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

2/13 | IIHCC Community Social at the Eastern Divide Brewing Co.

2/20 | Submission Deadline For The IIHCC Call for Grant Proposals

Correction for Vol. 2 No. 5

In Jonas Hauptman's Cluster Hire Spotlight, it is stated that he received an MFA in Metalsmithing and Craft & Design. However, he received an MFA in Metalsmithing with coursework in Craft & Design.

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

Essentially, one of the main objectives of my work is to develop a new generation of materials, the (ultra-)wide-bandgap semiconductors, and the related devices that can enable system-level benefits to all intelligent systems; not only power systems but many others like internet of things (IoT), solar energy systems, smart buildings/architecture, etc. Our first goal is to develop new materials and devices to be used for energy conversion and to make energy conversion more efficient. The second goal is to simplify system-level design, which can reduce the form factor of the system—size, weight, and volume. Ultimately, if you combine these two goals together, then we can envision lower costs for all these systems. Finally, the device or the materials that we develop are not only more efficient for energy processing but can also enable higher efficiency in energy harvesting, which will be important for wireless connection because the wireless connection is the foundation for IoT. The overall energy efficiency of wireless connection is still very low, and this is one of the limitations because a lot of the energy is lost during transformation. Basically, our devices and materials contribute to ensure that energy flow, energy processing, and energy communication occur with high efficiency, bringing a great amount of benefits to all the applications of the system. Top- level applications may benefit from the circuit to the system, from consumer electronic products to very large-scale systems like the Grid and buildings.

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

I am trying to see the interaction of fundamental system processing with machine learning and artificial intelligence. For example, in semiconductor processing, typically devices are manufactured on a wafer. One of the key challenges for the semiconductor industry is how to improve the yield of wafer production. The prerequisite to improve the yield is to categorize every device in a wafer, understand if the performance is outside the range of our expectations, and determine the root cause for the variance. This variance could be from one of many manufacturing steps or could be due to the nonuniformity of the materials or the wafer itself. As you can imagine, it can be very time consuming and costly, and it is not easy to go through every wafer and identify what is the root cause for the variation. That is why for any generation of devices, hundreds of billions of dollars have been spent on these processes. So, I want to research how machine learning can play its role in process variability analysis. If we can first identify the roots causes for potential variations in device performance, then we can train the machine learning algorithm using the collected data. If that algorithm is trained very well, then, for any device performance that it measures, the algorithm can tell you the root cause of this variation.

One field I am currently exploring is the application of machine learning in microelectronics and power electronics. For example, you have potential variation that may appear in device design, circuit design, etc. because these designs are essentially based on the experiences of the designer. We can apply machine learning to these designs because it can accommodate in the processing of more components and consider more combinations compared to any designer's existing experience. I think this can potentially lead us to achieve the global optimization for hardware systems that involve material-device-circuit interplays.

Advanced Materials

Semiconductor Devices

Power Electronics

Microelectronic Systems

Machine Learning

IIHCC'S NEW ADMINISTRATIVE STRUCTURE

In an effort to revitalize the Intelligent Infrastructure for Human-Centered Communities Destination Area (IIHCC) and reinvigorate engagement and participation, the Learning Systems Innovation and Effectiveness Office (LSIE) announced in October 2019 a new administrative structure and leadership. The Institute for Society, Culture, and Environment (ISCE) and the Institute for Creativity, Arts, and Technology (ICAT) have partnered to assume the role of administrative home for IIHCC. IIHCC will continue its operations to promote transdisciplinary research across the university and beyond.

IIHCC CALL FOR GRANT PROPOSALS

IIHCC invites proposals for projects that are creative, innovative, and show strong potential to contribute to IIHCC's goals and those of its research partners. These grants can be used to pursue a range of transdisciplinary activities, including creative projects, feasibility studies, and preliminary research studies. We will support projects that will ultimately become larger, longer term projects, as well as one-time events or exhibitions that are visible at the national level. There are three grant types: two open calls for $50,000 and $25,000, and one in partnership with ISCE and ICAT at $25,000 to fund a project that addresses age-centered environments. The deadline is February 20, 2020. More details about the grants and application requirements can be found here.

AKI ISHIDA APPOINTED IIHCC DIRECTOR

As a part of the updated administrative structure, Aki Ishida has taken the role of **IIHCC Director**. She is Associate Professor of Architecture and a registered architect with over 17 years of professional practice in New York City. She is a Senior Fellow of ICAT, and both her written scholarship and design projects are situated at the intersections of art, technology, and culture. In her book Blurred Transparencies in Contemporary Glass Architecture: Material, Culture and Technology (forthcoming in April 2020 from Routledge), she examines the technical advancements of glass within broader cultural and social contexts. She has led numerous transdisciplinary design projects with partners both inside and outside of the university, including the Smithsonian, the Japan Society New York, and Memorial Sloan Kettering Cancer Center. She has served three times as a panelist for the National Endowment for the Arts. "I am excited to foster cross-disciplinary research and teaching that examines both the physical and social infrastructures in our lives," says Ishida. Jordan Erisman, who served in the interim, will continue to assist with IIHCC operations as Project Analyst for IIHCC under Prof. Ishida.

SYLVESTER JOHNSON JOINS IIHCC STAKEHOLDER COMMITTEE

Dr. Sylvester Johnson, Director of the Center for Humanities, Executive Director of the Tech for Humanity Initiative and Assistant Vice Provost for the Humanities, has joined the Intelligent Infrastructure for Human-Centered Communities Stakeholder Committee. Sylvester's research has examined religion, race, and empire in the Atlantic world; religion and sexuality; national security practices; and the impact of intelligent machines and human enhancement on human identity and race governance. He is currently writing a study of book on human identity and politics in an age of intelligent machines and human-machine symbiosis. His appointment is part of a continued effort to connect researchers across the University with different backgrounds to tackle "sticky" problems, global issues requiring multi-faceted solutions. "Today's innovation economy is bringing tremendous benefits, but it is also producing real challenges, including concentrating wealth at an unprecedented scale." Dr. Johnson states. "This trend is intersecting with historical, institutional forms of injustice and precarity. As we focus on advancing the interests of human thriving, we must forge new opportunities for comprehensive approaches to technology to lead a society that is increasingly technological and that is being reshaped by innovation."

IIHCC COMMUNITY SOCIAL AT THE EASTERN DIVIDE BREWING CO.

You are invited to join the IIHCC community for a networking social at the Eastern Divide Brewing Company on Thursday, February 13 from 5 to 7pm. We will provide hors d'oeuvres and beverages. This is a chance to connect with your colleagues, learn about our Destination Area (DA), and meet new, potential collaborators. We hope you might have a conversation with someone that provokes a new project. To assist us with preparation, we request your response through this RSVP link.

IIHCC IN THE WORLD

Discovery of New Method Speeds Up Precision 3D Bioprinting | Researchers at TU Wien have made exciting steps in the field of bioprinting by improving the speed and accuracy that they can embed cells into 3-D matrices.

United Kingdom to embark on 'agricultural revolution' in break from EU farm subsidies | Great Britain expects sweeping changes to its agriculture industry as Brexit moves forward.

Company to harvest green hydrogen by igniting oil fires underground | Proton Technologies, a startup company focusing on harvesting hydrogen gas, seeks to use an innovative approach to collect the gas from petroleum reserves while maintaining zero carbon emissions during the process.