IIHCC

Solving problems that exist at, and along, the interdependencies between humans, community, and infrastructure to ultimately improve quality of life.

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What's Inside

Calendar

12/18/20 | End of Fall Semester

01/19/21 | Beginning of Spring Semester

02/12/21 | ICAT SEAD Grant Proposal Deadline

03/01/21 | ISCE Scholar Proposal Deadline

If you have any questions, comments, or concerns, please contact us:

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For more information about IIHCC, visit our website

CLUSTER HIRE SPOTLIGHT

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Human Health

Air Quality

Atmospheric Chemistry

Data Monitoring

Air Pollution Solutions

How do you see your work contributing to the goals and vision of IIHCC?

In terms of the goal of creating transdisciplinary solutions, my work engages technology, atmospheric physics, and atmospheric chemistry merged together to provide real-time air quality data around the globe to help improve human health. In a sense, being able to provide validation to satellites enables us to cover the entire globe, regardless of which community one hails from. Additionally, I am extremely interested in air quality in regions that do not presently have any representation such as Navajo Nation, where we are presently trying to install some instrumentation in collaboration with the schools there to enable the students to engage with both local and global air pollution solutions.

What other areas outside of your discipline would you consider for future research and proposal work?

One of the more natural propagations I am approaching is attempting to work with health professionals directly so that we can actually connect the information that we are collecting which exists strictly as data right now to the actual human health impacts and exposures. What I'm really interested in is the impacts of air quality not only on human health, but also on the health of the environment around us. For example, ground-level ozone caused by pollution creates billions of dollars of agricultural damage around the world and trying to connect what the safe levels of pollutants might be to potential methods of protecting crops. This connects my work to things like agriculture and botany, so there are many potential connections from my work to that of other disciplines. Another thing I'm very interested in is education because if we do not educate the next generation in sustainability and pollution prevention, they are going to suffer too. A connection between the technology I work with and educational environments could lead to improvements of quality of life not only across regions but across time as well.

CLUSTER HIRE SPOTLIGHT

Chen-Ching **Liu**

American Electric Power Professor

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Power Systems

Cyber Security

Resiliency

Artificial Intelligence

Energy Service

How do you see your work contributing to the goals and vision of IIHCC?

My collaboration with Virginia Tech Electric Service (VTES) through the Virginia Tech Climate Action Working Group (WG) is concerned with how the power grid and electric energy impact the society we live in. To deal with issues arising from climate change, the WG recommends a goal of 100% renewable electricity to help improve the overall quality of life. We propose a technology solution toward the 100% goal by building a Virginia Tech Smart Grid with large scale solar energy integrated with energy storage facilities. By storing solar energy, the Virginia Tech Smart Grid will be enabled to meet energy demand at all times and maximize the utilization of solar energy. The energy storage also enhances resilience of the Virginia Tech power grid by the new capability to sustain critical services when the bulk power grid becomes unavailable due to extreme weather conditions.

The research I am doing involved with cybersecurity and resiliency is very closely tied to how we can maintain electric energy services in the interest of preventing electric service disruptions. In additional to enhancing resilience with microgrid technologies, my students and I work on cyber security of the power grid. We develop new methods to detect cyber intrusions into the information and communications technology supporting monitoring and control of electric power grids.

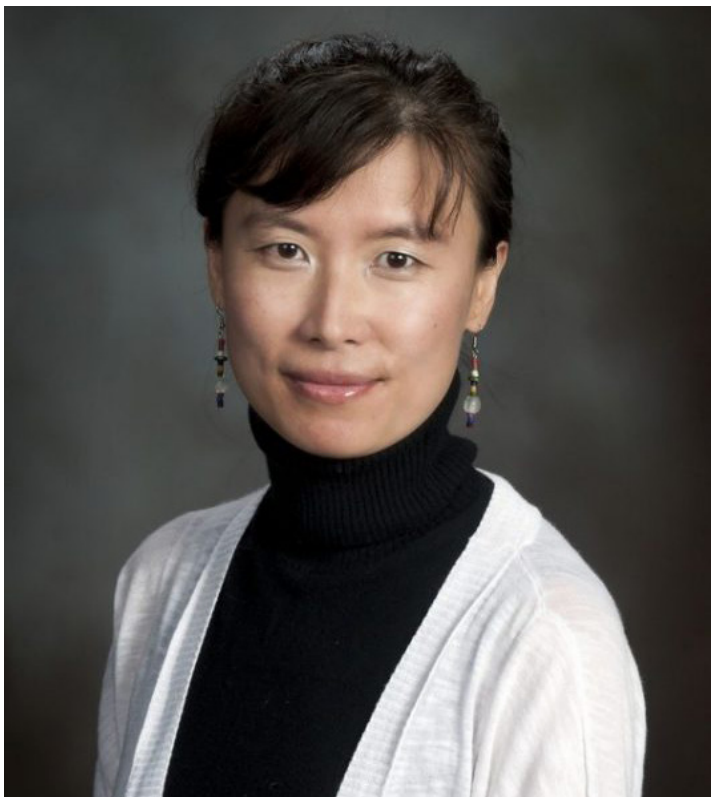
What other areas outside of your discipline would you consider for future research and proposal work?

Electrical energy studies have a very natural component of economics. This is because electrical energy, by itself, is being traded and can be viewed as a commodity. People generate/consume and then buy/sell electric energy to serve their various needs. As such, economics is an area that would work well with power engineering. I have been working in collaboration with economists and I feel that we have not done enough at Virginia Tech to promote this important subject. I would love to work with economics-oriented colleagues.

Another discipline I would like to work with is sociology because electric energy impacts people. We work on technology dedicated to clean energy, but how do people actually perceive or accept that? New technology may seem wonderful at first glance, but a sociologist is able to determine whether or not a particular community would view it as such. I would love for anyone in either of these fields to feel welcome to reach out to me with ideas for collaboration, as I feel that multi-disciplinary research is a great opportunity to make high-impact contribution to all fields of study.

ASSESSMENT STRATEGIES FOR AGE-FRIENDLY CITIES WITH DR. EUNJU HWANG

All across the world, young people are flocking to big cities in search of opportunities to make the most of what they have. As they do so, those cities often become crowded and some of the older community members become inclined to retire in smaller, more intimate communities. Dr. Eunju Hwang, Associate Professor with the Department of Apparel Housing and Resource Management, and her partners at the National Research Foundation of Korea have picked up on this trend and are working to make this new setting more welcoming to those of older generations.



Trained in the Interdisciplinary Housing Program for Vulnerable Populations, with a Gerontology minor for her PhD from the University of Minnesota, Dr. Hwang's primary research goal is to improve the overall quality of life and well-being of diverse populations. Her recent research activities focus on age-friendly environments (AFE) from international perspectives. These environments are intended to make our homes, buildings, and neighborhoods more user- and pedestrian-friendly for active aging. Smart technology is critical in the creation of more supportive and inclusive environments for everybody, Hwang says, but particularly for senior citizens.

Hwang accentuates that people can have good intentions and ideas, but if the environment does not support those concepts, then they are fruitless and can even become barriers instead of benefits. This, Hwang points out, is the value of transdisciplinary approaches to projects such as hers, as varying perspectives on an issue can shed tremendous light on the best possible solutions for that issue.

To build interdisciplinary research partnerships, she has received grants from Virginia Tech's Institute for Society, Culture and Environment (ISCE), Jeju Research Institute and the National Research Foundation of Korea in South Korea. She has used the World Health Organization (WHO)'s Global Age-Friendly Cities Initiative (GAFCI) to build research and policy frameworks to work with local communities. The key elements of GAFCI include built environmental aspects such as universally designed homes/buildings and walkable and safe neighborhoods. These are important in order to promote supportive environments for active lifestyles and overall improvements to the quality of life.

In Jeju, South Korea she has collaborated with the Jeju Ageing Society Research Center (JASRC). Jeju is an island off the southern coast of South Korea. It has the highest proportion of the oldest citizens (85+) in the country. She has visited there with Virginia Tech collaborators from her department and the Center for Gerontology regularly since 2013. She led data collection to analyze Jeju's older adults' perception and impacts of AFEs and built foundational work in 2018, when the Jeju provincial government started to adopt WHO's GAFCI as their policy priority. Following this, she still collaborates with JASRC to train AFE policy monitoring groups to assess their home/building

Hwang and her collaborators signed a Memorandum of Understanding between Jeju Development Institute and Virginia Tech in 2013.

accessibility and community walkability. These groups observe zero-step entries, universally designed bathrooms, street signs, and curb cuts on sidewalks.

In Hwang's words, they have been impressive citizen scientists to work in the interest of making their neighborhoods more life-span friendly. Their next step is to test smart technology for community-wide care service models and emergency preparedness.

Smart technology is especially useful in working to achieve the goals of Hwang's work. For example, people may employ cues, signals, and personal experiences to determine the best routes, safety options, and avoidance strategies when it comes to environmental hazards. A virtual environment can be utilized to track users' experience through tools such as mobility eye tracking. Augmented reality will enhance environmental awareness with real-time visual/auditory information, as well as improve methods of data collection. This will allow for an interactive experience with the real world and capture variations in sensory modalities.

The diversity of methods of data collection, as well as the firm adherence to Hwang's goals of improving quality of life makes this kind of project extremely delicate. These conditions require the team to reach across not only cultural boundaries, but also across disciplinary boundaries within the team itself. The project necessitates multi-disciplinary approaches to nearly all the challenges it faces, and Hwang says that "without collaboration, I cannot see this kind of project going through."

More information about her research activities and Virginia Tech's involvement in Jeju is available here. Her work related to VE is available at this link.

Anyone looking to reach out to Dr. Hwang with any questions or ideas for collaboration may contact her via email, hwange@vt.edu.

CALL FOR ISCE SCHOLARS

Our institute partner ISCE has launched a call for grants that provide faculty support for research in the social sciences, broadly defined, and consistent with ISCE's four thematic areas. Six to eight awards of up to $30,000 will be awarded for a period of one year, beginning in July 2021. The deadline is March 1, 20201. More information can be found on ISCE's website.

CALL FOR ICAT GRANTS PROPOSALS

Our institute partner ICAT has launched their annual call for grant proposals. Awards range from $25,000 for Major SEAD grants to $1,500 for student grants. The submission deadline is 5pm on February 12, 2021. More information can be found on ICAT's website.

TEAMS SUBMIT CONCEPT LETTERS TO NSF STRENGTHENING AMERICAN INFRASTRUCTURE INITIATIVE

On Friday, November 20th, IIHCC and ISCE co-hosted an information session for the NSF Strengthening American Infrastructure initiative. 72 faculty expressed interest, and over 50 attended the meeting, representing 10 different colleges and institutes. Uring the session, the requirements for submission were outlined, tips for responding to the call, and potential areas of interest discussed. 5 teams consisting of a total of 36 faculty from across the university and external partners submitted the required 2-page concept letter on December 11th. We are proud of the teams and hopeful that they will be invited to submit a full EAGER Proposal. winning awards will be for up to $300,000 for up to 2 years of support.