Rainscreen systems and products will also be discussed, including their potential benefit to the exterior wall system. This workshop will also discuss installation guidelines and details for manufactured stone veneer.

Hosted by HBA of Chester and Delaware Counties

NOVEMBER 19, 2019

BUILDING ENVELOPE DESIGN & CODE COMPLIANCE

HBA of Bucks and Montgomery Counties, Montgomery County

Hosted by HBA of Bucks and Montgomery Counties

DECEMBER 10, 2019

RESIDENTIAL DECK DESIGN

York Builders Association, York County

This one-day workshop will review the new prescriptive design requirements for joists, beams, and post sizing along with stairs and stair illumination. Learn to apply the prescriptive requirements to several design examples.

Hosted by York Builders Association and BIA of Lancaster County

MARCH 4-5, 2020

PCCA SYMPOSIA: CENTRAL

The Penn Stater Hotel & Conference Center, Centre County

Hosted by PHRC

2018 PENNSYLVANIA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS WORKSHEET

With the 2018 Pennsylvania Alternative Residential Energy Provisions presenting an energy code compliance path in the PA Uniform Construction Code since October 1, 2018, the PHRC team has received numerous questions and inquiries related to its use and implementation. To respond to these ongoing questions, the PHRC has published a two-page worksheet to assist with the permit application process.

If you are interested in sharing this worksheet or the full 2018 PA Alternative document on your organization's website, please do so by directing users to the PHRC link listed below. This will ensure that the latest version is available in the case of subsequent versions of either document being published:

- **2018 PA Alternative Residential Energy Provisions:**
<https://www.phrc.psu.edu/Publications/Housing-and-Land-Development-Standards-and-Guidelines.aspx>
- **2018 PA Alternative Worksheet:**
<https://www.phrc.psu.edu/Publications/Housing-and-Land-Development-Standards-and-Guidelines.aspx>

2018

**Pennsylvania
Alternative
Residential
Energy
Provisions**



2019 HANKIN DISTINGUISHED LECTURE



Timothy McDonald, president and co-founder of Onion Flats LLC

LEVERAGE POINTS: CLIMATE CHANGE AND THE IMPERATIVE OF AFFORDABLE HOUSING | TIMOTHY McDONALD

In Donatella Meadow's seminal 1999 essay, *Leverage Points: Places to Intervene in a System*, she reminds us that there are "... places within a complex system (a corporation, an economy, a living body, a city, an ecosystem) where a small shift in one thing can produce big changes in everything." Faced with the reality that buildings are responsible for over 40% of all greenhouse gas emissions in this country, and that the scientific community has been telling us for decades that Net-Zero-Energy, carbon-neutral buildings need to be standard practice by 2030, should developers, architects, and builders not be working over time to meet these needs? The dense, urban, multifamily work of Onion Flats, a Philadelphia-based development/design/build company, demonstrates the feasibility of making this "standard practice" a reality.

Timothy McDonald is a Registered Architect in Pennsylvania and New Jersey, LEED AP, Certified Passive House Consultant and Tradesman (CPHC) and president of Onion Flats LLC, an award winning development/design/build collective centered in Philadelphia. He has been teaching and practicing for over 20 years with a focus on community development, multidisciplinary thinking and making, high-performance building technologies, and alternative construction methodologies. Through his research and practice, Tim, along with his partners at Onion Flats, has developed, designed, and built some of the first LEED Gold and Platinum projects in the country and the First Certified Passive House, Net-Zero-Energy-Capable project in Pennsylvania.

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 13, 2019 @ 4:00 p.m. | AUDITORIUM, HUB-ROBESON CENTER

NEW EDITOR-IN-CHIEF FOR JAE

Ali Memari, professor of civil and architectural engineering, Bernard and Henrietta Hankin Chair in Residential Building Construction, and director of the Pennsylvania Housing Research Center at Penn State, was recently named the editor-in-chief of the *Journal of Architectural Engineering (JAE)*, produced by the American Society of Civil Engineers (ASCE). His new role will begin Oct. 1.

The *JAE* is a multidisciplinary journal for research-based engineering and technical information related to building engineering design, according to its website. The journal covers a broad range of topics and disciplines, including building systems; structural, mechanical, and electrical engineering; acoustics; and environmental quality, lighting, and sustainability. As editor-in-chief, Memari said his main goals will be to help enhance the publication's reputation and position it to be recognized as the preferred journal to find articles on the most recent innovations, advancements, and emerging topics and issues related to all types of buildings. "The making of buildings in general is a multidisciplinary process," Memari said. "I will be working with a distinguished team of associate editors to attract contributions from

both academia and industry authors to make the journal a forum for knowledge sharing and technology transfer. I would like to see that the publications in the journal will have real impact on the high-performance building design and construction industry."

Memari will serve as the editor-in-chief for a three-year period with an option to renew. Prior to being elected as the editor-in-chief, Memari served as the editor for the journal's Special Collection on Housing and Residential Building Construction section. He created the section in 2014 as an opportunity to publish papers focused in the area of housing and residential building construction. "The motivation was to encourage scholarly contributions related to this very important building sector," Memari said. "As the Bernard and Henrietta Hankin Chair of Residential Building Construction, I felt a responsibility to bring more academic and scholarly recognition to the residential construction sector, and a focused journal publication medium was a good way to reach this goal." The new section has attracted a total of 90 paper submissions thus far and has helped the *JAE* increase its overall number of published papers. "I think the experience

I gained in this process will certainly help as I work with editors to continue strengthening *JAE* over the next few years," Memari said.

Memari joined the Penn State faculty in 1998. His research interests include the evaluation of residential and commercial building systems, building science and energy efficiency, full-scale testing of different types of building envelope systems, and the study of building structural and nonstructural components and systems under natural hazard and environmental load effects. More recently, he also has been involved in studies related to the passive house design approach and 3D printing of concrete structures.

ASCE represents more than 150,000 members of the civil engineering profession in 177 countries. Founded in 1852, ASCE is the nation's oldest engineering society. The organization stands at the forefront of a profession that plans, designs, constructs, and operates society's economic and social engine — the built environment — while protecting and restoring the natural environment.

By Jennifer Matthews - May 28, 2019

HANKIN CHAIR UPDATE



Projects designed by Onion Flats LLC. IMAGE: ONION FLATS LLC

We are very pleased with the high achievements that our Residential Construction (RC) program team has had during the past year. The RC program and the PHRC have been successful in all areas of activities, including course offerings, student competitions, graduate and undergraduate research, R&D projects, training, conferences, publications, and the career fair.

The RC minor is now established as an attractive minor to students, in particular those majoring in architecture, architectural engineering, and civil engineering, but it is open to all majors. Currently, over 25 students have already been awarded the RC minor. With the 2nd PHRC Residential Construction Career Fair held in November 2018, we have provided the opportunity for students enrolled in the RC minor and other students interested in RC careers to meet representatives from all sectors of the industry for possible internships or jobs after graduation. Besides their formal coursework, some of our students with interest in the RC field also enthusiastically participate in two national student competitions, the NAHB Student Competition and the DOE Solar Decathlon Design Challenge. Benefiting from a team of dedicated PHRC coaches, our students placed second in the 2018-2019 NAHB Student Competition among 37 four-year programs. These student competitions provide excellent opportunities for our students to complement their formal coursework education and gain experience in projects that not only brings them a



2018-2019 DOE Solar Decathlon Design Challenge team volunteering with Habitat for Humanity of Greater Centre County

better understanding of real life projects, but also enhances other skills such as teamwork, communication, and leadership, among others.

Our RC program continues to attract top graduate students with interest in research related to technical and innovative aspects of residential building materials and systems. Currently, graduate and undergraduate students are involved in several different research projects, including determination of wall thermal resistance in existing buildings using infrared thermography, effect of hurricane wind and surge flood on coastal homes, retrofit of homes for Passive House standard, 3D printing of concrete buildings, and 3D printing of clay-based concrete for affordable home construction, among others. We continue to identify new ideas for research and submit proposals to funding opportunities including NSF, DOE, USDA, and the industry.



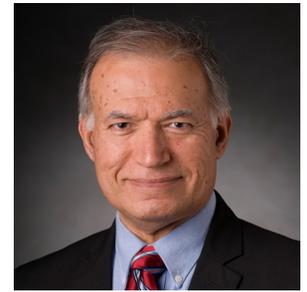
The Penn State Den@Mars shortly after completing the first-ever fully enclosed 3D-printed building structure. IMAGE: NASA

Annually since 2006, we invite a world-class speaker to talk about one of the most important issues regarding housing and residential construction as part of the Hankin Distinguished Lecture Series, which was initiated in honor of the late Bernard Hankin and his family for their generous support of our RC program. Last year, we had an excellent turn out for the lecture that was given by Carlos Martín, Senior Fellow at the Urban Institute. He presented his talk on November 7, 2018, titled "The Global Trends Shaping America's Future Home Building." The lecture can be viewed on the PHRC website with closed captioning.

With regard to outreach activities, besides the various training programs and webinars on offered by PHRC technical staff and outside instructors, we held the 27th Annual Housing Conference March 13-14, 2019, which turned out to be another successful event that highlighted mainly building

code changes, best practices, and new technologies for RC. Over the past year, we were also busy organizing our biennial 2020 Residential Building Design and Construction (RBDC) Conference (5th in the series), which will be held March 4-6, 2020. Benefiting from the experience gained from the past four conferences, we expect a very successful conference that provides a forum for academic and industry researchers, design professionals, and material manufacturers, among other stakeholders to share their accomplishments and contributions to the field, which helps advance state of the art and practice. We are proud to have received about 140 abstracts from nine different countries for the conference related to various topical areas, including Disaster Resilient Design, Building Science and RC Education, Building Envelope, Construction Quality, MEP Systems, Affordable High Performance Housing, Passive House, Retrofit of Existing Buildings, 3D Printing of Concrete, Innovations in Design and Delivery, Prefabrication and Modular Construction, Building information Modeling, and Aging-in-Place and Senior Living Housing.

The two keynote speakers will set the tone for the conference that signifies some of the important emerging areas related to RC. Lois Arena, director of Passive House Services for Steven Winter Associates, will discuss: Passive House: A Proven Path Toward Resilient, Affordable, and Energy Efficient Housing. David O. Prevatt, associate professor of Civil & Coastal Engineering, associate director NSF - NHERI Experimental Facility, University of Florida, will share some of his first-hand, seen effects of hurricanes on coastal and island regions and making a case for how to improve home building in such areas through his discussion, Wind Hazard Resilient Residential Communities — When Engineering Isn't Enough. We look forward to seeing strong participation and attendance at the conference from the home builders' community, code officials, architects, engineers, manufacturers, faculty, and students.



Ali Memari, Hankin Chair

2019 NAHB STUDENT COMPETITION



Penn State NAHB Student Competition team and advisers

The National Association of Home Builders (NAHB) student chapter at Penn State won second place in the Four-Year College category of the National Association of Home Builders (NAHB) Student Competition held at the 2019 NAHB International Builders' Show (IBS) in Las Vegas. Fifty-seven teams across the U.S. participated in the annual competition. 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 152-acre site in Coweta, Oklahoma. The Penn State team developed a 100-page proposal for a 290 single-family home subdivision that included six different floor plans built to meet the silver rating from the National Green Building Standard and

a HERS Index score of 68 for the base package mid-line home. The proposal also included thoroughly vetted market, financial, and risk analyses and a land development plan.

The 2018-2019 presentation team included: Lauren Lesniakowski, architectural engineering, as project manager; Drew Kreamer, architectural engineering; Justin Charles, architectural engineering; Mark DuBree, Jr., corporate innovation and entrepreneurship; David Gawryla, architectural engineering; and James Porter, finance. Additional team members included: Jonathan Gottlieb, civil engineering; Kristin Roy, architecture; and Matthew Yerk, architectural engineering. Students appreciate the ability to work across disciplines and gain experience in the residential construction industry. "With much of my engineering background being based in commercial building design, it was such a blessing to find the PHRC and NAHB student chapter at Penn State," said Lesniakowski.

The student team was coached by staff

of the PHRC: Brian Wolfgang, associate director, and Chris Hine, housing and land development specialist. "Our focus on a multidisciplinary approach has not only allowed students to work with peers outside of the major but has also allowed for a well-rounded approach to the competition overall. This project asks a lot of our students but we continue to hear feedback that the hard work the students put in on this project truly helps to strengthen the foundation for 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.



One of six Penn State NAHB Student Competition house designs

2019 DOE SOLAR DECATHLON

The PHRC supported the *Next Generation Building Solutions* team to compete in the 2019 U.S. Department of Energy (DOE) Solar Decathlon Design Challenge, formerly known as the Race to Zero Competition, held on April 12-13, 2019 at the National Renewable Energy Laboratory in Golden, Colorado. The competition featured 45 teams from 37 international, collegiate institutions. It challenges students to design an affordable, net zero energy home that meets DOE's Zero Energy Ready Home (ZERH) guidelines. Students develop and hone their skills in high performance building design in preparation for their careers in the industry. To facilitate a real world design experience, Penn State partners each year with a local

housing organization; this year was Habitat for Humanity of Greater Centre County (HFHGCC). Students volunteered on site and interfaced with HFHGCC board members, staff members, and the Penn State HFH Student Chapter to explore how to incorporate high performance home building into their current constraints. The result was a matrix of affordable, high performance home designs that could work for all site orientations, family sizes, and site conditions, while honoring the existing construction methods and architectural language. The team then presented at the competition a 1,320 ft², three bedroom, 1.5 bathroom, single-family, detached home that met the ZERH requirements, was 100% solar powered, and fit within HFHGCC's budget.

This interdisciplinary team included undergraduate students in architecture, architectural engineering, and civil engineering. It was led by four veteran team members in architectural engineering: Neno Agnello, Carly Asadi, Justin Charles, and Blaise Waligun. Industry mentors included: Jon Nelson,



Penn State team for the 2019 DOE Solar Decathlon Design Challenge

Larry Lucas, Stephanie Fost, and Lisa Riley Brown from HFHGCC; John Sloane from the Penn State HFH Chapter; Norm Horn, Tom Hanna, and Jason Grottini of Envinity, Inc.; Chad Owens of Timber Rock Homes; Bob Shoemaker of S&A Homes; Meghan Hoskins of Penn State's Sustainability Institute; and Rob Cooper of Penn State's Office of Physical Plant. Penn State faculty and staff included: Ali Memari and Sarah Klinetob Lowe of PHRC; Chris Hazel, research assistant in architecture; Lisa Lulo, associate professor of architecture; and Andy Lau, associate professor of engineering design. Travel support for the competition was provided by the Lewis Endowment in the College of Engineering and the PHRC. Interested in joining as a 2020 industry mentor or sponsoring student travel? Contact Sarah Klinetob Lowe, sek175@psu.edu.



Final rendering of the Next Generation Building Solutions design

RC PROGRAM: ALUMNI SPOTLIGHT

CHRIS GUYAN, *staff engineer at Dewberry and Penn State Class of 2015*

I graduated from Penn State in May 2015 with my B.S. in civil engineering, a minor in history, and a housing certificate. During my time at Penn State, I was heavily involved in the NAHB Penn State student chapter, both in the club and on the NAHB Residential Construction Management Competition (RCMC) team, now the NAHB Student Competition. I was the website coordinator of the club my sophomore year (2012 – 2013) and was chapter president my junior and senior years (2013 – 2015). My biggest goals as president were to get as many students involved in the club and to find exciting events to connect them with the industry. Bringing industry professionals in for lectures and taking site visits were definitely the highlights for me. I was on the NAHB RCMC team my junior year, where we placed seventh at the national competition, and my senior year, where we placed first in 2015.

Since graduating four years ago, I have been working for Dewberry as a staff engineer in their site/civil department, primarily focusing on land development projects in the D.C. metro area. I am currently working on a large greenfield,

transit-oriented development in Loudoun County, Virginia, called Metro Walk. Our client is Toll Brothers, and we are developing plans for 739 residential units (175 townhomes and 564 multifamily units) across 68 acres. Metro Walk is part of a larger planned development called Moorefield, which has zoning approval for 9.75 million square feet of non-residential development and 6,000 residential units, adjacent to the Ashburn Metro Station (expected to open in 2020). In addition to this project, I am involved on other residential, commercial, and mixed-use sites in Arlington and Fairfax Counties.

In 2017, I also had an exciting opportunity to spend a year working as an editor and contributor to Dewberry's fourth edition of the Land Development Handbook. We updated the book with new content, revamped it to be more applicable, and added interesting case studies throughout. I was able to learn more about the land development process across the company and throughout the country. That knowledge was brought into the book for the benefit of practicing engineers and students alike. The fourth edition of the Land Development Handbook was published in May 2019.

How did Penn State prepare you for your

career?

At Penn State, I credit the NAHB RCMC as being one of the best experiences of my time. The project incorporated a real situation on an actual site that required me to work with a team of multidisciplinary students to create our proposal. I not only learned about land development engineering and site design, but also how the whole development process comes together. This experience confirmed my interest in the land development field and helped to prepare me for my career at Dewberry after graduation.

What is one piece of advice you'd offer to current students?

My recommendation to students would be to find what they are passionate about. Penn State provides a lot of opportunities, so take advantage of what is available. The more you can experience, the better. Classes, clubs, and extracurricular activities all provide ways to learn something new, network, and figure out what you like within your field.



Chris Guyan, staff engineer

STUDENT SCHOLARSHIPS

NAHB STUDENT CHAPTER SCHOLARSHIPS

The NAHB Student Chapter Scholarships are available to students in the NAHB Student Chapter at Penn State through a scholarship application that includes their career objectives, academic course plan, and transcript. The scholarships are annually awarded to students at the NAHB Student Chapter Awards Banquet in November. This annual event brings together the residential construction industry and the next generation for an evening full of networking, delicious



NAHB Student Competition Team Travel Award by Toll Brothers

food, and celebration at the Nittany Lion Inn. Travel support to the NAHB Student Competition team is also awarded at this banquet. If your company is interested in supporting student scholarships and attending the banquet, contact Tracy Dorman at tsd5@psu.edu.

J. ROGER GLUNT GRADUATE FELLOWSHIP IN HOUSING

Celebrating 25 years of awarding fellowships in 2020, the J. Roger Glunt Graduate Fellowship in Housing is an award for full-time graduate students who are currently in, or planning to enroll in, the College of Engineering, and who are focusing on topics related to housing and residential construction, such as architectural engineering or civil and environmental engineering. The Fellowship was endowed in honor

of Mr. Roger Glunt, past president of the National Association of Home Builders, by the Pennsylvania Builders Association.

The applicant's graduate studies research should be related, but not limited, to various aspects of architectural and structural engineering, architecture, construction management, land development, sustainability, energy efficiency, etc. as they relate to residential construction. The applicant is also expected to demonstrate promise of academic achievement and quality of leadership, perseverance, and dependability. The J. Roger Glunt Fellowship will provide financial resources to cover travel, research, and educational expenses.



J. Roger Glunt

PHRC CAREER FAIR | 11/13

3RD 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, tsd5@psu.edu.

WEDNESDAY, NOVEMBER 13, 2019 @ 10:00 a.m. - 1:00 p.m. | HERITAGE HALL, HUB

Thank you to KSE Engineering for sponsoring the Student Lounge!



Attending companies include D.R. Horton, Inc., Envinity, Inc., Hankin Group, KSE Engineering, Nave Newell, Inc., NVR, Inc. / Ryan Homes, Toll Brothers, International Code Council, Huber Engineered Woods, LLC, and more. Register today!

REGISTER | http://pennstate-csm.symplicity.com/events/engr_phrc19



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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.

Director | **Ali Memari**
Associate Director | **Brian Wolfgang**
Housing & Land Development Specialist | **Chris Hine**
Housing Systems Specialist | **Sarah Klinetob Lowe**
Training & Events Coordinator | **Tracy Dorman**
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