

# PENNSYLVANIA HOUSING RESEARCH CENTER MAGAZINE

PHRC.PSU.EDU



## FALL 2021

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From all of us at the Pennsylvania Housing Research Center (PHRC), we hope that the past year has been safe and successful. Author Jack Canfield once stated, "Change is inevitable in life." Certainly, change can be expected as the years pass, but I am fairly confident that few of us could have anticipated the scale of change that our industry, our communities, and our families have endured since early 2020. While many aspects of our society and the residential construction industry look more familiar these days, we are still enveloped by pandemic circumstances at every turn. I feel very fortunate to report, though, that the operations of the PHRC continue to adapt and thrive.



Brian Wolfgang, associate director



Brian Wolfgang's home office for remote work conducting virtual training sessions

So, what is new for the PHRC team? Last year's magazine mentioned the phrase, "Hold the methods loosely." This phrase will continue to guide the PHRC team as we navigate new methods for learning, our ever-changing work environments and rhythms, and broad challenges to the overall homebuilding industry.

Education in a mid- to post-pandemic world will continue to look a bit different from previous iterations. Over the past two years, groups like the PHRC have been forced to adapt to a fully virtual training environment. Yes, this has led to an overwhelming amount of Zoom time, but this has also enabled us to better learn how to engage in an online environment. While training into late 2021 and beyond, including code update training, will not be entirely virtual, there will be remnants of what worked virtually being utilized in the long term. Virtual training allows for lower cost options for hosts and attendees, increased accessibility, and reduced travel; additionally, it easily enables recording and future viewing. But, there will be a return to in-person training and networking, which offers an opportunity to learn from your peers, as well as program instructors.

At the end of the day, it is the PHRC family that makes it all work. That includes the PHRC staff, the Industry Advisory Council, and many other core stakeholders that have supported and engaged with the PHRC for years. Although we are not yet finished with pandemic-related challenges and disruptions, our team is as confident as we have ever been that each day brings us closer to our vision of "a residential construction industry equipped with the knowledge, skills, and technology to build better homes." We hope that you will become part of the PHRC family this year!



PA UCC Residential Code Update: Part 1 webinar screenshot on Sept. 14, 2021

# PHRC CONFERENCE WEEK | 2022

## PHRC HOUSING CONFERENCE

**SAVE THE DATE** | The 30th Annual PHRC Housing Conference highlights best practices, regulation, and innovation in the housing industry. This conference brings together all sectors of the housing industry including builders, design professionals, remodelers, code officials, educators, factory-built housing manufacturers, and product manufacturers.

- Registration opens in late 2021!
- PHRC and Pennsylvania Builders Association (PBA) Members, code officials, nonprofits, and students receive a registration discount.
- Continuing education is available for sessions, which may include AIA, ICC, PA L&I, NARI, and PA PDHs for engineers.
- A hotel discount is offered with code, PAHL22A, by January 29, 2022.
- More information is available at <https://bit.ly/HOUSINGCONFERENCE>.

**MARCH 2-3, 2022 | THE PENN STATER HOTEL AND CONFERENCE CENTER**

## TOPICS

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. If you are interested in speaking at the PHRC Housing Conference, contact Chris Hine, [chine@psu.edu](mailto:chine@psu.edu). Potential topics include:

**High-performance homes**  
**Panelized construction**  
**Manufactured and modular homes**

**Zoning and land use**  
**PA Uniform Construction Code**  
**Innovative technologies and materials**



Lois B. Arena, director of Passive House Services at Steven Winter Associates Inc, presented her keynote, "Passive House: A Proven Path Toward Resilient, Affordable & Energy Efficient Housing," on March 5, 2020.



Checking Your Work: Properly Installed HVAC in High-Performance Homes by Dean Gamble of the US EPA on March 4, 2020

## SPEAKER RFQ FOR PHRC EVENTS

The PHRC has an open Request for Qualifications (RFQ) for event speakers, which includes conferences, webinars, and more. The PHRC is seeking knowledgeable and dynamic speakers to present on Pennsylvania-applicable topics that align with the PHRC's mission and vision. Learn more and submit speaker names at <https://bit.ly/SpeakerRFQ>.

## SPONSORSHIP OPPORTUNITIES

**2 TO SPONSOR, CONTACT RACHEL FAWCETT, [RFAWCETT@PSU.EDU](mailto:RFAWCETT@PSU.EDU), FOR MORE INFORMATION.**

# 2022 RESIDENTIAL BUILDING DESIGN & CONSTRUCTION CONFERENCE (RBDCC)

The 2022 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, affordable, and innovative residential construction. The event also focuses on the dissemination of recent research findings, state-of-the-art technologies, advanced projects, and new approaches in the field. This conference will focus on various types of residential buildings, including single-family dwellings, multi-family multi-story apartment buildings, mid-rise and high-rise residential building towers, factory-built and modular housing, dormitories, and hotels/motels. The RBDCC was previously held in 2013, 2014, 2016, 2018, and 2020. More information is available at <https://bit.ly/2022RBDCC>.

- Registration opens in late 2021. All abstract submitters must register by January 10, 2022.
- A hotel discount is offered with code, RBDC22A, by January 29, 2022. Free parking and shuttles to the airport are available.

**MARCH 2-3, 2022 | THE PENN STATER HOTEL AND CONFERENCE CENTER**

## KEYNOTE SPEAKERS



### **Rusty Smith**

Associate Director, Rural Studio  
Auburn University School of Architecture, Planning, & Landscape Architecture  
*Rural Studio: What Does Affordable, High-Performance Housing Truly Afford?*

### **Wil V. Srubar III**

Associate Professor, University of Colorado Boulder  
Founder and Managing Director, Aureus Earth, Inc.  
*Transforming Buildings into Carbon Sinks*



## 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 118 abstracts from eleven 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

# 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 National Association of Home Builders (NAHB) Student Chapter, and more.

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

## 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 DORMAN, TSD5@PSU.EDU, TO BECOME A 2022 PHRC MEMBER.**

## 2021 MEMBERS

### GOLD



Hankin Group

### SILVER

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

### BRONZE

Housing Innovation Alliance  
Liberty Homes Custom Builders  
Sukonik Building Companies  
The Torron Group  
UpStreet Architects

### ASSOCIATION

BIA of Philadelphia  
Blair-Bedford Builders Association  
Builders Association of Central PA  
Builders Association of Northwestern PA  
Carbon Builders Association  
HBA of Chester and Delaware Counties  
Indiana-Armstrong Builders Association  
Lebanon County Builders Association  
Northeast Training Institute  
NuWool Company

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

### INDIVIDUAL

Szabi Fekete  
Jim Franey  
Jim Freihaut  
Alan Hawman  
Dean Hilliard  
Richard Hotchkiss  
John Hudak  
Jon Kautz  
Thomas McCosby  
Roy Pedersen



# CODE TRAINING UPDATE

In accordance with the requirements of Act 45 of 1999 as amended, the Pennsylvania (PA) Uniform Construction Code (UCC) Review and Advisory Council (RAC) completed the review of the 2018 I-Codes on April 29, 2021. The code provisions that were adopted during this process will take effect in the first quarter of 2022 with the official effective date to be confirmed. To learn more about these upcoming changes, schedule a training with the knowledgeable staff of the PHRC today! Training sessions can be held in person at your location or via Zoom. Due to overwhelming requests for training, groups of ten or less may be asked to consolidate with another group or start with scheduled webinars. Modules below are all one hour in length, and they can be mixed and matched to create the ideal session for your audience.

## REGISTER FOR TRAINING SESSIONS

[phrc.psu.edu/Industry-Education/Resources/Code-Update-Training.aspx](http://phrc.psu.edu/Industry-Education/Resources/Code-Update-Training.aspx)

### AVAILABLE OCTOBER 1

#### PA UCC RESIDENTIAL CODE UPDATE: PART 1

This session will review implications of transitioning to the 2018 ICC base codes, discuss PA legislative and RAC amendments, and dive into some highlights of the new code provisions for residential construction.

#### PA UCC RESIDENTIAL CODE UPDATE: PART 2

This session will build on Part 1 by providing an overview of the most substantial changes between the 2015 and 2018 ICC base codes for residential construction.

### AVAILABLE OCTOBER 15

#### ADAPTING STUCCO & STONE ASSEMBLIES TO CHANGING CODES

With Pennsylvania's Uniform Construction Code (UCC) updating to the 2018 ICC base codes in early 2022, one of the critical changes that building professionals will need to consider involves stucco and stone wall assemblies. During the UCC code adoption process, provisions impacting stucco and stone were adopted based on language out of the 2021 International Residential Code. This session will dive into the changes that will have a significant impact on the design and installation of exterior plaster assemblies.

#### ADAPTING TO TIGHTER ENCLOSURES THROUGH SCOPES OF WORK

One of the core aspects of any high-performance building is the ability to control air infiltration through the building enclosure. As the PA UCC updates to the 2018 ICC codes, the main airtightness requirement will shift from a blower door result of five air changes per hour at fifty pascals of pressure (ACH50) down to three ACH50. What will it take for the residential construction industry to adapt to this change? This session will focus on the execution and installation of air sealing details around the building enclosure. Often, the keys to success involve properly designed details and material specifications, thus utilizing a well-crafted air sealing scope of work for subcontractors.

### AVAILABLE NOVEMBER 1

#### 2021 PA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS UPDATE

The PA UCC RAC completed the review of the 2018 ICC codes on April 29, 2021. The code provisions that were adopted during this process will take effect in the first quarter of 2022. These changes trigger an update of the PA Alternative Residential Energy Provisions (PA-Alt). The PA-Alt 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 International Energy Conservation Code (IECC) in terms of energy efficiency. This session will dig into the updated version of this standard.

# 2021 PA ALTERNATIVE

## PENNSYLVANIA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS

The development of the 2021 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 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 2021 PA-Alt, the 2018 IRC, and the 2018 IECC. The PA-Alt will be published in late fall 2021 and available to download from the PA Department of Labor and Industry and the PHRC.

# 2021-22 | WEBINAR SCHEDULE

Tune in every second Tuesday of the month, 1:00-2:00 p.m. (E.T.), and occasionally on the last Thursday of the month, 11:00 a.m.-noon (E.T.), for free webinars! Live webinars are approved for American Institute of Architects (AIA) Learning Units, International Code Council (ICC) Contact Hours or continuing education units (CEUs), PA Dept. of Labor and Industry (L&I) Contact Hours, National Association of the Remodeling Industry (NARI) CEUs, and PA professional development hours (PDHs) for licensed professional engineers, which includes certificate for \$20. Past webinars are available to view on our website under "Industry."

## JOIN WEBINARS

[phrc.psu.edu/Industry-Education/Webinar-Index.aspx](http://phrc.psu.edu/Industry-Education/Webinar-Index.aspx)



### SEPTEMBER 14 | 1:00 P.M. (E.T.)

#### PA UCC RESIDENTIAL CODE UPDATE: PART 1

In accordance with the requirements of Act 45 of 1999 as amended, the Pennsylvania Uniform Construction Code (UCC) Review and Advisory Council (RAC) completed the review of the 2018 I-Codes on April 29, 2021. The code provisions that were adopted during this process will take effect in the first quarter of 2022 with the official effective date to be confirmed. This session will review implications of transitioning to 2018 ICC base codes, discuss PA legislative and RAC amendments, and dive into some highlights of the new code provisions for residential construction.



### OCTOBER 12 | 1:00 P.M. (E.T.)

#### PA UCC RESIDENTIAL CODE UPDATE: PART 2

This session will build on Part 1 by providing an overview of the most substantial changes between the 2015 and 2018 ICC base codes for residential construction.

### OCTOBER 28 | 11:00 A.M. (E.T.)

#### ALL-ELECTRIC NEW HOMES IN PA

With the advancement of heat pump technology, choosing all-electric systems for new construction homes is now a much more feasible option in cold climates like Pennsylvania. This webinar

will describe the latest best practices in all-electric new home design, including the latest in cold-climate heat pump technology for heating and water heating, and review occupant benefits of all-electric home design, such as improved indoor air quality and reduced environmental impact.

### NOVEMBER 9 | 1:00 P.M. (E.T.)

#### ADAPTING TO TIGHTER ENCLOSURES THROUGH SCOPES OF WORK

One of the core aspects of any high-performance building is the ability to control air infiltration through the building enclosure. As Pennsylvania's Uniform Construction Code updates to the 2018 ICC codes, the main airtightness requirement will shift from a blower door result of five ACH50 down to three ACH50. What will it take for the residential construction industry to adapt to this change? This session will focus on the execution and installation of air sealing details around the building enclosure. Often, the keys to success involve properly designed details and material specifications, thus utilizing a well-crafted air sealing scope of work for subcontractors.



### DECEMBER 14 | 1:00 P.M. (E.T.)

#### 2021 PA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS (PA-ALT) UPDATE

The Pennsylvania Uniform Construction Code (UCC) Review and Advisory Council (RAC) completed the review of the 2018 I-Codes on April 29, 2021. The code provisions that were adopted during this process will take effect in the first quarter of 2022. These changes trigger

an update of the PA-Alt. The PA-Alt 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. This session will dig into the updated version of this standard.

### JANUARY 11 | 1:00 P.M. (E.T.)

#### RESEARCH TO PRACTICE: WHAT CAN I DO TO IMPROVE MY BMP?

We will review practical lessons learned from research at Villanova University that can be applied to your property regarding best management practices (BMPs). Focus will be on the processes used in stormwater systems and how you can apply them to retrofit or build new green infrastructure practices.

### JANUARY 27 | 11:00 A.M. (E.T.)

#### RADON-RESISTANT NEW CONSTRUCTION TECHNIQUES

Radon-resistant new construction (RRNC) techniques are a series of steps that the new home builder can incorporate into their homes during construction to make them "radon ready." These techniques in themselves do not necessarily prevent radon entry, but they do make it much easier to solve a radon problem once a family is in the finished home and find through radon testing that they have an indoor radon problem, which is very common in Pennsylvania. The techniques also make for a much more aesthetically pleasing radon system since it is all contained within the structure. There is no longer a "ugly" pipe running up the outside of the house, nor a fan at grade level. All that is visible is a twelve-inch stack out of the roof for an exhaust. Not all RRNC-installed systems need to be "activated" via a fan. Some homes will simply have low radon levels that do not need the installed system. However, it is felt that it is far better to have the system installed and not needed, rather than the other way around.

# 2021-22 | WEBINAR SCHEDULE, CONT.

**FEBRUARY 15 | 1:00 P.M. (E.T.)**

## **ADAPTING STUCCO & STONE ASSEMBLIES TO CHANGING CODES**

With Pennsylvania's Uniform Construction Code (UCC) updating to the 2018 ICC codes in early 2022, one of the critical changes that building professionals will need to consider involves stucco and stone wall assemblies. During the UCC code adoption process, provisions impacting stucco and stone were adopted based on language out of the 2021 International Residential Code. This session will dive into the changes that will have a significant impact on the design and installation of exterior plaster assemblies.

**MARCH 2-3**

## **PHRC HOUSING CONFERENCE**

No webinar in March due to conference.

**APRIL 12 | 1:00 P.M. (E.T.)**

## **THE BENEFITS OF SAFETY PLANS ON THE JOBSITE**

This webinar introduces attendees to health and safety (H&S) plans used on residential construction sites. The talk defines an H&S Plan and presents its primary components. The webinar looks at Occupational Safety and Health Administration's (OSHA) enforcement of applicable standards. Lastly, the talk introduces a systematic approach for identifying, assessing, and controlling jobsite hazards to aid employers when creating their own jobsite H&S Plans.

**APRIL 28 | 11:00 A.M. (E.T.)**

## **WHY PASSIVE HOUSE DESIGN FOR MULTIFAMILY AFFORDABLE HOUSING**

The presentation will focus on the benefits that Passive House design, especially its cost effectiveness through the reduction of energy consumption

in buildings. Passive House design can provide a path to Net Zero/Net Positive Energy, which can offer healthier and more comfortable living and/or working environments in multifamily affordable housing. Case histories will be included from the Northeast USA in climates zones 5 and 6.

**MAY 10 | 1:00 P.M. (E.T.)**

## **MOISTURE-CONTROL LAYERS AND MATERIALS**

Moisture can move in two main ways: in bulk, or liquid form, and in vapor form. This webinar will look at how exterior wall assemblies are designed and construction to manage both forms. We will also examine construction details and material properties for managing moisture.

## SPEAKING ENGAGEMENTS

The PHRC offers a speaker service that provides short technical presentations to organizations or associations related to the residential construction industry. Over the past ten years, the PHRC has made hundreds of these presentations to over 20,000 individuals. Most of our presentations offered under this service are best suited for local, regional, or state associations and companies working in Pennsylvania or cold weather climates. These thirty to sixty minute programs are ideal for dinner meetings or other gatherings of your members or employees.

These speaking engagements are also available for virtual delivery. Our team can create a virtual meeting space where your team, audience, or members can log in to participate in an online session delivered by the PHRC staff.

One free speaking engagement will be provided to all Pennsylvania associations/companies each year, independent of PHRC membership, which does not include overnight travel. Additional speaking engagements may be subject to a negotiated fee in order to cover travel and development costs.

**CONTACT TRACY DORMAN, [TSD5@PSU.EDU](mailto:TSD5@PSU.EDU), TO SCHEDULE A SPEAKING ENGAGEMENT.**

## AVAILABLE SPEAKING ENGAGEMENTS

[phrc.psu.edu/Industry-Education/PHRC-Training-Programs/Speaking-Engagements/index.aspx](http://phrc.psu.edu/Industry-Education/PHRC-Training-Programs/Speaking-Engagements/index.aspx)

- Air Sealing for 5ACH50
- Blower Doors for Builders
- Code-Compliant Whole-House Mechanical Ventilation
- Control Layers: Vapor Barriers, Vapor Retarders, & Air Barriers
- Crawlspace Design & Construction
- Energy Codes in PA
- High-Performance Walls
- Intro to the Passive House Standard
- Manufactured Stone Veneer
- Thermal Bridging & Continuous Exterior Insulation
- Residential Deck Design and Construction
- Residential Energy Auditing
- Residential Moisture Management: The 4D's
- Slab Insulation
- Solar Photovoltaic (PV) in PA
- Visitability

# ON-DEMAND COURSES

For a brand new offering, you are able to receive continuing education credits from the PHRC at any time or day of the week! In addition to live webinars for continuing education, the PHRC now offers on-demand courses to assist residential construction industry professionals in meeting ongoing continuing education requirements. Typical continuing education approvals include PA Dept. of Labor and Industry (L&I) Contact Hours, PA professional development hours (PDHs) for licensed professional engineers, American Institute of Architects (AIA) Learning Units, International Code Council (ICC) Contact Hours or continuing education units (CEUs), and National Association of the Remodeling Industry (NARI) CEUs. Upon completion of all course requirements, you will be able to download your continuing education certificate. The on-demand courses are available through Penn State Extension. New courses will be added periodically throughout the year. Course pricing varies upon the length of the course and applicable continuing education credits available. Check the specific course webpage for its cost.

## REGISTER FOR ON-DEMAND COURSES

[phrc.psu.edu/Industry-Education/PHRC-Training-Programs/On-Demand-Courses/index.aspx](http://phrc.psu.edu/Industry-Education/PHRC-Training-Programs/On-Demand-Courses/index.aspx)

Currently available on-demand courses (all one hour):

- Slab Insulation: Finding the Right Details
- It's More than "Just a Deck"
- Solar PV in PA: Intro to the Design of New Construction and Retrofit Residential Systems
- Reducing Thermal Bridging with Continuous Exterior Insulation
- High-Performance Walls in Pennsylvania
- Control Layers: Vapor Barriers, Vapor Retarders, & Air Barriers
- The Do's and Don'ts of Crawlspace Design and Construction Revisited
- Healthy Homes: Insights for Existing Construction
- Wall Bracing in the UCC
- Air Sealing Tips, Tricks, & Details

## IAC SPOTLIGHT

The PHRC Industry Advisory Council (IAC) helps generate ideas for PHRC projects, training, and outreach programs. The IAC reviews and prioritizes the PHRC initiatives and projects to pursue, which will receive funds provided to the PHRC by the Commonwealth of Pennsylvania through Act 157 of 2006 permit fees as amended by Act 36 of 2017. IAC representatives are categorized as either appointed/designated, nominated/elected, or ambassador, and they typically meet twice per year. The PHRC welcomed three new elected representatives in 2021.



Emma Dickson

Emma Dickson, Toll Brothers—Dickson has made it her goal to build better homes through new innovations and education, a goal she first learned to value while working with the PHRC. Dickson became involved with the PHRC through the NAHB Student Competition and later became a student researcher. She researched and developed publications and webinars for topics chosen by the IAC. At Toll as a project manager, she utilized research and training learned at the PHRC to transform Pennsylvania's concept for luxury homes by modernizing plans and optimizing construction processes and to develop Toll's Construction Management Training Program, which equips employees with tools to become effective construction managers.



Adam Eckley

Adam Eckley, Nexii Building Solutions—With a career in the building industry spanning over two decades, Eckley began his journey as a tradesperson in the area of interior finish. As his career progressed, he worked in residential drafting and design, eventually working his way into residential design/build, supervision, and project management. Throughout his career, he also served in various management and directorial roles for some of America's largest material suppliers. Always passionate about cutting-edge, high-efficiency practices and materials, his career path led him to direct the Client Experience team at Nexii Building Solutions, a Canadian prefabricated, green building company, which has recently begun setting up operations in the United States. He believes whole-heartedly and strives to find solutions to revolutionize the global housing industry with regard to embodied and operational energy efficiency, carbon emissions, and overall improvement of the built environment.



Paul Szostak

Paul Szostak, Timbercrest Builders—Szostak started his career in the construction industry in the early 90s as a construction manager and later became a project manager for a large single-family home building company in northeast PA. He started his own company, Timbercrest Builders, in fall 2012. The company specializes in mid- to high-end single-family home construction in the Lake Wallenpaupack region of the northern Poconos. He is a lifetime director to the board of the Pennsylvania Builders Association (PBA), a licensed building code inspector, a member of International Code Council and Pennsylvania Association of Building Code Officials, and a director on the board for the Wayne-Pike Building Industry Association. He is also a past regional legislative officer for the northeast region (two terms) within the PBA.



# HANKIN CHAIR UPDATE



PA Hemp House in New Castle, PA

Despite restrictions for in-person meetings and interactions due to the COVID-19 pandemic, I am pleased to share some exciting progress in our work related to our Residential Construction (RC) program. Most of our activities were carried out through digital communication tools, which proved highly successful in many areas, such as course offerings, participation of students in national competitions (NAHB Student Competition and DOE Solar Decathlon Competition), research meetings with graduate and undergraduate students, research and development (R&D) project meetings, and delivery of outreach activities.

The cornerstone of our RC program are several courses related to residential buildings, as well as opportunities for students to enroll in our residential construction minor and housing certificate. We are excited that over forty students have been awarded the residential construction minor and almost thirty students are currently enrolled. In addition to courses such as Residential Building Design and Construction, Construction Management of Residential Building Projects, Building Enclosure Science and Design, Integrative Energy and Environmental Design, and Sustainable Residential Subdivision Design, we are pleased to share that our program—in collaboration with the Department of Architectural Engineering—now offers a new course, Ultra-High-Performance Buildings: Passive House Principles & Design.



PA Hemp House project after application of hempcrete

Our RC program has also been successful in recruiting graduate students to conduct research in areas related to home building. Topics that students have worked on over the past year include evaluation methods for homes built in coastal regions vulnerable to hurricanes and flooding, 3D printing of homes using concrete- and clay-based mixtures, use of cross-laminated timber (CLT) for home building and shelters, use of hempcrete for home building, evaluation of air barriers for passive house design under earthquake induced drift conditions, and development of retrofit methods for energy deficient homes to upgrade to near Passive House standard. Several of our research projects are funded externally, which provides support for graduate students and laboratory experimental studies.

Here are a few details about our current research projects:

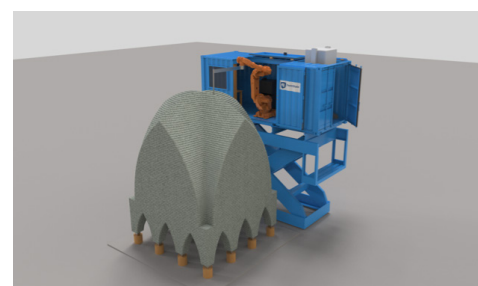
PA Hemp House is a project led by DON Enterprise Inc. that involves the retrofit of an existing highly deficient home in New Castle, Pennsylvania. The retrofit design used hempcrete as insulation to fill the spaces between studs. This hempcrete consists of a mixture of hemp hurd and fibers, lime, and water, which produces a highly sustainable material. Parsons School of Design, located in New York City, New York, undertook the design for the retrofit, while our team is developing energy models that rely on the thermal resistance of walls, determined by field testing. The objective of the energy modeling is to illustrate that a home built out of hempcrete has the potential to significantly lower the cost of an electricity bill compared to the pre-retrofit condition. Additionally, it will demonstrate healthier indoor air quality through the use of bio-based material with minimal chemical content in the construction.

Another project involves 3D printing concrete habitats in remote regions of Alaska. The project is led by Xtreme Habitats Institute with Penn State handling the design, modeling, analysis, testing, and construction of two prototypes: A tiny house version (about 144 square feet) in Fairbanks and a small house version (about 1,200 square feet) in Nome. The Penn State team has developed conceptual designs for phase one, a feasibility study, and is currently working toward a phase two proposal. The 3D printing of the concrete habitat uses an industrial robot arm. One of the

main design challenges is to consider the potential melting of permafrost (frozen soil layers). This requires preventing the transfer of heat from the house to the underlying ground by building the house on elevated piles to avoid melting, which leads to excessive settlement and damage to the home.



Ali Memari, Hankin Chair



Design concept for 3D-printed concrete home in Alaska

As part of our outreach activities, we were pleased to hold the annual Hankin Distinguished Lecture, which was initiated in honor of the late Bernard Hankin and his family for their generous support of our RC program. In 2020, we organized an online lecture for the first time. Brett C. Singer spoke on “Advances, Challenges, and Opportunities for Indoor Air Quality in U.S. Homes,” and the presentation was quite relevant during the COVID-19 pandemic. Singer is a staff scientist and head of Sustainable Energy and Environmental Systems, as well as lead of the Indoor Environment Group at the Lawrence Berkeley National Laboratory. The lecture can be viewed on the PHRC website with closed captioning.

Finally, we are excited for the upcoming sixth biennial Residential Building Design and Construction Conference (RBDCC) to be held March 2-3, 2022. As in previous conferences, it will provide unique opportunities for the attendees to benefit from presentations on a wide variety of R&D topics related to residential buildings. We are proud to hold it concurrently with our thirtieth annual PHRC Housing Conference, which is geared more toward residential building practitioners, remodelers, and code officials. PHRC Housing Conference attendees will be able to interact with speakers and attendees of the RBDCC as well.

# 2021 HANKIN DISTINGUISHED LECTURE



Amanda L. Reddy, executive director of the National Center for Healthy Housing

## FLORENCE NIGHTINGALE WAS RIGHT: THE CENTRAL ROLE OF HOUSING FOR ENSURING HEALTH AND WELL-BEING IN A CHANGING WORLD | AMANDA L. REDDY

Florence Nightingale once wrote, "The connection between health and the dwelling of the population is one of the most important that exists." In modern parlance, we often state that housing is one of the most well-documented and powerful social determinants of health, and this association holds true not just despite our increasing globalization, but also because of it. In the face of pandemics, climate change, and the ongoing fight for racial and economic justice, housing is essential to our collective and individual well-being. Homes are also increasingly serving as workplaces and learning

environments. We'll explore opportunities to leverage housing in addressing traditional and emerging threats to our health and well-being but also opportunities to use housing as a platform to help individuals and communities thrive.

Amanda Reddy is the executive director of the National Center for Healthy Housing, an organization founded on the premise that better housing can be a powerful platform for better health. Reddy describes her path into the field of environmental health by saying that "she took a job and found a calling." Over the last fifteen years, she has answered that call by working with communities to effectively prevent housing-related illness and injury by implementing evidence-based and equitable policies that improve housing quality. Reddy has served as a national leader in securing sustainable financing for healthy homes services, and she developed a talent for making topics like healthcare financing, code enforcement, and economic evaluation engaging. She holds degrees in environmental health from the London School of Hygiene and Tropical Medicine and in neuroscience from Mount Holyoke College.

The Hankin Distinguished Lecture Series invites world-class speakers to address Penn State students, faculty, staff, and industry professionals. The lecture is free and open to the public. 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, NOV. 17, 2021 @ 4:00 P.M. (E.T.) | [HTTP://BIT.LY/2021HANKIN](http://bit.ly/2021hankin)**

# 2021 DOE SOLAR DECATHLON

The Penn State student team participated virtually in this year's U.S. Department of Energy Solar Decathlon Design Challenge Competition on April 16, 2021. The annual competition challenges teams to design highly energy-efficient buildings powered by renewable energy. It also offers students a unique experience to develop critical career skills, learn from both national experts and peers, and gain valuable insights from world-class thought leaders.

Penn State tackled a unique challenge this year: a net-zero deep energy retrofit design of affordable townhomes in State College, Pennsylvania. This year's partner was the Energy+ Initiative, a collaboration of the Borough of State College, the State College Community

Land Trust, The Home Foundation, the College of Arts and Architecture's Hamer Center for Community Design, and the PHRC. To gain the latest best practices on deep energy retrofit design, the team engaged industry experts across Pennsylvania, including Laura Blau of BluPath Design, Dario Giandomenico of Green Building Alliance, Norm Horm of Envinity, Inc., and Gary Moshier of Moshier Studio.

The project team consisted of students representing multiple colleges and departments at Penn State, as producing a successful design required interdisciplinary knowledge. The team was led by veteran competition team member Holly Zimmerman, third-year architecture student. Additional team members included the following students in architecture: Thamer AlSalem, Kaila Colley, Paul Panassow, Sara Papillo, Kevin Plamenco, Alyssa Penrod, Luke Scanlon, Elizabeth Stefanelli, and Kiarat Vidal Rodriguez. Civil engineering students included Tyler Breda, Karl Diekman, Karen Marchakitus, Andrew Seitam, and Jessica Vergara; and architectural engineering students included Alan Chong, Em Dent, Shane



Penn State team for the 2021 DOE Solar Decathlon Design Challenge

Facciponti, Khaled Khalil, Jason Langland, James Ryba, and Robert Sullivan.

The competition features a one-credit course in the spring semester, CE 411: Residential Construction Design Project, which is taught by Sarah Klinetob Lowe, high-performance housing specialist of the PHRC. Faculty advisors included Hankin Chair Ali Memari as head advisor and Lisa Domenica Lulo, associate professor of architecture and director of the Hamer Center for Community Design in the Stuckeman School.

If you are interested in participating in the 2022 Solar Decathlon Team as a student, faculty mentor, or industry adviser, contact Sarah Klinetob Lowe at [sek175@psu.edu](mailto:sek175@psu.edu).



10 Rendering of the 2021 Solar Decathlon Design Challenge design

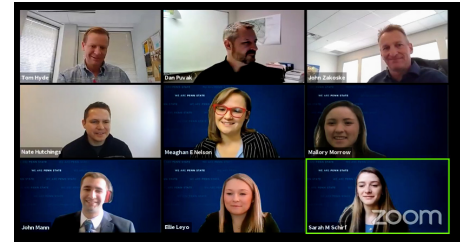


# 2021 NAHB STUDENT COMPETITION

The annual National Association of Home Builders (NAHB) Student Competition is one of the highlights of the International Builders' Show (IBS). The competition gives students the opportunity to apply skills learned in the classroom to a real construction company by completing a management project/proposal. Proposals are submitted to a group of construction company executives who act as judges. Due to the COVID-19 pandemic and university travel restrictions, the 2021 NAHB Student Competition was held virtually with presentations taking place over video conference in February 2021.

Penn State's 2021 NAHB Student Competition proposal detailed a 300-acre residential development, Dogwood Acres, in Concord, North Carolina. Dogwood Acres consisted of 265 single-family homes with three different floor plans. Penn State's NAHB Student Competition team competed against twenty-eight other four-year universities from across the country and finished in the top ten.

The 2021 presentation team included Ellie Leyo, civil engineering; John Mann, architectural engineering; Mallory Morrow, finance; Meaghan Nelson,



*Penn State NAHB Student Competition team presenting virtually*

architectural engineering; and Sarah Schirf, civil engineering. The student team was coached by PHRC staff Brian Wolfgang, associate director; and Chris Hine, residential design and construction specialist.

## ALUMNI SPOTLIGHT | DUSTIN KINNEY



*Dustin Kinney, assistant vice president of development with Toll Brothers Apartment Living*

I am the assistant vice president (AVP) of development with Toll Brothers Apartment Living. We are a specialty division within Toll Brothers that focuses on multifamily and mixed-use developments across the country. As the AVP of development, I oversee a few regions for Toll Brothers Apartment Living, primarily the Southeast through the Southwest U.S., including student housing, mixed-use, and luxury rental products. This division of Toll Brothers has existed for roughly ten years and was created out of the Great Recession, when the homebuilding company needed to diversify the product type it offered and launched a multifamily development platform. I joined in 2014 when there were only about a dozen of us at that time. Today, the company has grown to 170+ employees. We have progressed from being a Mid-Atlantic multifamily developer to expanding into the Northeast, Southeast, Midwest, Southwest, and West Coast. I have been very fortunate to experience tremendous growth here at Toll Brothers, and for the past few years, I have moved into a role to help manage a lot of that growth in building our teams and organizational practices across numerous markets, as well as expanding to new markets.

### HOW DID PENN STATE START YOU ON THIS PATHWAY?

In 2008, I received my bachelor's degree in civil engineering, with minors in both leadership development and entrepreneurship, and obtained the housing certificate. The breadth of those experiences and my personal intrigue of creating spaces people choose to live in really galvanized my desire to work in the construction management side of residential construction. When I came out of my undergraduate studies at the start of the Great Recession, the single-family market was dismal, and I was lucky that my employer from my previous summer internship in the D.C. region, CBG Building Company, kept their commitment to hire me full-time in the multifamily construction industry. The thing that resonated with me, growing up as a kid who was very hands-on with projects around the house and spending much of my childhood working on a farm, was using my hands. It was the civil engineering major that I found to be a very diverse kind of curriculum. You can take several different pathways focusing on environmental issues, water management and hydrology, transportation, structural steel and concrete, or heavy civil. How do I take a degree from a university like Penn State, along with the knowledge and understanding of the world that you gain from hard work in hands-on experiences, and apply it in a way that impacts the world? The construction management side of the engineering program was on point with where I wanted to be in my career. In construction management, it is about how to lead multidisciplinary teams to achieve a common goal. Whether you are a project manager, a superintendent on a construction site, or in pre-construction or estimating, you need to be able to manage the flow of information across a diverse team of people working individually toward a common outcome: Delivering a quality construction project on time and within the budget.

### WHAT ADVICE WOULD YOU OFFER STUDENTS OR RECENT GRADUATES ENTERING THE RESIDENTIAL CONSTRUCTION INDUSTRY?

The industry is not just about wearing work boots and hard hats. It encompasses many other roles, responsibilities, skill sets, and experiences to make a large industry like residential construction be a valuable industry to our society. Think about the architects, engineers, product research and development specialists, salespeople, accountants, lenders, lawyers, insurance agents, and a plethora of others who contribute to the industry besides true construction folks. Early career professionals often do not start where they want to end up, and you need to understand that it is okay. It is very difficult for an entry-level candidate to really know what you want to be doing when you are thirty, forty, or fifty years old, but it is important to gain diverse experiences, get outside your comfort zone, be hungry to learn, and understand what you're passionate about and why. To sum it up: Don't put a box around your degree in a way that limits your field of possibilities. The world needs a diversity of thought and skill, so surround yourself with diverse people and perspectives, and don't stop pursuing your passions.

# 2021 CAREER FAIR

## PHRC RESIDENTIAL CONSTRUCTION CAREER FAIR

All companies and organizations are invited to the 2021 PHRC Residential Construction Career Fair! Students in attendance will include various disciplines such as architectural engineering, architecture, civil engineering, economics, and more.

The event will be held in Heritage Hall of the HUB-Robeson Center on the University Park campus. Companies can register at <https://bit.ly/2021-PHRC-Career-Fair>.

Following a year off due to the COVID-19 pandemic, the PHRC team is looking forward to hosting the in-person PHRC Residential Construction Career Fair while adhering to all Penn State health guidelines. At previous fairs, companies in attendance have ranged from nationwide homebuilders to code officials to material manufacturers, which offer students a broad exposure to the diverse career opportunities in residential construction.

Additionally, the NAHB Student Chapter at Penn State offers scholarships each fall to exceptional students that are passionate about the residential construction industry. Consider providing financial support to students, and contact Tracy Dorman, [tsd5@psu.edu](mailto:tsd5@psu.edu).



Chad Owens and Jason Grottini of Envinity with a Penn State student on Nov. 13, 2019

**WEDNESDAY, NOV. 17, 2021 @ 10:00 A.M.-12:00 P.M. (E.T.) | HUB-ROBESON CENTER**



Bill Dare of Spotlight Home Inspection speaking to a Penn State student on Nov. 13, 2019



Shawn Strausbaugh and John Eby representing code officials with a Penn State student on Nov. 13, 2019



Tom McHugh of Hankin Group with a Penn State student on Nov. 13, 2019

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The PHRC collaboratively engages with the residential construction industry to catalyze advancements in homebuilding through education, training, innovation, research, and dissemination. The PHRC envisions a residential construction industry equipped with the knowledge, skills, and technology to build better homes.

Director | **Ali Memari**  
Associate Director | **Brian Wolfgang**  
Residential Design & Construction Specialist | **Chris Hine**  
High-Performance Housing Specialist | **Sarah Klinetob Lowe**  
Meeting & Events Coordinator | **Tracy Dorman**  
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