ANS HFICD

Happy Fall to all the members of ANS Human Factors, Instrumentation and Control Division (HFICD)! My name is Anna Hall, and I am the new HFICD Communications Chair. Welcome to our Fall 2025 Newsletter! Please find below exciting updates and news from our division. Feel free to forward any HFICD communications updates or bulletins to me at Anna.Hall@INL.gov – I'd love to hear from you!

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Hyun Gook Kang	*RPI*
Ronald K. King	*Consultant*
Nancy J. Lybeck	*Idaho National Lab*
Padhraic L. Mulligan	*Oak Ridge National Lab*
Christopher Poresky	*Kairos Power*
Michael Rowland	*Sandia National Lab*
Michael Thow	*EPRI*
Graeme West	*University of Strathclyde*
Fan Zhang	*Georgia Institute of Technology*
Xingang Zhao	*University of Tennessee Knoxville*

Newsletter Contents:

Thoughts from the new HFICD Chair – Adam Deatherage

Dear HFICD Members,

It is a great privilege and honor to serve as the 2025-2026 chair of our division. It is an exciting time to be in nuclear and a part of HFICD, and I am grateful to be tasked with a small role to help the industry at large and our Human Factors and I&C community as we navigate the wave of momentum our industry is experiencing. One of the ways our division is preparing for the future is by actively looking at ways we can improve our processes and evaluating new ways to serve our members. This effort was formally started earlier this year by my predecessor Dr. Ron Boring, who as chair established a formal "HFICD Improvement Committee" which is being spearheaded by Dr. Ahmad Al-Rashdan. This was a key step for our division's future, and I sincerely appreciate Ron and Ahmad's leadership in this effort.

One of my key goals for the year as chair is to take the recommendations being developed by this committee and help to ensure successful implementation. As an I&C person, I've noticed that like transmitters or temperature sensors, we as people and organizations have a tendency to drift. When that happens, we need recalibrating, and things like this improvement committee are the nuts and bolts of how that recalibration happens. I won't spoil all the suggested changes here, but I am excited to see what the next year has in store and I'm grateful to play a small part in helping prepare the division for the opportunity our industry has in front of us.

I'd be remiss to not express gratitude for a few others in this column. First, I want to sincerely thank Dr. Vivek Agarwal, who leads our program committee and all the tireless work he and so many others put into the NPIC&HMIT 2025 conference to make it successful. I'd also like to thank Dr. Anna Hall, who has graciously taken over the communications committee and is already doing an excellent job, as seen in this edition of the newsletter!

To conclude, I encourage you all as we approach the new year to be thinking about ways that you can increase your involvement and participation in HFICD. If there is an area that you think could be improved, please do let us know as we are actively trying to ensure the division continues to serve as the premier venue for Human Factors and I&C involvement.

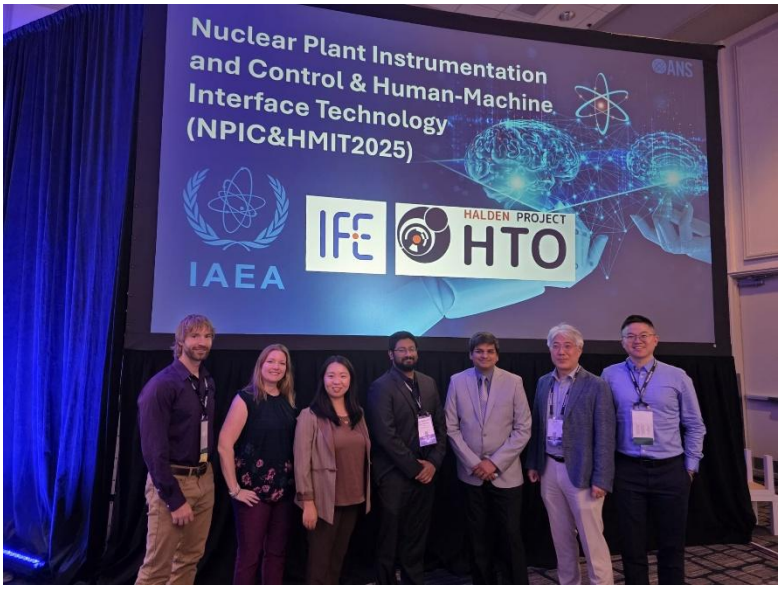
Adam Deatherage, MBA
HFICD Division Chair 2025-2026

Improvement Committee Update

HFICD established an improvement committee in 2024 with the goal of enhancing the performance of the division. This committee commenced its activities in January 2025, with Ahmad Al Rashdan appointed Chair of the Committee. The first phase targeted issues within the division's various committees separately. To achieve this, the committee conducted a series of meetings focused on identifying and understanding the challenges faced by each committee. Following the initial identification phase, a voting process was implemented to prioritize the most pressing issues. This process enabled the committee to target the top candidates for improvement, ensuring that their efforts would have the most significant impact.

Once the key issues were identified, the committee engaged in an extensive brainstorming effort to generate a wide range of potential solutions. Members were encouraged to propose diverse and effective strategies for addressing the identified challenges. Subsequent follow-up meetings were held to evaluate the recommended solutions. During these sessions, the committee reviewed and discussed each proposed solution and shortlisted the most viable and impactful ones. Moving forward, meetings will be held with each of the division's committees. During these meetings, the improvement committee will share the identified issues and the proposed solutions and hold open discussions on the best methods for implementing these solutions. The focus will be on collaboratively developing actionable plans and establishing clear metrics for assessing the effectiveness of the deployed solutions. This collaborative effort is expected to drive meaningful improvements and foster a culture of continuous enhancement within the division.

ANS NPIC 2025 Summary



The 14th International Topical Meeting on Nuclear Plant Instrumentation, Control, and Human-Machine Interface Technologies (NPIC & HMIT 2025), was held in Chicago, Illinois, United States from June 15 to 18. Hosted by the American Nuclear Society, the conference was held in cooperation with the International Atomic Energy Agency (IAEA) and Institute for Energy, Halden Project. NPIC&HMIT was one of the embedded conferences with the ANS Annual Meeting that attracted 1408 registered attendants. NPIC&HMIT had 201 full papers presented across 44 technical sessions, on topics covering (but not limited to) sensors, instrumentation, control, human factors, artificial intelligence, digital twins, standards, and regulatory guidance for both existing and new reactor technologies.

The technical presentations were amplified by seven panel discussions and three plenary sessions, solidifying NPIC&HMIT as the premier forum for nuclear instrumentation, control, and human factors engineering professionals to engage with national and international industry leaders, regulators, and academics. The Digital Instrumentation & Control and Human Factors Engineering Workshop: Enabling Future Technologies for the Nuclear Fleet, brought together experts from academia, industry, international organizations, and regulatory bodies, to exchange information, brainstorm, and identify collaboration opportunities.

One of the highlights of the 2025 NPIC&HMIT conference was the remarkable engagement of students, emphasizing the critical role of nurturing future leaders in the nuclear industry. The student paper competition not only showcased groundbreaking research but also provided an unparalleled platform for young innovators to gain recognition. The successful planning and execution of the 2025 NPIC&HMIT is a testament to the exceptional teamwork and dedication of the ANS staff and the Conference Organizing Committee. On behalf of the ANS HFICD and the 2025 NPIC&HMIT Organizing Committee, I would like to extend my heartfelt gratitude to all the reviewers and sponsors. Your invaluable contributions and unwavering support truly made this conference an outstanding and memorable event. Thank you for your commitment to advance the nuclear industry.
Looking forward to your active participation and engagement with the 15th NPIC&HMIT conference to be held in Salt Lake City, Utah, from May 8 to 12, 2027. Dr. Hyun is the general chair of the 2027 NPIC&HMIT.

Dr. Vivek Agarwal, General Chair, 2025 NPIC&HMIT

Thoughts from the outgoing HFICD Chair – Ron Boring

It's been an honor to serve as the HFICD Chair this past year. Over this year, the HFICD elected officers, members of the Executive Council, and I, wrestled with HFICD's changing role to support new researchers and practitioners in human factors and instrumentation and controls (HF/IC). How do we promote opportunities for HF/IC for both existing and new reactors? How do we best support nuclear stakeholders to value and avail themselves of these capabilities? How can we help educate the future workforce to support this increased need for HF/IC expertise? Add to this, does AI fundamentally shift the role of HF/IC such that we make that part of our charter?

There are no simple answers to these questions. What is certain is that HFICD remains more central than ever to the nuclear community and ANS. I'm particularly proud of the HFICD Improvement Committee (led by Dr. Ahmad Al Rashdan) that's working to identify how HFICD can develop and fully engage the talents of our members. I'm also looking forward to our new HFICD chair, Adam Deatherage, moving the division forward in these areas.

Changes in Nuclear Technology that Require HF/IC

Domain	Current Reactors	Advanced Reactors
Technology	Analog	Digital
Procedures	Paper Procedures	Computerized Procedures
Control	Human	Automation
Operator Training	Years	Months
Operator Role	Monitoring + Control	Monitoring
Monitoring Type	Deductive	Inferential/Predictive
Operator Span	Single Unit	Multiple Units
Control Station	Control Room	Workstation
Operations Location	Local	Remote
Number of Operators	Crew	Individual
Communications	Oral	Digital
Security	Physical	Cyber

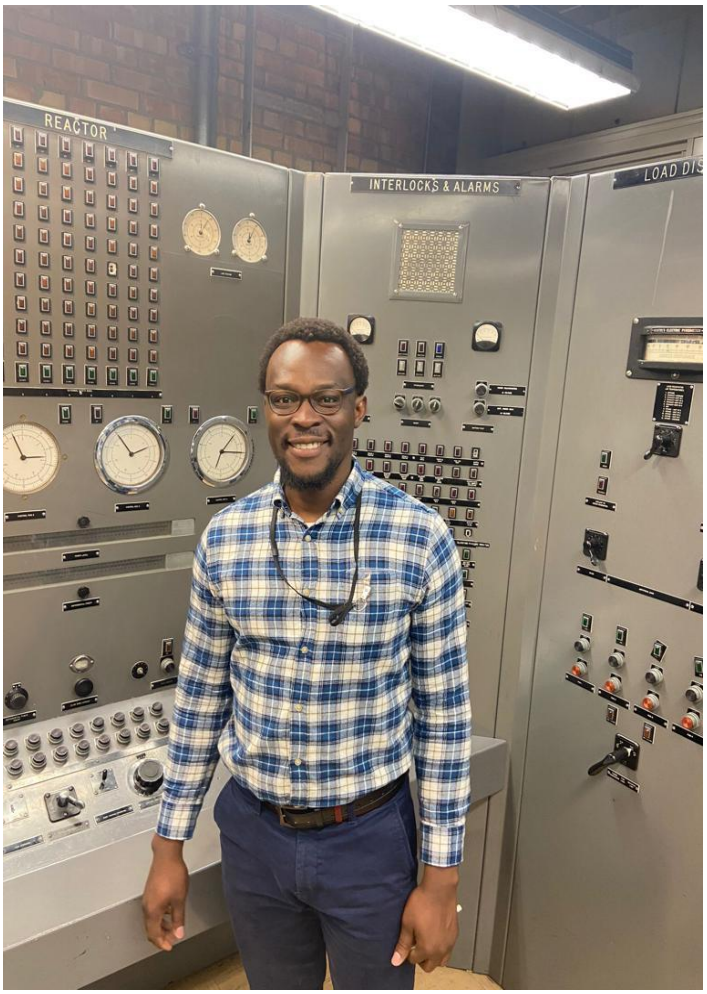
Boring (2023) | DOI: 10.54941/ahfe1003781

Recently, our HFICD student representative, Gbenga Gideon, attended the ANS Student Conference. (Make sure to see the excellent feature on him later in this newsletter!) Of the roughly 650 attendees, Gbenga seems to be the only person with a primary focus on human factors. I use this example to reflect on the importance of ensuring we as a community have the right pipeline to ensure the future success of nuclear power deployment. As universities, national labs, vendors, and utilities move from design to deployment of new reactors, the skillsets represented by HF/IC become increasingly important (see table for crosswalk of emerging areas). New plants absolutely require control systems and, even amid increases in automation, humans remain essential for successful operations. But realistically, this has not been the main focus of nuclear energy funding or education in recent decades. The demand simply hasn't been there. Efforts like the U.S. Department of Energy's Light Water Reactor Sustainability Program or Nuclear Energy University Program have helped reinvigorate nuclear activities in HF/IC. Growing electricity demand for data centers and manufacturing industries has shifted the pendulum from maintaining current nuclear capacity to expanding it significantly. Presidential Executive Orders have also jumpstarted this expansion. As the demand for nuclear energy rises, so too will the demand for the core disciplines represented by HF/IC.

That is the tremendous opportunity before us! Like so many of you, I'm passionate about what HF/IC can do for the future of nuclear energy. We need to do everything in our ability to make sure the pipeline supports these activities. I encourage my industry counterparts to mentor students and early career staff to help them be ready with essential HF/IC skills. Where there are gaps, work to establish paths to integration, including identifying new funding that enables people to step into HF/IC roles. For educators, please ensure that HF/IC is part of the curriculum so that new graduates have these core skills. And, for my student and early career friends, find your passion in HF/IC and bring your best ideas forward. We need you and your ideas for the next generation of nuclear energy! HFICD will continue to be the champion and home for HF/IC professionals. I encourage you to find ways to be involved in sharing your expertise, opportunities, and vision.

Young Member Spotlight – Olugbenga Gideon

Olugbenga "Gbenga" Gideon is a PhD student in Human Factors at University of Idaho and serves as the HFICD Student Representative.



I'm originally from Nigeria and have my undergraduate degree in basic medical sciences. I worked in human resources for ten years in Nigeria, and then came this wonderful opportunity for me and my wife to pursue our PhDs in the USA. I discovered human factors in the Psychology Department at University of Idaho, but this was new terrain for me. My background had nothing to do with human factors or nuclear. Everything was new.

The first time I ever heard about nuclear engineering was in my first engineering psychology class, where one of my professors used an example from some of the control room studies that were happening at Idaho National Laboratory. This sounded very interesting to me, especially pertaining to attention, perception, and workload in the control room. I just said to myself that if I ever had an opportunity, this is something I would definitely like to explore.

The first time I had the opportunity to explore that interest was when I worked with INL in the spring of 2022. INL had me do an assessment of one of the simulators for a small modular reactor vendor. Basically, I was to assess the capability of that control room and also review the capabilities that simulators will require to go beyond conventional use cases—from training for current and future nuclear power plants to becoming a testbed for conducting research into advanced reactor deployment needs.

In just three years, I got to the point where I could actually be part of the design of a plant system! Last summer I worked on authoring the computerized procedure system for running a simulator for a small modular reactor. When I came into my first contact with doing something with nuclear engineering in 2022, it was very overwhelming. I knew nothing. Nuclear looks very intimidating, especially if you come in as a psychologist. So, there's that fear. I definitely experienced it! But, I will say that I've had the privilege of working with the most supportive people at INL—my mentors Doctors Ron Boring and Tom Ulrich—and at University of Idaho—Professor Roger Lew. They were able to shepherd me through the process. They taught me to have patience with myself. Give yourself time to learn. Learn something new every day about nuclear engineering, and just keep progressing. It takes time. It might feel difficult at the outset, but just keep at it and don't be intimidated. Go for it, find good mentors, and work hard!

Unfortunately, nuclear energy is still in its infancy in my home country. I really look forward to a day when we will also be able to, as a nation, join the conversation on how to harness the endless possibilities and potentials of nuclear to power my country and to also provide energy solutions around the challenges that we have currently. Human factors empowers me to shape our future in nuclear energy deployment!

Where are they now? Syed Bahauddin Alam

I am currently an Assistant Professor in the Department of Nuclear, Plasma & Radiological Engineering at the University of Illinois Urbana-Champaign. My research focuses on energy-efficient artificial intelligence (AI), digital twins, cybersecurity, and nuclear energy, particularly in developing foundational models for next-generation nuclear systems. I have a strong commitment to advancing the scientific and mathematical foundations of trustworthy AI for energy applications, mentoring the next generation of scientists and engineers, and contributing to national AI initiatives.

Presently, I serve as one of 11 National Committee Members on *Foundation Models for Scientific Discovery and Innovation* at the National Academies of Sciences, Engineering, and Medicine. In 2025, I was recognized as a national AI leader in the University of Illinois's official response to the White House AI Action Plan. Additionally, I was invited by the Simons Foundation as one of approximately 100 global leaders shaping the future of foundation models for science. I received the Dean's Award for Excellence in Research from the Grainger College of Engineering in 2025 and was a finalist for the Illinois Innovation Award in 2024. My research has been featured in Bloomberg News for expert commentary on "Nuclear-Powered Data Centers," and my work on digital twins for nuclear systems, published in the Nature Portfolio, ranked in the top 5% of all research outputs scored by Nature Altmetric globally.

Recent HFICD Award Winners

2025 Don Miller Award Winner

Stephen A. Fleger from the U.S. Nuclear Regulatory Commission (Retired) received the Don Miller Award for outstanding contributions to human factors engineering in the nuclear industry. The award honors major achievements in nuclear instrumentation, control, and human-machine interface technology worldwide, as exemplified by Don Miller.

The prestigious award honors Steve's more than 45 years of leadership, research, and innovation in advancing safety and human performance across the nuclear industry. Following the Three Mile Island accident, Steve's extensive research and technical contributions helped shape critical regulatory guidance, including *NUREG-0700*, *NUREG-0711,* and *NUREG-0800.* These documents continue to guide the application of human factors principles throughout the nuclear industry today.

At the U.S. Nuclear Regulatory Commission, where he served for 16 years before retiring in 2024, Steve was instrumental in advancing human factors engineering for both operating reactors and the next generation of advanced reactors. Most recently, Steve played a key role in developing human factors elements for the proposed Part 53 regulations, ensuring these guidelines effectively address modern operator needs and emerging technologies in the nuclear sector.

2025 Don Miller Award Winner

Kenneth (Ken) G. Lowery from Southern Nuclear also received the Don Miller Award for his exceptional contributions to nuclear instrumentation and control through pioneering leadership and innovative work that have advanced the industry.

The award honors Ken's significant contributions to nuclear instrumentation and control, spanning nuclear power operations, licensing, and engineering. Ken led the development and implementation of the AMS Online Monitoring Program at the Vogtle Electric Generating Plant, Units 1 and 2—the first of its kind in the commercial nuclear power sector. This groundbreaking initiative set a new benchmark for monitoring, safety, and reliability and has since been expanded to the Farley and Hatch Nuclear Plants.

Throughout his career, Ken has shared his expertise through influential publications, including *"Elimination of the Containment Spray Additive at Vogtle Electric Generating Plant"* (ASME, 1995) and *"Westinghouse AP600 Steam Generator Blowdown System"* (ASME, 1992). These works advanced the understanding of reactor systems and contributed to improved operational methodologies across the industry. Ken's leadership has been recognized through multiple Nuclear Energy Institute (NEI) Top Industry Practice (TIP) Awards.

2025 H. M. Hashemian Mid-Career Award Winner

Dr. Vivek Agarwal of Idaho National Laboratory (INL) won the H. M. Hashemian Mid-Career Award for advancing nuclear energy sustainability and deployment through artificial intelligence (AI) and machine learning (ML). The award honors significant contributions in the first 15–25 years of a career and highlights the next generation's impact on nuclear instrumentation and controls.

Dr. Agarwal's leadership in automating nuclear power plant processes and developing predictive maintenance strategies earned recognition through this award, emphasizing his impact on boosting operational efficiency, safety, and cost-effectiveness across the industry. His work has accelerated AI/ML integration and transformed plant data into actionable insights, shaping digital nuclear systems.

During his 13 years at INL, Dr. Agarwal has led high-impact projects under the U.S. Department of Energy's Light Water Reactor Sustainability Program. He advanced online monitoring, predictive maintenance, and autonomous control, producing technologies now deployed across the industry. Notably, he co-developed the wireless valve position indication system with Constellation Energy, earning the 2024 IAEA Innovation Award. His portfolio contains over 200 publications, three U.S. patents, and seven software copyrights.

2025 Ted Quinn Early Career Award Winner

Dr. Majdi I. Radaideh from the University of Michigan was awarded the Ted Quinn Early Career Award in recognition of his consistent contributions to Autonomous Control Algorithms, Digital Twins (DT), and Fault Detection with Machine Learning (ML) for Nuclear Reactor Systems. The award recognizes promising early-career members in nuclear instrumentation and controls, highlighting the importance of young members in the future developments of nuclear instrumentation and controls and human factors research, development, and deployment.

The award is in honor of Dr. Radaideh's work in advancing the fields of autonomous control algorithms for microreactors, mathematical modeling of digital twins, and fault detection and prognosis with machine learning—areas critical to the safe and intelligent operation of the next generation of nuclear systems.

Through collaborative efforts, Dr. Radaideh and his group pioneered the use of deep reinforcement learning (RL) for nuclear reactor design optimization, outperforming traditional stochastic methods and establishing a new standard for data-driven advances in reactor design toward intelligent microreactor control. Supported by the DOE-NE Distinguished Early Career Program and the Eric and Wendy Schmidt AI in Science Program, his group has developed multi-agent RL and hybrid NMPC-RL controllers capable of safe, autonomous load-following operation—work that is reshaping how small, modular, and microreactors will operate in the future.

HFICD Scholarship Winners

Carlo Dal Colletto - Robert E. Uhrig Graduate Scholarship Winner

My interest in nuclear engineering began due to its unique position at the intersection of fascinating science and major global challenges—energy and international security. During my undergraduate studies, I engaged deeply with the field through professional organizations like ANS and INMM. Now pursuing my master's degree, I serve as technical chair for the 2026 ANS student conference while conducting research on hybrid cyber-physical attacks on advanced reactors, studying how adversaries could manipulate sensors, safety logic, and access controls to create unsafe conditions and enable physical infiltration.

My research experiences have given me deep appreciation for the critical role of instrumentation and controls in nuclear engineering, where success depends on reactors operating reliably, securely, and in ways that are intuitive to operators and tolerant of human error. Beyond my current work, I hope to contribute throughout my career to next-generation control room design, safety automation in advanced reactors, and integrating human factors into security systems.

It is an honor to receive the Robert E. Uhrig Graduate Scholarship—Dr. Uhrig's work advanced our analysis of reactor systems, and through this award, that advancement continues in his memory. This scholarship will enable me to attend conferences like the ANS Winter Meeting to deepen my knowledge of human factors, instrumentation, and controls, and to help enable others to do the same.

Emily Gillmore - Joseph Naser Undergraduate Scholarship Winner

I am in my third year studying Nuclear, Plasma, and Radiological Engineering at the University of Illinois Urbana-Champaign. I have spent two summers with Constellation, the first in BWR cycle management and the second in reactor engineering at Nine Mile Point Nuclear Station.

At my internship this summer, I absolutely loved being in the control room and I loved noticing all the human-factor designs that go into the components. Something specific that interests me is the development of modern digital control systems. Everything else in our lives today has been digitized, while the plants remain trapped in time. I am passionate about controls and interface technologies within a nuclear plant. Nuclear is necessary for energy security and, in order for it to reach its full potential, instrumentation needs to be optimized and human-centered.

This scholarship will make such a significant difference in my academic career. This year I will be able to focus on my studies and pursue my passions without the added stresses of finances. I am so passionate about clean energy generation, and I know there is so much more I can do thanks to your support. I can't explain to you how happy I was to hear that I was receiving this scholarship. Besides the monetary aspect, this scholarship serves as a reminder that there are people who believe in my goals and support my college education. Pursuing nuclear engineering has been one of the best decisions I have ever made, and I will certainly not take your support lightly. Thank you so much.

HFICD Governance

Upcoming Events

- 2025 ANS Winter Conference & Expo
  November 9-12, 2025
  Washington DC
- IAEA Technical Meeting (AI focus on HF/IC)
  November 10-14, 2025
  Daejeon, Korea
- 2026 ANS Annual Conference
  May 31-June 3, 2026
  Denver, CO
- Probabilistic Safety Assessment and Management
  18, July 19-23, 2026
  Pittsburgh, PA
- ASPIRE Human Factors and Ergonomics Society
  October 19-23, 2026
  Reno, NV
- 2026 ANS Winter Conference & Expo
  November 15-18, 2026
  Phoenix, AZ

Upcoming Meeting Spotlight: 2027 ANS NPIC &HMIT

This conference is the 15th in a series organized by ANS's Human Factors, Instrumentation & Controls Division (HFICD). Sponsored by ANS, the International Topical Meeting on Nuclear Plant Instrumentation, Control, and Human-Machine Interface Technologies (NPIC & HMIT 2027) is the de facto forum for nuclear instrumentation and control and human factors engineering professionals to meet with leaders in industry and academia, discover the state of the technology, exchange information, and discuss future directions. The 2027 edition of the conference will be jointly held with the 9th International Symposium on Future I&C for Nuclear Power Plants (ISOFIC 2027).

NPIC-HMIT 2027 General Chair:	Hyun Gook Kang, Rensselaer Polytechnic Institute
NPIC-HMIT 2027 Program Chair:	Fan Zhang, Georgia Institute of Technology
NPIC-HMIT 2027 Publication Chair:	Katya L. Le Blanc, Idaho National Laboratory