



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

Cluster Hire Spotlight
Census Research Data Center
IIHCC Climate Survey Notice
IIHCC Call to Action
In the News

Calendar

5/06	Hitt and IIC Intelligent Infrastructure Meeting
5/09	Virginia Tech Reading Day
5/10-15	Virginia Tech Exams
5/17-18	Virginia Tech Graduation
5/28	IIHCC Monthly Stakeholder Update Meeting

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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**Auditory
Displays**

**Affective
Computing**

**Automotive
User Interfaces**

**Assistive
Technologies**

**Aesthetic
Computing**

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

Initially, I can say that we are focusing on a non-traditional construct, which is emotions. Previously, human-computer interaction and human factors have focused mostly on cognition, but we want to see the entire human. Not just cognition but cognition, emotion, and behavior—all things that we want to see together. And, we also focus on a non-traditional modality, which is audio because, previously, 90% of all the research projects in human-computer interaction focused on vision. So, we focus on audio as well as visual, tactile, and haptic. This type of different focus on non-traditional constructs and modality can help us see the interaction between humans and technologies in a more holistic way, and then, we can improve the interactions between people and technologies. Ultimately, that will contribute to making intelligent infrastructure for the community and Virginia Tech.

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

While working at Michigan State, we created an after-school program called “Child-Robot Theater”. We would bring all the robots to the elementary school every Wednesday and create live theater play with the kids. The kids were the actors and actresses, and they were directing, selecting music, and making props. Even when they were making props with crayons and pens, we had swarm robots, like vehicle robots, with pens attached to their body so that the children could make geometric shapes (e.g., Beast’s castle) using the swarm robots. We did this after-school program a couple of times. One iteration lasted 8-12 weeks and every week was a different module: acting module, music module, drawing module, and dancing module to learn about robots, STEM education, and also art, music, and dance. We call this STEAM education: STEM plus art and design. I used to work in computer science and psychology and so, my students came from computer science and psychology, but this project is really about theater. One very good thing about Virginia Tech is that we have visual arts and performing arts departments. I want to work more with these music, theater, dance, cinema, and visual arts folks. That could really add to this STEAM education project.

CLUSTER HIRE SPOTLIGHT



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**Civil
Infrastructure**

Concrete

**Cement
Chemistry**

**Materials
Sustainability**

**Pavement
Engineering**

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

I see my work fitting into resilient infrastructure. The work I do relates to the materials that we use in civil engineering infrastructure. I am in the Transportation Infrastructure and Systems Engineering group (TISE), so my background is more in materials applications for roadways and pavements, particularly “how can we, more or less, reuse waste or byproduct materials in our roadway systems.” This leads to a materials sustainability perspective, mostly with regard to materials science. If you are reusing a byproduct or waste material in your roadway structure—let’s say in your concrete—what’s going on at a materials level? What’s the chemistry of that interaction, and how are we changing the failure modes of our pavement structure by using these alternative materials? One example is taking old asphalt pavements, crushing it up, and mixing it into concrete for new roadways, which was the basis of my graduate work. Do we change the failure mode of our pavement by doing this? Do we have to change our design methodology as a result? It turns out that when you do things like this, the material doesn’t behave the same anymore, so you have to start thinking about changing your design methodology.

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

Right now, I am talking with some colleagues in a few departments, kicking around some ideas. For example, how can we use novel techniques to study materials and civil infrastructure? In one project, I’m studying what is going on at the nanoscale between cement and water before it even becomes concrete—just in the first few seconds. I have been in talks with some other people about studying the corrosion of metals. We use a lot of steel and concrete in civil infrastructure, and over time that steel typically corrodes. We are trying to better understand what is going on there, particularly at the nanoscale, and specifically how the relatively high pH environment in concrete affects this. I am also working with people in geosciences, basically taking the techniques they use in geochemistry and applying them to cement. They are more of the experts on these sort of reaction kinetics. How can we apply that to my scenario of cements? I’m also working with colleagues within the Civil Engineering Department. Since I focus on concrete from more of a materials perspective, we can actually look at multiple applications, such as structural engineering as well as transportation engineering. Concrete is a very versatile material, so I’m interested in researching any application; for instance, immobilization or encapsulation of waste materials, use of recycled or by-product materials in concrete, chemical modifiers for concrete, and alternative or supplementary cementitious systems.

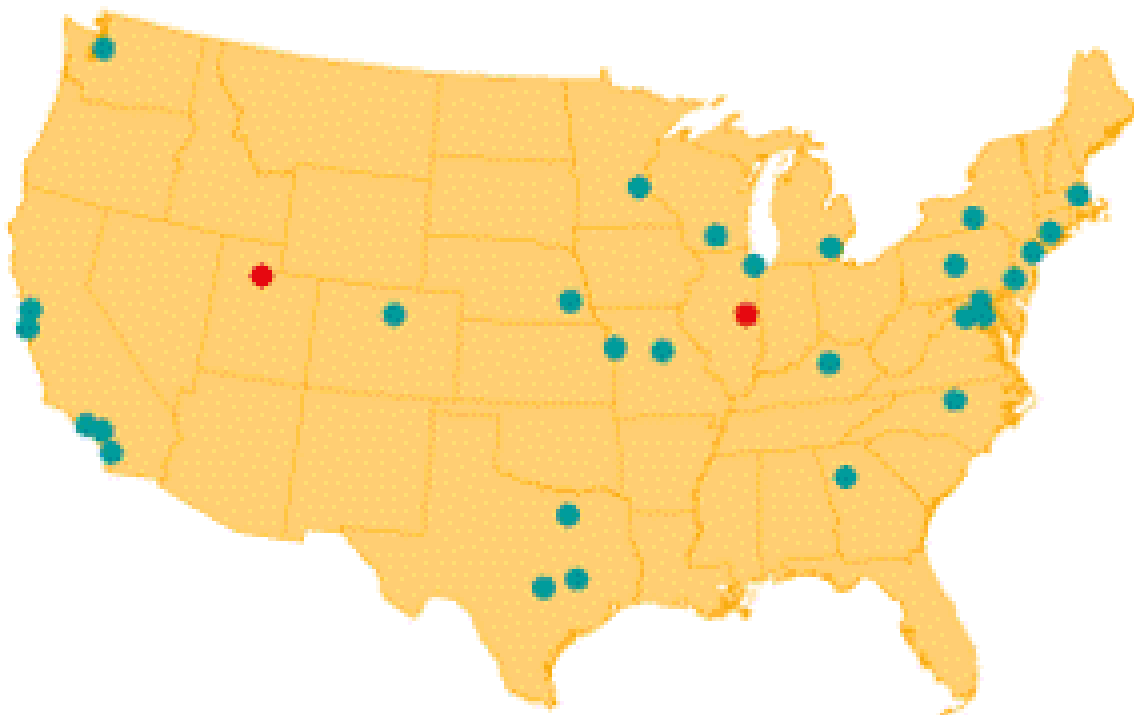
CENSUS RESEARCH DATA CENTER

Currently, IIHCC is collaborating with the Institute for Society, Culture, and Environment (ISCE) to provide Virginia Tech faculty and researchers access to the Census Research Data Center. This data center is a secure federal facility that provides approved researchers access to restricted microdata from multiple federal agencies, including the U.S. Census Bureau, Bureau of Labor Statistics (BLS), National Center for Health Statistics (NCHS), Agency for Healthcare Research and Quality (AHRQ), and more. The data center houses microdata and variables not publicly available. Additionally, researchers are able to access a full range of response items (e.g. industry codes, occupational codes, detailed race answers, etc.) and make linkages between external data and internal data sets via non-public link keys. There are a number of benefits to the access and use of this resource. These would include:

- Greatly expanding the policy and basic questions that can be addressed.
- Building on past research findings with richer data.
- Improving competitiveness of grants and publications (60% of publications using data from the CRDC are published in top journals).
- Improving graduate education (big data/statistical techniques) and placement.

To access the CRDC, research projects must undergo a formal approval process with the agency that owns the data, e.g. U.S. Census Bureau, NCHS, and BLS. Researchers must go through a background investigation that qualifies them for “Special Sworn Status (SSS)”, which makes them an unpaid Census Bureau employee. Results must be formally reviewed for disclosure violations prior to leaving the secure facility. For further information or for inquiries concerning the CRDC, please contact IIHCC at IIHCC@vtti.vt.edu

Census Research Data Center Locations



IIHCC CLIMATE SURVEY NOTICE

This summer, IIHCC will be sending out a climate survey to all those involved with the Destination Area. This survey will be used to identify IIHCC's current strengths as well as areas of improvement for the upcoming school year. Furthermore, this survey will provide an organized, concise outlet for those who wish to share their thoughts. It is imperative to the ongoing success of this Destination Area that members critically assess the Destination Area's work and provide feedback. This feedback will help to determine IIHCC's course for the following year to provide the most value for all those involved. We ask that all involved with IIHCC be aware of the climate survey and complete it upon request.



IIHCC CALL TO ACTION

IIHCC is looking for people to assist in the development of the IIHCC mission and goals. Roles are available in IIHCC working groups, including Curriculum, Human-Centered Communities, Research, and Facilities. For more information about these roles and how you can support the Destination Area and associated Beyond Boundaries initiatives, contact us at IIHCC@vtti.vt.edu.



IN THE NEWS

Meet the Robot Firefighter That Battled the Notre Dame Blaze | During the burning of Notre Dame, a new approach to tackling structure fires was deployed: a robotic vehicle called Colossus.

What is a Living Roof? The standard for most homes in the U.S. is asphalt shingles, followed by clay tiles, wood shakes and metal roofing. One medium often not considered in North America is living vegetation.

