FLORIDA INSTITUTE FOR HUMAN & MACHINE COGNITION

ihmc

VOLUME 20 ISSUE 2

It's hard to believe the holidays are right around the corner – a testament to the busy summer and fall we've had at IHMC. A central initiative we've been working over these past months is the subject of the cover story in this edition of the newsletter, our National Center for Collaborative Autonomy (NCCA). This is a multimillion-dollar effort to leverage and extend our expertise in human-machine teaming, autonomous systems, AI and robotics.

Our motto at IHMC always has been "research that makes a difference" and it is hard to think of an area more central to the transformational changes in technology taking place around us. The NCCA will build upon our long-standing relationships with the miliary and other national security partners. Collaborative autonomy is reshaping industry as well, and has broad applications in the public sector including natural disaster recovery and preparedness; infrastructure and utility assessment; and more.

Once again, we have been fortunate to receive investment from the Board of Directors of Triumph Gulf Coast to help bootstrap the Center. Work that falls under the NCCA's umbrella is under way and we have begun adding to our research team.

You also can learn more about the research efforts our human performance team is undertaking to improve psychomotor vigilance testing and training for military personnel.

Summer is always a busy time for our public outreach. We hosted another successful Robotics Camp experience in both Pensacola and Ocala, including adding another week of programming in Pensacola to meet demand. This is always a highlight for the students who join us – and for the researchers who share their time with our campers. The start of Fall also means another full slate of Science Saturdays, Evening Lectures, and STEM-Talks are under way, and we recap where those efforts have been.

Finally, we say a heartfelt farewell to Julie Sheppard, IHMC's former Executive Vice President and Chief Legal Counsel, upon her much-deserved retirement. Julie was true to her name, guiding the Institute from its earliest days, spinning a small research organization out of the University of West Florida into the internationally known research center it is today. For so many years, she was the person people turned to not just for answers, but for clarity, calm and reason. In my time working with Julie, I have valued her approach to creative problem-solving and quickly getting to answers to move the Institute forward.

For that we all owe her a debt of gratitude...godspeed Julie and thank you for your indelible impact on IHMC.

Best,

Morley O. Stone

Morley Stone

Florida Institute for Human & Machine Cognition

A University Affiliated Research Institute

University of West Florida

MOFFITT CANCER CENTER

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Decades of AI-expertise fuel growth of National Center for Collaborative Autonomy at IHMC

Recent military conflicts around the world have underscored the growing importance of autonomous systems, including drones, in modern warfare.

In the civilian world, the impact of these systems is equally profound and is expected to grow with exponential increases in capability greatly impacting future commercial applications. These systems can be part of everything from self-driving vehicles to space exploration and more.

Controlling and coordinating these interconnected human-machine systems, and maximizing their utility and efficacy in the air, on land, underwater, and even in space, will be critical to protecting the nation's security and economic interests.

An award secured by the Florida Institute for Human and Machine Cognition (IHMC) has the Institute poised to be the leader of this initiative, creating a center of research excellence in cooperative human-machine teaming, a research area focused on optimizing the ability of these systems to work together with humans.

The National Center for Collaborative Autonomy (NCCA) leverages and expands IHMC's internationally recognized expertise in drones and autonomous systems, human-machine teaming, communications networking, collaborative federated multidomain autonomy in uncertain communication environments, and related disciplines.

This $6.7 million award from the Triumph Gulf Coast Board will establish and support multiple areas of research, add technology-centered jobs to the regional economy, and advance innovation in the Northwest Florida region.

Triumph is the nonprofit corporation funded by a legal settlement with BP following the 2010 Deepwater Horizon oil spill. Its purpose is to seed projects that will transform the regional economy of Northwest Florida. The NCCA is poised to do just that, says Dr. Morley Stone, IHMC's Chief Executive Officer.

Dr. Niranjan Suri, IHMC's associate director, is part of the team leading the growth and development of National Center for Collaborative Autonomy.

"The Center for Collaborative Autonomy could have a generational impact not only on the regional economy, but also on military response, disaster response, and much more," Stone says. "Improving the way humans and machines learn and team together is one of our foundational pillars. No one knows more about this work than the IHMC team. This award will allow us to elevate the research that we do in order to get the maximum benefit for our national security and first responder communities.

"Triumph Gulf Coast is once again making a significant investment in IHMC and in the future of this region as a center of excellence in science and technology," Stone says. "We are grateful for their partnership."

The future of warfare — and more

Momentum for the Center comes at a time when it is increasingly clear that unmanned aerial vehicles are changing the future of warfighting dramatically. Dr. Niranjan Suri, IHMC's Associate Director, says the war in Ukraine shows this starkly.

"The nature of warfare is fundamentally changed by what we see in Ukraine in the use of drones," he says. "And we know that our adversaries know this as well. The only way to scale this up is to have autonomy, but autonomy of a single platform is not sufficient. We need all of these platforms to start collaborating with each other."

Where in the past one unmanned aerial vehicle was controlled by one operator, future strategies will mean moving away from that 1-1 ratio toward systems that allow individual operators to manage multiple UAVs — and that will require even larger groups of UAVs to be able to communicate and collaborate among each other in real time.

The NCCA's work will also draw upon research into reasoning under uncertainty and teaming intelligence, both areas where IHMC has deep expertise. Dr. Matt Johnson has decades of experience in making human-machine teams more

Dr. Niranjan Suri

flexible, resilient and effective.

"The NCCA is focused on the scaling problem," Johnson says. "In order to get more bang for your buck (these robotic systems) you need them to do things autonomously and to do that, they need to be able to see the world for themselves and be able to interpret what they're seeing, and they need to be able to make their own decisions. All of that should be in the context of a human directed goal," Johnson says. If you don't, one-to-one control is going to be your limit and that's just not very useful."

While military application is the prime initial focus, other applications for robust collaborative autonomous systems include disaster relief.

Suri says collaborative autonomy will enable a fleet of vehicles surveying from the air and land to assess damage to infrastructure, enhance situation awareness and support logistics for relief efforts after a natural disaster — in a fraction of the time it would take boots on the ground to accomplish the same thing.

"It will allow us to know what has happened, where is the highest-priority need, and what do we need to do. We feel that collaborative autonomy will play a major role in that kind of disaster response scenarios," Suri says.

Even as researchers work to understand the possibilities that collaborative autonomy presents, so too will they need to focus on methods to counter it.

"It is quite easy for our adversaries to basically take the same autonomous platforms, put a bunch of payloads on them, deploy them and destroy or damage some critical infrastructure," Suri says. "We need to be able to defend against that."

Another asset for the NCCA is Pensacola's geography itself. A coastal city with access to fresh and saltwater bodies, inland waterways and ocean environments, even the presence of artificial reefs such as

Dr. Matt Johnson

the Oriskany aircraft carrier reefed in 2006 southeast of Pensacola Pass in the Gulf could become a ripe testing ground for navigation and perception algorithms or water -surface and underwater autonomous systems, or testing autonomous teams

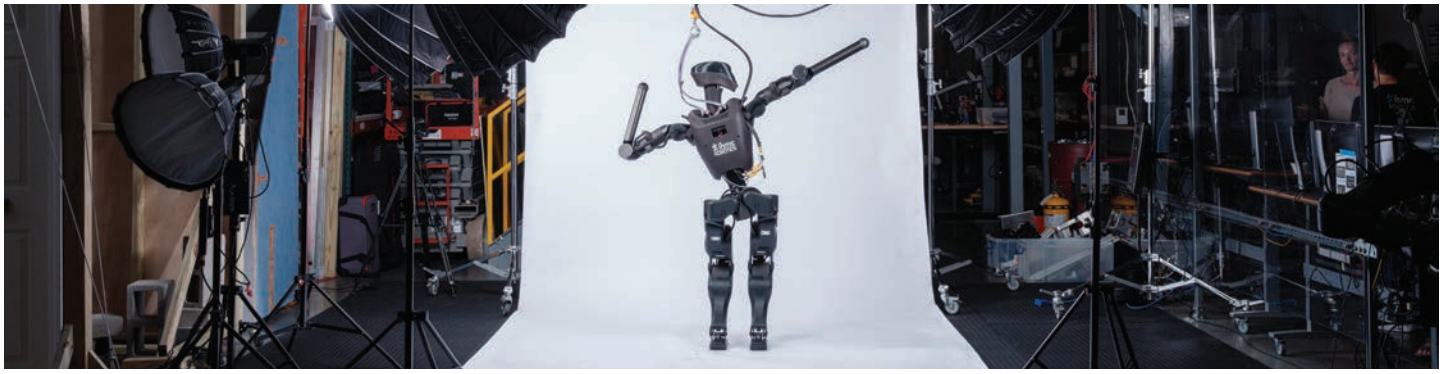
working in multiple domains in variable conditions, for example.

So too is the region's substantial military research presence an asset. Northwest Florida is home to the U.S. Air Force Research Laboratory at Eglin Air Force Base, Special Operations Command at Hurlburt Field, and the Navy Surface Warfare Center in Panama City.

The NCCA also creates a unique academic opportunity thanks to IHMC's partnership with the University of West Florida in its Intelligent Systems and Robotics Ph.D. program. The Triumph award will support the strategic hiring of 12 highly qualified personnel over four years to address key research areas in collaborative autonomy including autonomous marine systems, communications infrastructure, human-machine teaming, and engage industry and academic partners, along with post-graduate and graduate student researchers.

"We are bringing together, of course, our expertise in robotics, AI, human-machine teaming and other traditional IHMC research areas," Suri says. "This is, at its heart, a big part of what IHMC does. A new challenge comes up. We find what expertise we can draw on to help address the challenge. We assemble the team, and we go to work on solving the problem."

Alex marks next-level innovation in humanoid robots



Alex is going out into the world.

The Florida Institute for Human and Machine Cognition's newly developed robot is the latest chapter in IHMC's long history of excellence and innovation in the field of humanoid robotics. It takes the lessons of years of work on integrated controls and behaviors as well as in-house hardware design to prioritize out-of-the-lab testing and experimentation.

Alex is a multi-year, multimillion dollar project funded through the Office of Naval Research (ONR). It builds upon the design work the Robotics team did on Nadia, a humanoid that advanced the genre — and gained YouTube notoriety playing ping pong and boxing.

Nadia's proficiency with behavior, decision-making, push-recovery and more in the lab informed the team's work moving forward. Nadia was a rich testbed not only for the structural specifications of the humanoid — from joints to actuators — but also for the software that drives behavior capabilities, perception sensing, virtual reality teleoperation, and more.

Senior Research Scientist Dr. Robert Griffin leads the Alex team.

"The idea is to really start pushing the robot to go outside of the lab and develop it into a system that we can take places and test what we've developed." Griffin says.

The research goals enabled by the ONR funding include design and integration of next-generation controllers for outdoor urban operations, enhanced design of behaviors for building exploration, integration of a behavior cloning pipeline, and improved simulation environment.

The goal is for Alex and its successors to be hardy and nimble enough ultimately to operate in extreme environments where the risk to human responders is high, from military scenarios to disaster response.

A key innovation in Alex is the high-powered custom actuators, which significantly drop the humanoid's weight compared to Nadia, which weighed about 100 kilograms. Alex weighs approximately 85 kilograms with a battery.

"Long-term, we think we can make the body itself a lot lighter, allowing us to really focus on high speed and performance," Griffin says.

The capabilities that allow humanoids like Alex to act as deeply integrated team members in a squad also could translate to other scenarios. Maneuverability, durability, autonomy and search skills can allow Alex to serve as a human avatar first-responder in disaster situations, keeping emergency personnel in relative safety.

"We think Alex will help advance the abilities of humanoids and their speed of operation, with the goal of achieving human-level speeds so that robots can keep up with the tempo of real-world operations," Griffin says.

Research platforms aim to better support military personnel in high-stress environments

Operational medicine is a common theme in Dr. Jeff Phillips' research.

His expertise in the effect of common aviation stressors (i.e. hypoxia) on operator performance dates back decades. In this newest iteration of his work, Phillips and his team are researching ways to support military operations and maximize human potential in extreme environments.

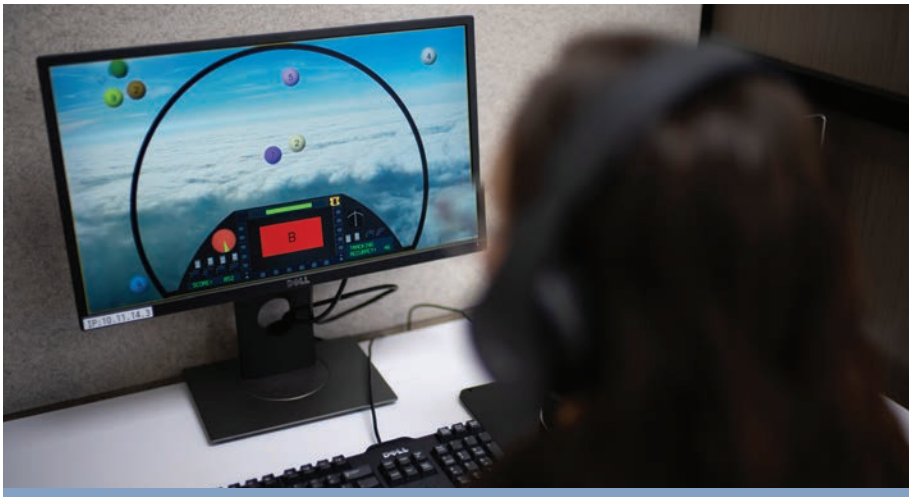
The goal of a servicemember making better decisions and reacting faster in a challenging scenario calls for a new generation of psychometric tests that gather human performance metrics.

Two recent projects Phillips has led at the Florida Institute for Human and Machine Cognition (IHMC) have shown promise to elicit and track the data needed to make the next generation of warfighters safer and better able to perform tasks with immense physical and cognitive demands in extreme environments.

"What we're doing here is trying to make psychometric tools that fit the bill for these specific stressors and states that we're interested in," Phillips says. "The traditional battery of psychometric tests do not measure tasks that are germane to flying or to the real-world demands that special operations ground forces encounter."

Take for, example, hypoxia.

"If I expose you to 25,000 feet or the equivalent barometric pressure, I have three to five minutes to evaluate you," Phillips says. "We have scores of psychometric tools, but most of them are 10 to 20 minutes long and they're intended to measure traits, consistent aspects of human behavior -- like personality, as opposed to transient states — like hypoxia, motion sickness, or fatigue."



The CAAPES platform developed by the U.S. Air Force School of Aerospace Medicine sets a baseline for cognitive function in aviators and tracks how stressors alter that function.

Tracking aviators' stressors

The U.S. Air Force School of Aerospace Medicine developed the Cognitive Assessment of Aviation Performance and Evaluation of State (CAAPES) as a psychometric tool to track the effects of environmental stressors on aviators.

CAAPES began as part of the Air Force's efforts to understand instances where aviators felt like they were deprived of oxygen without obvious physical or mechanical cause. These episodes can be caused by hypoxia, hypocapnia, fatigue, gravity-induced loss of consciousness, spatial disorientation and dehydration.

The IHMC's work on CAAPES has filled several gaps, including developing a new way to measure tracking performance in shorter time intervals, updating graphics, and improved capture performance reliability.

This video-game-like evaluation platform sets a baseline for cognitive function by having users track targets, shoot at them while simultaneously performing three other sub tasks. Using the platform after a subconcussive brain injury could help note changes in cognitive function, as one example for its use-case.

IHMC has used CAAPES to test performance effects under various stressors, including hypoxia, dehydration and hypercapnia.

Dr. Jeff Phillips

The results show that CAAPES can track if performance impacts are the result of stress alone or if it is the result of an interaction between stress and workload.

That's a distinction that is crucial for personalizing training and improving aviators' tolerance of high-G stress circumstances.

"The UPE crisis is no longer a crisis," Phillips says. "We've done a lot of investigations. We've concluded that it's probably safer now to be a fighter pilot than ever before. But we're also pushing the limits of human physiology more now than ever before because we're going higher and at a faster ascent rate.

Understanding more about this is key to continue to innovate in pilot safety."

Tracking demands on ground forces

The Cognitive Enhancement Resources for Battlefield Resiliency and Optimization (CEREBRO) aims to improve how cognitive performance and marksmanship are assessed and trained.

It is aimed at Special Operations Command ground forces.

"These operators are very good at what they do," Phillips says. "The U.S. military spends millions on each guy before they are in their first firefight. They try to train them to automate everything that they need to do to make decisions, but there's just no way to predict how that person will react when it's a real situation until you are in it."

Meanwhile, there grew a desire to develop better metrics that could be used to track the effects of subconcussive brain injuries in a more real-world testing environment.

The CEREBRO platform is born of those twin tracks.

IHMC is a subcontractor for the project to BAE Systems Space and Mission Systems Inc. Year one saw the IHMC team focus on designing the methodology and the scenario of the test. The test tasks were developed on a fully immersive shoot simulation environment with particular focus on stimulus timing, response capture, and task logic.

The goal is to more closely mimic the kind of environment in which military personnel are expected to perform.

Year two is about refining those methodologies with layers of increasing complexity, including developing a trail-making task for the virtual platform as well as shoot-don't shoot scenarios in challenging visual environments.

One of the CEREBRO scenarios could mimic, for example, the view as a servicemember stands watch over a base keeping an eye out for a signal or stimulus coming from a predefined area of interest in the field of view.

"If you see a red dot in this area, you have to make sure they're not trying to sneak drones through this pass right here," Phillips says. "So if you see a red dot, rules of engagement require a human in the loop to confirm a kill shot within one half a second before a missile hits the base.

In the old paradigm, you had to present a stimulus and it had to be missed to get a negative score," Phillips says.

"But now I have an eye-tracking system and an area of interest that I can marry that to, and I can measure visual discipline and tell if you're looking where you're supposed to look or not," he says.

This vigilance concept is big across the human problem space, he says. It is not difficult to imagine many situations where you just have somebody awaiting a critical signal while overlooking a field crowded with visual stimuli.

"We hope that over time we can train vigilance," Phillips says. "It can be trained as kind of a meditation where you use the task itself as an anchor."

The CEREBRO system helps evaluate the psychomotor vigilance of service personnel using visual scenarios such as shown above.

The CEREBRO platform will help train and evaluate military personnel using simulation tools like these.

Study for U.S. Air Force Research Lab tracks impact of ketones on pilot ventilation

Military aviators breathe rarefied air — figuratively and literally.

They operate elite aircraft at altitude in stressful conditions with protections in place to ensure that the atmosphere they breathe in flight helps ensure their physical and cognitive performance doesn't suffer in the extreme conditions they navigate.

Finding ways to ensure proper ventilation in pilots is what underlies an ongoing research project at the Florida Institute for Human and Machine Cognition sponsored by the U.S. Air Force Research Laboratory. It aims to assess the effects of exogenous ketones on operator ventilation.

"When you're dealing with these oxygen delivery systems in the aircraft, typically the failures are intermittent," says Research Scientist Dr. David Morris, part of the study team led by Senior Research Scientist Dr. Jeff Phillips. "It's not total failure of the system, but because of the way they're designed, you can get reductions in oxygen flow from time to time for periods of time."

For nearly two decades, unexplained physiological episodes (UPEs) have been a challenge to aviators. Studies have identified a few factors that may play a role in UPEs:

- Hypobaria (low ambient pressures)
- Breathing hyperoxic (high oxygen level) gas
- Obstructive breathing resistance
- Hypocapnia (low blood carbon dioxide levels) associated with hypobaria, hyperoxia, and breathing resistance.

Military aviators wear oxygen masks that allow them to breathe hyperoxic air, a standard operating strategy that provides adequate oxygen in flight and protects against decompression sickness in case of sudden depressurization of the aircraft.

Breathing this hyperoxic air causes hyperventilation, breathing out more carbon dioxide than the body produces. Since carbon dioxide helps regulate blood flow to the brain, a deficit of it in the bloodstream can reduce blood flow to the brain. It also raises your blood's pH which makes the affinity of oxygen to hemoglobin so high that the oxygen doesn't get released from the red blood cells to get to the actual tissue to support metabolic processes. Paradoxically, breathing hyperoxic gas may result in reduced oxygen delivery to the brain and lead to a UPE.

The hypothesis for the IHMC study is that drinking exogenous ketones will lower the body's pH and increase metabolic production of carbon dioxide when compared to a placebo and mitigate the potential impacts on aviators' physiology.

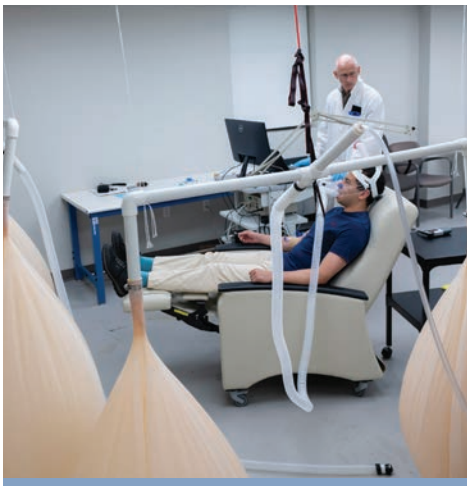
The early results are promising.

"We believe that this could be a way to help make our aviators safer and offer them some metabolic protection, if you will, from the effects of hypocapnia at altitude," Morris says. "By helping maintain carbon dioxide levels in the blood, we hope that we can offer a buffer for aviators to help protect them against possible UPEs."

Morris says that participants on the ketones were able to maintain more normal breathing. On the placebo, participants' breathing just stayed flat even after they transition from hyperoxia to hypoxia and their blood oxygen levels dropped.

"On the ketones, not only did they maintain higher ventilation volumes during hypoxia, that hypoxic ventilatory response happened almost immediately. We found that on the carbohydrates, it was delayed," Morris says.

The findings could be applicable to other warfighters who work at altitude as well as have impacts mitigating the risk of frostbite and freeze-related injuries.



IHMC Researcher Dr. David Morris works with a study participant.

"From a physical standpoint, if you have more oxygen in the blood, typically you're going to maintain better blood flow to your fingers and toes, especially in cold environments" Morris says.

Some evidence also suggests that exogenous ketones may help to alleviate a condition known as hypoxic pulmonary vasoconstriction.

In this condition, the blood vessels in the lungs constrict in response to hypoxia which causes the blood pressure in the lungs to rise. This causes a couple of problems. In the short term, fluid is forced from the bloodstream and into the lungs, causing a potentially deadly condition known as high-altitude pulmonary edema.

If the person's hypoxia is caused by a chronic lung disease such as chronic obstructive pulmonary disease, the pulmonary hypertension can become chronic and lead to heart failure.

IHMC and UWF partner on robotics grant

A University of West Florida-Institute for Human Machine & Cognition (IHMC) research team received a $478,000 grant for the acquisition of advanced robotic platforms and equipment from the Defense University Research Instrumentation Program (DURIP) of the Office of Naval Research (ONR).

The grant was one of only 64 grants awarded in the nation. Dr. Robert Griffin and Dr. Matt Johnson, who both hold dual appointments with IHMC and UWF through the Intelligent Systems and Robotics program, and Dr. Hakki Erhan Sevil, UWF ISR faculty member, worked together to apply for the funding.

"(ONR) has been an enormous supporter of both IHMC and the UWF ISR program for as long as I have been here," Griffin said. "While much of their focus and involvement with us has been towards humanoid robots, the research they have supported and DURIPs they have granted have allowed us to greatly expand our capabilities."

This funding will enhance UWF and IHMC's ability to develop, test and deploy mobile robotic systems outside of the lab.

"It affords students in the UWF-IHMC ISR program access to the state-of-the-art systems for their research to foster development of high-quality next generation researchers," Johnson says.

A key component of this expansion is the acquisition of a Boston Dynamics Spot robot, which will serve as a platform for research on autonomy and human-machine teaming. Additionally, upgrades to existing robotic platforms will enable research on dexterous manipulation for tasks.

This is the third DURIP grant received by the UWF-IHMC team from ONR.

NIA funded study tracks changes to gait as we age

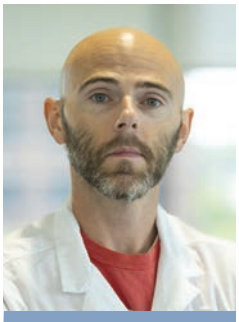
Some people call it "walking on ice" — the careful steps and slower pace that older people take on when they walk.

Biomechanically it is a way to prioritize stability over economy — we slow down to decrease the chances we will fall and use our hips more than we use our ankles.

But "walking on ice" costs our bodies more metabolically and reduces walking speed, both of which have downstream consequences for healthspan. Learning more about that intersection is the heart of a recent award by the National Institute on Aging (NIA) to Florida Institute for Human and Machine Cognition (IHMC) researchers Dr. Greg Sawicki and Dr. Zach Graham.

The $3.2 million award, run through Sawicki's lab at the Georgia Institute of Technology and the Florida Institute for Human and Machine Cognition in Pensacola will focus on Identifying Multi-Scale Mechanisms for Age-Related Increase in Metabolic Cost of Walking.

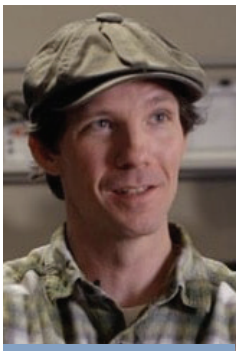
"Mobility serves as a surrogate for well-being with age-related limits to walking function that include increased energy cost and decreased speed," says Graham. "We want to understand more about how multiple systems interact as we age."


Dr. Zachary Graham

Sawicki, whose home-base is the Human Physiology of Wearable Robotics Laboratory at Georgia Tech, was part of an expert panel convened by the NIA in 2021 to identify gaps in our knowledge about why mobility declines as we age. From that gathering, a key age-related difference in walking function emerged — the source of mechanical power generated by muscles to walk is redistributed within the leg from ankles to hips. Scientists refer to this as the 'distal-to-proximal shift, Graham says.

The goal of the IHMC study is to take a multi-scale approach to understanding the causes and consequences of that shift.

"We've pulled together a strong team that will combine traditional whole-body and joint-level biomechanics with tissue-level physiological data — including molecular analysis of key locomotor muscles — to understand the full cascade of age-related changes contributing to slow, effortful walking," Sawicki says.


Dr. Greg Sawicki

Data suggest walking function begin to sharply decline at age 60. This cross-sectional observational study will shed light on how this phenomenon plays out in the body and ultimately will aid in design of more effective interventions to keep us all walking vigorously into our 80's and beyond.

"I look forward to connecting our sites with other study sites at Johns Hopkins and UMass-Amherst to share data and insights and make them available to other scientists, clinicians and engineers for maximum impact." Sawicki says.

Florida Blue makes contribution to support education and research in health and wellness

Florida Blue and IHMC leadership announced a collaboration to support outreach and education efforts.

Florida Blue, the state's Blue Cross and Blue shield plan, announced in May 2025 an award to the Florida Institute for Human and Machine Cognition (IHMC) to further health and wellness research and community outreach.

The grant reflects a continuing partnership between the two entities and will help support education and outreach efforts that further IHMC's mission to advance the human condition. The community room in IHMC's new Healthspan, Resilience, and Performance Research Complex will be named in recognition of Florida Blue's support.

"Florida Blue is committed to improving the health of all our communities," says Hong Potomski, market leader for Florida Blue in Northwest Florida. "IHMC's innovative research and approach to advancing the human condition aligns with our mission, and we are excited to support their efforts."

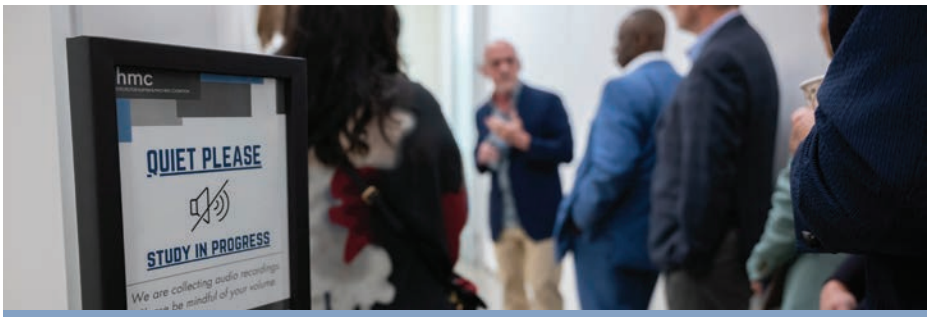
Dr. Morley Stone, IHMC's Chief Executive Officer, notes that the Institute's purpose is research that improves healthspan and resilience for all. That dovetails with Florida Blue's commitment to building healthy communities across the state of Florida.

"This collaboration is a reflection of their commitment to us, to the community, and to the importance of the work that we can do together," Stone says. "We are grateful for their partnership in what we feel will be a collaboration that benefits the community at large over the long term."

The contribution reflects the way the community has answered the call to support IHMC and its decades-long effort to pursue innovative work in three research pillars — artificial intelligence and human-machine teaming, robotics, and healthspan, resilience, and performance. The research aims to push the boundaries of science and technology forward.

"Advancing the human condition is at the root of our mission," says Carl Carlan, IHMC's Director of Philanthropy. "We can't do what we do without the community and the support of partners like Florida Blue who embrace that mission, see its value, and want to help further it."

Florida Blue has for 80 years worked to bring quality, affordable care to all to help people and communities achieve better health. Florida Blue has become the largest single state provider of individual marketplace insurance plans in the country.



Florida Blue leadership on tour of IHMC faciliites.

Science Advisory Council meets for briefings on ongoing research initiatives and projects

Even leading scientific thinkers need a cadre of people to go to for guidance.

At the Florida Institute for Human and Machine Cognition (IHMC), the Science Advisory Council (SAC) stands as that valuable resource in steering the Institute's broad research goals.

In May 2025, the council gathered in at IHMC's Pensacola headquarters. These scientists and engineers, from a range of disciplines and backgrounds, are leaders in government, corporate and academic arenas. They lend their input to support IHMC's goals of advancing the human condition through research.

Dr. Morley Stone, the Institute's chief executive officer, credits the council as an exceptionally valuable resource of knowledge, support and expertise.

"Our in-person meetings with the Advisory Council were limited due to the COVID-19 pandemic," Stone says. "I'm grateful that this spring we could share more with them about our plans."

During the meeting, Advisory Council members heard project briefings including reports on progress in exoskeletons and robotics, human-machine teaming and virtual reality, autonomous marine systems, artificial intelligence systems, vagal nerve stimulation research and its imapct on autism spectrum disorder, schizophrenia, and optimizing brain development and learning potential, and the strategy to augment ketosis study to mitigate mild traumatic brain injury impacts.

Participants also heard briefings on an Air Force Office of Scientific Research-funded project to boost understanding of the biological, physiological, and cognitive variations in people in response to nutritional stress, sleep stress, and physical stress; an ongoing National Institutes of Health-funded clinical trial to understand exercise responsiveness in older adults; and an update on the IHMC-developed KENNEL Threat Detection System, which provides networked sensors to provide a low-cost initial line of defense against a wide range of threats including most chemical warfare agents and gamma radiation sources.

Members of the Science Advisory Council for Florida Institute for Human and Machine Cognition met in May 2025 for research briefings.

The Council participants included:

- Retired U.S. Navy Vice Admiral Al Harms Jr., who served as commander of Naval Education and Training Command and Director of Naval Education and Training for the Chief of Naval Operations.
- Dr. Paul Kaminski, whose military and government service includes pivotal contributions to stealth technology and acquisition reform in the U.S. Department of Defense.
- Dr. Alexander Levis, a George Mason University professor and former Chief Scientist of the USAF, who has conducted basic and applied research in many aspects of command and control.
- Dr. Robert Mandelbaum, who is director and general manager of Lockheed Martin's Advanced Technology Laboratories. He was a program manager at the Defense Advanced Research Projects Agency (DARPA).
- Katharina McFarland, an expert in government procurement. She is President of Blue Oryx Inc., a consulting firm she founded in 2017, and Vice Chair of the Army Science Board.
- Dr. Jon Mogford, a biomedical researcher and academic leader whose career includes defense research, higher education and biotechnology innovation.
- Dr. JoAnn Morgan had a four-decade-long career at NASA, serving as Director of External Relations & Business Development, and briefly as Acting Deputy Director of Kennedy Space Center in 2002. She was a key member of the Apollo, Skylab, and Apollo-Soyuz programs.
- Dr. Bradley Nindl, director of the Neuromuscular Research Lab/Warrior Human Performance Research Center at the University of Pittsburgh.

Friends, family laud Julie Sheppard upon her retirement after 20 years in IHMC leadership

Julie Sheppard's retirement in June 2025 marked the end of an era at the Florida Institute for Human and Machine Cognition (IHMC).

Sheppard had been with the Institute from its earliest days, working closely with founder Dr. Ken Ford for more than 20 years to build IHMC into an independent research entity with worldwide reputation for excellence.

"Julie has been such a steady, insightful, and genuinely kind presence at IHMC — someone we've all relied on more times than we can count," said Ford.

"She has been here from the start, helping to build not just the organization, but the culture — something much harder to do and incredibly valuable. As the culture goes, so the organization goes."

She served for 13 years as IHMC General Counsel, for seven of those years Sheppard acted as Executive Vice President and Chief Legal Counsel.

"The team at IHMC has been my second family and that is truly what has made this place so special," Sheppard says.

Ford praised Sheppard's wisdom and judgment as well as the influence she had on making IHMC the place it is.

Julie Sheppard and Carol Carlan, IHMC Director of Philanthropy

Philanthropist and businessman Quint Studer embraced Julie Sheppard at her retirement celebration.

"She brought clarity when things were cloudy, reason when things got complicated, and more than a few instances of finding the best way to handle potentially sticky situations," Ford said. "She didn't just shape IHMC's direction — she shaped how it feels to be part of this place."

Sheppard formerly she served as the General Counsel at the University of West Florida and Associate General Counsel at the University of North Florida.

She had a long career in academia and the law, working as Counsel to the Florida Board of Regents Office of Human Resources and Labor Relations;

Administrative Hearings Officer to the Florida Department of Labor and Employment Security; Associate Attorney, Bernstein, Shur, Sawyer and Nelson, Portland, Maine; and Law Clerk to The Honorable Robert V. Cauchon, Justice of the Massachusetts Trial Courts-Land Court Department.

She earned her Juris Doctor degree, cum laude, from Suffolk University Law School and her bachelor's degree from the University of Virginia. Julie is admitted to practice in Florida, Maine, and Massachusetts.

Julie Sheppard was honored at a community celebration at IHMC.

Businessman David Bear joins board of directors

David Bear has joined the Board of Directors of the Florida Institute for Human and Machine Cognition, adding to his impressive business and civic resume.

"David has a wealth of experience in both business leadership and civic involvement, along with deep community ties and philanthropic vision," says Dr. Morley Stone, IHMC's Chief Executive Officer. "He will be a tremendous asset to IHMC and we are fortunate to have him join our Board of Directors."

Bear is the owner and CEO of The Lewis Bear Company, a beverage distributorship founded in 1876 in Pensacola. Bear and his company founded Bear Family Foundation in 2002, which has awarded millions of dollars in grants to more than 118 local nonprofit organizations serving Northwest Florida.

IHMC is one of the lesser-known jewels in the intellectual and economic landscape of Northwest Florida," said Bear. "Over the years, I've watched the Institute expand and innovate, and I've become a great admirer of the research challenges it embraces. I am honored to serve on its board of directors and look forward to being of service."

In addition to his entrepreneurial success, Bear has built upon his family's legacy of commitment to public service and community engagement.

From August 2021 until June of 2025, he served on the Board of Triumph Gulf Coast, the nonprofit corporation funded by a legal settlement with BP following the 2010 Deepwater Horizon oil spill.

Triumph Gulf Coast's purpose is to seed projects that will transform and diversify the regional economy.

Bear's leadership extends beyond the business community into cultural and economic development. He is the founder and Trustee Emeritus of Art, Culture, and Entertainment, Inc., and has held significant roles such as the current Chairman of the Escambia County Tourist Development Council, Chair of the Florida Beer Wholesaler Association, and Chairman of Florida West.

David Bear

Bear is past president of the Boards for the Arts Council of Northwest Florida, Pensacola Museum of Art, Creative Learning Academy, and Pensacola MESS Hall. He earned his bachelor's degree in business administration from Belhaven College.

New administrative team members welcomed

CLAUDIA ARTZER
Robotics Lab Coordinator

Claudia Artzer joined IHMC in June of 2025 as coordinator in the robotics lab. She works with the robotics and exoskeleton teams to ensure the logistics operations of the lab function smoothly. Claudia has a background in project and event coordination, budget management and contract compliance in arts organizations in Luxembourg, Italy, and France. She previously served as administration and production manager for the Pensacola Symphony Orchestra. She earned a bachelor's degree in marketing and communications and a master's degree in law and another in art history from the Universite de Lorraine.

SAMANTHA LI
Pre-Award Administrator

Samantha Li joined IHMC in April 2025 as the pre-award administrator. In this role, she will work with research staff and IHMC administrative staff to help track grant management, contract compliance, project management and process improvement. She earned a bachelor's degree in finance and a master's degree in business administration from the University of West Florida. She comes to IHMC from Navy Federal Credit Union, where she was analyst in the business lending department. In her free time, she enjoys volunteering with her church, board and video games, puzzles, and spending time with her husband and their two cats.

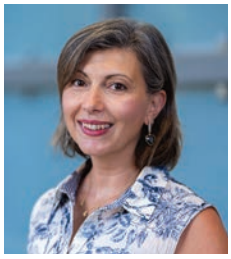
IHMC continues to add to its ranks by welcoming new Senior Research Scientists

The Institute for Human and Machine Cognition is pleased to welcome new colleagues to our ranks. IHMC is an independent, not-for-profit research institute of the Florida University System and is affiliated with several Florida universities. IHMC's main campus in historic downtown Pensacola opened in 1999 as part of the city's urban core revitalization effort. The Ocala campus opened in 2010. It is located near three major university research partners in the state's centrally located tech corridor.

Our research falls under the auspices of advancing the human condition, which we in the braid disciplines of artificial intelligence and machine learning, robotics and exoskeletons, and healthspan, resilience, and human performance. Our researchers are pushing the envelope of what is possible in robotics with a particular focus on humanoid robots and exoskeletons . Our research in healthspan, resilience, and performance is a collaborative area of investigation that aims to provide a biological and physiological blueprint to improve human performance in high-stress and physically demanding situations. This research also will offer insights into aging, and improve life for those with neurodegenerative diseases, musculoskeletal disease, traumatic injuries, cardiovascular and metabolic diseases and more. Researchers at IHMC work in teams across disciplines, with high standards in exciting scientific pursuits.

TIMOTHY BUNNING, SENIOR RESEARCH SCIENTIST

Timothy Bunning joined IHMC as a Senior Research Scientist in October 2025. He works with Chief Executive Officer Dr. Morley Stone on a variety of research projects. He retired after most recently serving as the Chief Technology Officer for the U.S. Air Force Research Laboratory (AFRL), where he was the primary science and engineering advisor to the AFRL Commander, responsible for assisting with planning and execution of an annual $3.5 billion science and technology program. It was a role that saw him serve as the corporate-level science and engineering interface for a government/military workforce of nearly 6,000 people in nine technology directorates and the 711th Human Performance Wing. He served as the senior AFRL technology ambassador with academia, industry, other Department of Defense services, other government agencies, and with international partners. His Air Force career began as a doctoral fellow conducting Ph.D. research at Wright-Patterson Air Force Base. He is a graduate of the University of Connecticut, where he earned a Ph.D. in Chemical Engineering followed by a post-doc at Cornell University before joining AFRL full-time. His technical background is rooted in materials science focused on light/soft matter interactions. Current specific interests include biomaterials, 4-G optics, chiral liquid crystals, and polymer/LC composites.

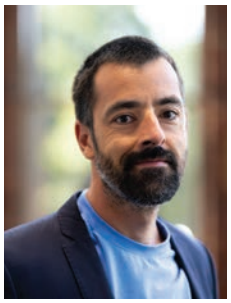


MONICA GORI, SENIOR RESEARCH SCIENTIST

Monica Gori joined IHMC in September 2025 as a Research Scientist working with the Healthspan, Resilience, and Performance team. She studied art, cognitive neuroscience and has a PhD in humanoid technologies. She is the Principal Investigator of the Unit for Visually Impaired People of the Italian Institute of Technology. Her lab there included 35 researchers, including cognitive neuroscientists and engineers. One of her works has been listed in the faculty of 1000 (Gori et al. Curr Biol, 2008). In 2012, she won the Italian TR35, in 2020 an ERC STG and in 2022 an ERC PoC. In February 2025 she was featured as the scientist of the month in Current Biology, and Monica is listed among the top 2 percent of researchers worldwide whose work is most cited in the discipline of psychology according to the Elsevier Data Repository. In researching the complex processes behind sensory information processing and integration as a means to understand reaction time, precision, and response accuracy. Her work shows how visual modality is critical in developing audio and tactile integration. The connection between sensory interaction and multisensory development offers a model to disentangle the basic principles that subtend our ability to learn to interact in a multisensory environment and to develop science-driven technology to improve the quality of life of sensory impaired individuals.

BOB MORRIS, SENIOR RESEARCH SCIENTIST

Bob Morris joined IHMC in June 2025 after more than 25 years at NASA Ames Research Center. His interests are in developing artificial intelligence and autonomous robotic systems for space exploration and other extreme environments. His research focus has been on systems that exhibit robust goal-directed adaptive behavior to enable greater levels of autonomy. While at NASA, Bob was a sub-program manager for the Intelligent Systems program in the area of Autonomous Systems, and for the Advanced Information Systems Technology (AIST) program, focusing on AI for building autonomous observation systems and Earth System modeling. More recently his research focus has been on developing models and algorithms for multi-agent strategic planning for NASA's Urban Transportation Management, in the Aerospace Directorate. He is co-author of a book on temporal reasoning for AI systems. He completed his Ph.D. in philosophy at Indiana University and a master's degree in computer science at Wright State University. He loves cooking and collecting recipes and playing piano and attending sports events with his stepsons.



ALBERTO PARMIGGIANI, SENIOR RESEARCH SCIENTIST

Alberto Parmiggiani joined IHMC in September 2025 as a Research Scientist working with the robotics team. His interests include mechatronics, robotics, additive manufacturing, digital fabrication, compliant mechanisms, and lightweight design. His work is characterized by a passion for creating high-performance mechanisms with minimalistic and efficient designs. His research interests include exploring the challenges inherent in creating highly integrated, sophisticated robotic systems. It also reflects an interest in how design philosophies have evolved in parallel with technological advances. He enjoys exploring the future of robot design, speculating on emerging trends, challenges, and the opportunities that lie ahead for engineers and researchers seeking to push the boundaries of what robots can be. He graduated cum laude in Mechanical Engineering from the Università degli Studi di Modena e Reggio Emilia in 2006. He pursued his PhD at the Istituto Italiano di Tecnologia in Genova, focusing on the hardware development of the iCub humanoid robot. After earning his PhD, he continued his work on iCub as hardware lead, first as a postdoctoral researcher and then as a Research Technologist. Since 2019, he coordinates IIT's manufacturing and design unit.

ELLIOTT ROUSE, SENIOR RESEARCH SCIENTIST

Elliott Rouse joined IHMC in July of 2025 as a Senior Research Scientist working with the robotics team. He is an associate professor of mechanical engineering and robotics at the University of Michigan. He directs the Neurobionics Lab, who studies the dynamics of how and why people use wearable robotic systems. His group uses this understanding to develop novel hardware designs, including the Open-Source Leg. His research interests include precision machine design, development of exoskeletons and robotics prostheses, brushless motors, dynamic of human locomotion, human perception and psychophysics, neural control of movement, biomechanics, and human performance augmentation. He holds patents for the design and control of wearable robotic systems. Rouse and his research have been featured at TED, on the Discovery Channel, CNN, National Public Radio, Wired Magazine UK, Business Insider, among others. He is a recipient of the National Science Foundation CAREER Award and the Henry Russel Award at UM. He is on the Editorial Board of Wearable Technologies and is a member of the IEEE EMBS Technical Committee on BioRobotics. He earned bachelor's degree in mechanical engineering at The Ohio State University, and a Ph.D. in biomedical engineering from Northwestern University. Subsequently, he joined MIT as a Postdoctoral Fellow in the MIT Media Lab. Prior to joining Michigan, he was a principal investigator at the Shirley Ryan AbilityLab / Northwestern University, and worked as a mechanic in professional Le Mans autoracing. In 2019 – 2020, he was visiting faculty at (Google) X where he co-founded their exoskeleton development team. In 2024-2025, he was on sabbatical at the Robotics and AI (RAI) Institute, where he worked on advanced machine design workflows. In his personal time, he enjoys spending time with his wife and two sons, who are very into building and destroying stuff. He likes to play the drums, work on cars, and research UFOs.

Summer Robotics Camp 2025 sparks students imaginations

Dr. Nicole Stafford volunteered as part of Summer Robotics Camp to give students something she missed as a kid.

"I did not go to a camp like this growing up and I feel like it is an excellent chance for kids to see if they like robotics and interact with scientists," says Stafford, a mechanical engineer on the exoskeleton team at the Florida Institute for Human and Machine Cognition. "(IHMC) does a great job to give kids that opportunity and it was special to be a part of."

Stafford, who earned a bachelor's and a master's degree at Standford University and her Ph.D. at the University of Florida, was one of a handful of IHMC scientists who acted as guest lecturers at the camp, answering questions and sharing what a life in science might look like.

"Interacting with the campers through a lecture and lunch was a fantastic and fun opportunity. The campers asked some great questions related to exoskeletons and being an engineer, so it was fun to see their curiosity."

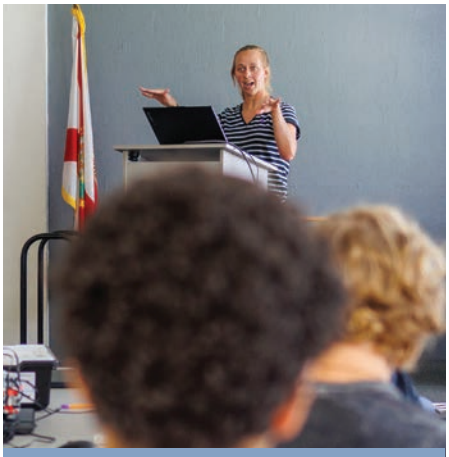
Robotics Camp ran in three sessions in Pensacola and two sessions in Ocala this year. Participants spent four days learning to program LEGO Mindstorms robots, meeting STEM professionals and learning about robotics research at IHMC.

Camp is sponsored by the NextEra Foundation, Florida Blue and Cox. Their support helps make these camps possible and funds scholarships to cover camp fees for students from families of limited means.

Research Scientist Jared Li also was among those who took part. Li leads the Institute's exoskeleton team.

Research Scientist Dr. Toshi Miyatsu enjoys being part of "Lunch with a Scientist" at Summer Robotics Camp.

Research Scientist Jared Li guided campers through the IHMC robotics lab.



Research Associate Dr. Nicole Stafford shared her work and experience with campers.

"I find it very fulfilling to present our work to younger generations and give them a glimpse behind the scenes of tech that mayseem like science fiction," Li says. "I want them to get excited, knowing that it's well within their reach!"

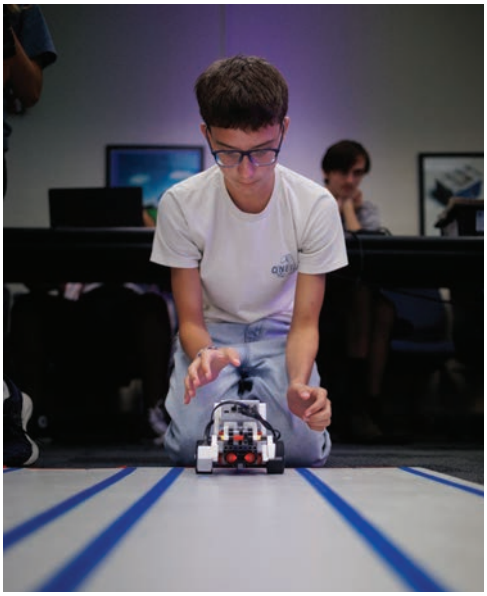
Research Scientist Dr. Toshi Miyatsu is part of the healthspan, resilience, and performance research team at IHMC.

His research focuses on neuroscience and cognitive and technological tools that enhance learning, instruction, and assessment. He says giving lecture to campers and having lunch with them is "always the highlight of my week."

Not only is it a chance to share science he is passionate about with curious young minds but also it is a chance to recharge his own enthusiasm. "I always emerge from the lecture energized, reminded of how fortunate I am to study these subjects for a living," Miyatsu says.

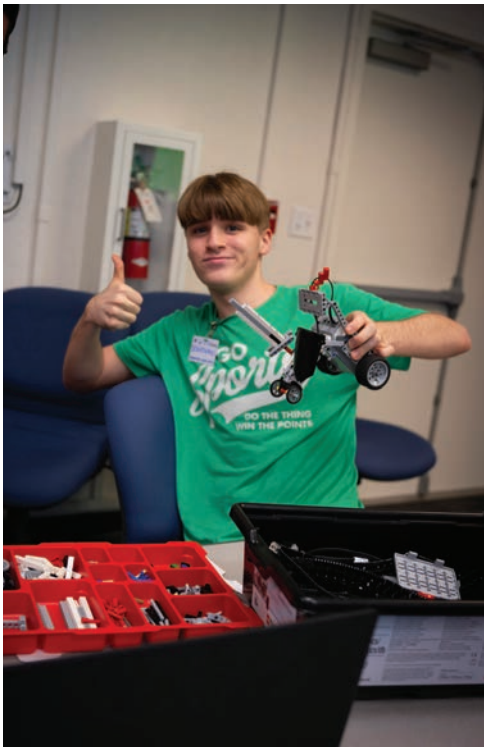
"Robotics Camp is a great IHMC tradition that both inspires students and recharges scientists, and I'm proud to be part of it each year," he said.

IHMC is a not-for-profit research institute of the Florida University System where researchers pioneer science and technology aimed at leveraging and extending human capabilities. IHMC researchers and staff collaborate extensively with the government, industry, and academia to conduct ground-breaking science and develop breakthrough technologies. IHMC research partners have included: DARPA, the National Science Foundation, NASA, Army, Navy, Air Force, National Institutes of Health, IBM, Microsoft, Honda, Boeing, Lockheed, and many others.








Science Saturdays bring out the best in student volunteers

There is a lot to love about Science Saturdays at the Florida Institute for Human and Machine Cognition.

These science-enrichment sessions bring science to students in grades 3-7 in fun and engaging ways on topics ranging from paper airplanes to robot hands and roller coasters.

It is free — which is something parents can love. It is full of examples of the ways scientific principles jump out the textbook and into the real world — which is something students and instructors can love.

But what makes Science Saturdays truly special are people like sisters Hannah and Rachel Kirby.

The Kirbys — twins who graduated in 2025 from Pace High School — are two stalwart high school volunteers who have given more than a few Saturdays to work with small groups of students. Both are headed to Florida State University this fall to study biomedical engineering — inspired in large part by what they saw at IHMC.

"It has been a true pleasure to have Hannah and Rachel volunteer with us," says Ursula Schwuttke, IHMC's director of community outreach. "It's easy for the younger students to relate to them as someone to emulate because they are such inspiring STEM role models. We will definitely miss them as they head off to college, but I know they are bound for great things in the future."

The volunteers for this program are selected not only for their science abilities, trustworthiness and reliability, but also for their abilities to work with others, to explain science concepts to children, and to make learning fun.

Each Saturday that the program is offered, an IHMC research scientist leads a set of hands-on activity in an area of science or engineering. The volunteers' task is to help the children assigned to him with the hands-on activities that are the emphasis of the program, to make sure each child has an equal opportunity to participate and has a good time.

Rachel Kirby

Hannah Kirby

Hannah and Rachel both came to Science Saturdays as younger students. Hannah says that experience sparked her further interest in STEM and helped her build other skills that she knows will serve her well.

"Volunteering at IHMC has helped me develop strong communication skills and the patience needed to lead and teach a group effectively," Hannah says. "It also taught me how to navigate challenges that may arise in group settings. These skills are valuable in any team environment and will better prepare me for future internships or job opportunities."

Rachel agrees and notes that her time volunteering at IHMC helped her build confidence in her ability to multitask, communicate directions and collaborate with others.

"I also genuinely enjoyed volunteering because I got to work with younger kids and see their excitement and love for learning science," Rachel says. "It really reminded me of how I used to be while learning new things." Getting sneak peeks into the work IHMC does was also a nice perk, says Rachel, who "hopes one day to contribute to projects like those I saw at IHMC."

Both Kirbys say they earned rewards apart from the purely scientific inspiration.

"The most rewarding part is seeing younger students get excited about learning," Hannah says. "It brings me so much joy to see their curiosity and intelligence. They have so much potential, and it gives me hope for the future."

To learn more about student volunteer opportunities with Science Saturdays, email uschwuttke@ihmc.org.

Science Saturdays

Pensacola Dates

September 20	October 18
November 22	December 20

Ocala Dates

September 6	October 4th
November 8	December 6th




ihmc
23



SCIENCE
SATURDAY





Annual Open House shares science, engineering and robots with the community for National Robotics Week

Want to meet the human who battles the humanoid robot Nadia at ping pong and boxing?

Or the researchers harnessing virtual reality and data visualization to help improve our ability to manage, synthesize, and act upon data in a slew of disciplines — from search and rescue and special warfare operations to the early detection of mild traumatic brain injuries and more.

The Florida Institute for Human and Machine Cognition (IHMC) was once again the place to be for the annual Open House event, when dozens of researchers, roboticists, engineers, cognitive scientists, and human performance experts shared what they love about their life in science.

Timed to coincide with National Robotics Week, the family-friendly event encouraged scientific discovery through hands-on activities, challenges, and demonstrations while providing the opportunity to learn.

The Pensacola MESS Hall science museum was also on campus for the event, as were robotics students from both Pensacola State College and the University of West Florida.

April 10, 2026

Save the date and make plans to join us next year

Vagus nerve research, the future of space exploration, and AI are in focus on latest episodes of STEM-Talk

STEM-Talk continues to feature conversations with some of the most interesting people in the world of science and has been downloaded by more than 4.3 million people across the world since its launch in 2016. In 2024, it won the bronze award in the third Annual Signal Awards for best General Health and Wellness podcast. In 2020, the show was nominated for a Webby Award in Science and Education. In 2019 and 2017, STEM-Talk won first place in the Science and Medicine category of the annual People's Choice Podcast Awards. Host Dr. Ken Ford and his cast of co-hosts have compelling conversations with thought leaders, scientists, and experts in multiple disciplines.

JP Errico, Episode 179

JP Errico is known for his innovative work in neuroimmunology, the study of how the nervous system and immune system interact. Much of his research focuses on the role that the vagus nerve plays in the treatment of pain, depression, ketone expression, improving learning and much more. Neuroimmunology affects a wide range of health factors including inflammation, mental health and aging. Errico believes everyone should understand the field to live a healthy life. "When I think of the four most fundamental pillars on which all life functions, it's your immune system, it's your cellular metabolism it's your microbiome and it's your autonomic nervous system," Errico says.

Dr. Pascal Lee, Episode 180

Dr. Pascal Lee had led more than 30 expeditions to the Arctic and Antarctic to gain knowledge for a greater adventure — Mars. Lee, a planetary scientist with the SETI Institute, the Mars Institute, and NASA Ames Research Center brings this lofty vision to his third STEM-Talk appearance. His past appearances were Episode 121 in 2021 and Episode 17 in 2016. While Mars exploration is more prevalent in recent popular imagination, Lee says establishing a permanent base on the Moon is critical to the future of human space exploration. "I see the Moon as a scientific jewel," he says. "There are so many things we can explore," including caves on both the Moon and Mars, which could act as possible refuges for humans there. "Caves are the difference in something that is much more survivable for life from Earth versus the surface."

Dr. Ken Forbus, Episode 181

This episode offers a conversation with three fellows of the American Association for Artificial Intelligence: Northwestern University's Dr. Ken Forbus, IHMC Founder Dr. Ken Ford, and retired associate IHMC director Dr. James Allen. Co-hosts Ford and Allen interview Forbus about his development of the Structure Mapping Engine, a computer simulation of analogy and similarity comparisons that helped pave the way for computers to think like humans. The media focus on chatbots has obscured other methods of AI that are used all of the time. It is as if, Ford notes, the broad public believes chatbots are all there is to AI, when, as this episode shows, that couldn't be farther from the truth. "There are so many other things going on that are not in the popular press," Forbus says.

Dr. Michael Schmidt, Episode 182 and 183

The conversation with Dr. Michael Schmidt was so wide-ranging, it merited two episodes. Schmidt is the founder, CEO, and Chief Scientific Officer of Sovaris Aerospace, a company focused on assessments and solutions applied to humans in space and extreme environments on Earth. Episode 183 featured our conversation about NASA's plans to send humans to Mars and build permanent colonies on the Moon and Mars. Episode 182 featured Schmidt's pioneering work in precision medicine and how he has used it to improve the cognitive and physical performance of astronauts as well as NBA, NFL players and Special Operations forces.

Ask Me Anything, Episode 184

Episode 184 is another Ask Me Anything episode of STEM-Talk, where Dr. Ken Ford answers listeners most pressing questions. From whether Ken and co-host Dr. Dawn Kernagis read books digitally or in print to the power of grip strength as a biomarker for aging adults, listeners had a lot of their minds. The foibles of AI transcription tools, the power of large language models to improve patient care and healthcare workflows, and the prospects of a medical "digital twin" upon whom virtual experiments could be performed are also up for discussion. Make sure you stay until then end, when you will get to hear Ken's words of wisdom to graduates at the 2025 University of West Florida commencement ceremony.

Subscribe to STEM-Talk on your favorite podcast platform, follow our YouTube channel, or our website, https://www.ihmc.us/stemtalks/

Evening Lectures in Pensacola & Ocala featured experts on Mars exploration, ketamine therapies, sleep, and much more

The award-winning Evening Lecture Series is part of the Florida Institute for Human and Machine Cognition's community outreach efforts that creates a space for engaging and enlightening conversation. Since 2001, IHMC has hosted this series, bringing leaders in science, technology, civic and organizational leadership to share their wisdom with an engaged audience.

The 2025 season of Lectures include thought leaders in disciplines that span all three pillars of IHMC research. Experts in ketamine therapy, space exploration, climate science, sleep, AI, robotics and more have been featured. Evening Lectures are part of IHMC's footprint and reflect our commitment to continuous learning and community engagement.

Dr. Daniel Britt

Orbits and Ice Ages: The History of Climate

Climate change has become a major political issue, but few understand how climate has changed in the past and the forces that drive climate. Most people don't know that 50 million years ago there were breadfruit trees and crocodiles on the shores of the Arctic Ocean, or that 18,000 years ago there was a mile-thick glacier on Manhattan and a continuous belt of winter sea ice extending south to Cape Hatteras. The History of Climate provides context of the current climate debate and fundamental insight how the climate works from Dr. Daniel Britt, the Pegasus Professor of Astronomy and Planetary Sciences at the University of Central Florida.

Dr. Tim Broderick

Wearable Devices That Extend Human Health, Performance, and Teaming

Dr. Tim Broderick is Chief Science Officer and Senior Research Scientist at IHMC. In this lecture, he looked at the difference between promise and reality when it comes to expensive wearable physiologic monitors that say they will improve health and performance. From battery life to the quality of physiological data, Broderick noted the gaps and shortfalls in what current wearables can provide users and highlighted how ongoing IHMC research is pushing beyond these limits using advanced physiological sensors, tactical noninvasive nerve stimulators, and novel "e-skin" materials that enable us to assess and augment performance in extreme environments. Broderick has helped develop advanced biomedical technologies for the Department of War, NASA, and global medical device companies.

Dr. Johnathan Edwards

Ketamine: From Anesthetic to Healer

Dr. Johnathan Edwards is a practicing anesthesiologist and visiting physician at IHMC. With 20 years of experience, he has used ketamine extensively to treat mental health issues. Ketamine was developed in 1960s in the search for an anesthetic that did not cause post-operative delirium. It became the most used anesthetic in the world. In the 1990s, researchers found that in low doses it had a huge effect on eating-disorder patients. It was tried in treatment-resistant depression patients, then in the prevention of suicidal ideation. Edwards co-authored "The Revolutionary Ketamine" with Gavin de Becker to spread the message that ketamine can save lives.

Dr. Butler Hine

The Promise of Spacecraft Swarm Missions

Technological advancements across the small satellite community have enabled new approaches to complex, large scale missions. Multi-spacecraft geometries of constellations, clusters, and swarms are being developed to undertake a variety of defense, scientific, and commercial missions. These missions leverage groups of small satellites working together as a system. Dr. Butler Hine works at the center of these innovations as a space flight program manager at NASA Ames Research Center and project manager for the HelioSwarm mission. His lecture talked about the technology advancements being used for spacecraft swarm missions, and how those are being deployed, tested, and adopted into future missions. He was previously the project manager for the LADEE mission, a lunar science orbiter launched in 2013.

Explore the full library of IHMC Evening Lectures at our website, https://www.ihmc.us/life/evening_lectures/





Dr. Michael Larson

Sleep — What It Is and Why We Can't Do Without It

Sleep is so much more than just downtime. It is when our brain does some important heavy lifting, consolidating memories and clearing out toxins. It's crucial for regulating mood, boosting immunity, and maintaining a healthy weight. Over time, lack of quality sleep can feed into health problems such as heart disease, diabetes, and dementia. Dr. Michael Larson highlighted technology IHMC is developing that can be a game-changer in bringing the benefits of deep restorative sleep. Larson earned a Ph.D. at Massachusetts Institute of Technology, enjoyed stint in the U.S. Air Force, spent more than 30 years in academia, and co-founded four tech start-ups.

Dr. Pascal Lee

Moon to Mars: Our Amazing Human Exploration Future Ahead

Dr. Pascal Lee is a planetary scientist with the SETI Institute, the Mars Institute, and NASA Ames Research Center in Mountain View, Calif. His research focuses on the Moon and Mars, in particular the history of water and ice on these worlds, and planning future human exploration there. His lectures looked at plans to return to the Moon and journey on to Mars, the challenges we face, the wonders that lie ahead, and the important decisions required to make these audacious exploratory goals possible. It is a subject few are better versed in than Lee, who among his many accolades, received the Sagan Prize for the Popularization of Science. Lee is a member of the U.S. National Academies' steering committee on "A Science Strategy For the Exploration of Mars."

Dr. Dave Rabin

The Art and Science of Self-Healing and Learning

In this lecture, Dr. Dave Rabin explored practical strategies for harnessing neuroplasticity to enhance learning, memory, and emotional well-being. He highlighted techniques such as breathwork, touch, movement, and the use of psychedelics and wearables, to facilitate personal growth and address mental health challenges like trauma, depression, and stress. Rabin is a board-certified psychiatrist and neuroscientist, and is the co-founder & Chief Medical Officer at Apollo Neuroscience, the first scientifically-validated wearable system to improve heart rate variability, focus, relaxation, and access to meditative states by delivering gentle layered vibrations to the skin.

Dr. Brent Venable

How the Way We Think is Shaping Smarter AI

As artificial intelligence becomes integrated into our lives, the way machines "think" is beginning to mirror how humans make decisions. The recent rise of Large Language Models (LLMs) has brought renewed attention to a style of intelligence that resembles what psychologists call "thinking fast"— quick, intuitive, and context-driven responses. But human intelligence also relies on a slower, more deliberate system of reasoning —"thinking slow"— which allows for reflection, planning, and logical analysis. In this talk, Dr. Brent Venable explored how insights from dual-system theories of human cognition can help us build smarter, more adaptable AI. She is a Senior Research Scientist at IHMC and is director of the IHMC–University of West Florida Ph.D. program in Intelligent Systems and Robotics.

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