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FLORIDA INSTITUTE FOR HUMAN & MACHINE COGNITION

VOLUME 5 ISSUE 1

IHMC scientist Pat Hayes interacts with 5th-grade students.

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Dear Friends of IHMC,

At IHMC, our central mission is to improve the relationships between humans and the machines they use. Beyond that, however, IHMC is about our own people: the principal investigators who have earned worldwide renown; their research associates, many of whom are rising stars in their own right; the graduate and undergraduate students who travel from afar to intern at IHMC while finishing their degrees; the administrative staff members who enable us to function effectively; and the leadership team that holds us all together and keeps us working toward the right goals.

In the course of my duties, I'm often asked to discuss IHMC with other groups and organizations. In doing so, I am careful to explain that our success is a product of bringing in the most talented people in their respective fields and providing an atmosphere that encourages that talent to flourish, amazing results are a natural outgrowth.

Unlike past issues, this edition will spotlight a large number of individuals who have recently joined IHMC. Even as we shine the spotlight on these newly hired individuals, I hope you will remember that all of our research and innovations are made possible through interdisciplinary collaborations by all the people that make up IHMC.

IHMC is rethinking the relationship between humans and machines, defining new directions in human-centered computing by linking cutting-edge research into a new alliance of artificial intelligence, psychology, robotics, philosophy, engineering, and social and educational studies. Accomplishing that objective begins with hiring the best of the best human talent available. I am proud to say, we are doing just that and I hope you will enjoy meeting some of our people on the next few pages.

Best Wishes,

Ken Ford

Kenneth M. Ford, Director

IHMC
Florida Institute for Human & Machine Cognition

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University of West Florida

FAU Florida Atlantic University

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Ad Astra Per Scientiam
1958

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IHMC welcomes new employees

PEOPLE. Despite its high-tech mission, IHMC is above all about people: the people who make up our world-class research team as well as the people that research will benefit. IHMC is an interdisciplinary research institute, meaning that our scientists and researchers come from a wide variety of educational and professional backgrounds. Our team members include computer scientists, medical doctors, engineers, psychologists, and philosophers. It is this blend of expertise that enables IHMC to understand and improve the relationships between humans and the machines they work with. Likewise, our research yields benefits to people from all walks of life. Astronauts are gaining new tools to help them do their work more efficiently, while our men and women in uniform will employ smart robots that can keep them out of harm's way. School children are exploring a new way to learn and preserve knowledge and the elderly and disabled stand to benefit from the development of technologies that enrich the human experience by enhancing and restoring the senses, mobility, and cognitive function.

IHMC has been very fortunate in attracting some truly outstanding individuals, and we aim to continue to attract the finest minds to join our team. It is a highly competitive world out there in terms of recruiting top talent, but given our operating model, exciting research, quality of life, reputation, etc., IHMC is confident that we will continue to recruit truly amazing talent. Another key to effective recruitment is having a culturally rich, livable environment, such as that found in Pensacola's downtown, which researchers, scientists, and students enjoy being a part of. Join us in welcoming our newest employees.

Dr. Pamella Dana

Dr. Dana recently joined IHMC as *Senior Advisor for Strategic Initiatives*. She was previously the executive director of the Florida Governor's Office of Tourism, Trade and Economic Development (OTTED). She will focus on managing strategic relationships with affiliated organizations, state and federal government and selected private sector partners. During her service to the State of Florida, Pam provided senior-level oversight to more than 80 programs and partnerships, including Enterprise Florida, VISIT FLORIDA, Florida Sports Foundation Board, Florida Office of Film and Entertainment, as well as rural initiatives, enterprise zones, business incentives, and legislative and corporate outreach. As Florida's Chief Protocol Officer, Pam also maintained direct responsibility for all international affairs and issues, protocol, and consular corps activities. She also served as the State's senior point person in interactions with the military, Department of Defense, and the Pentagon.

A native Californian, Pam holds a Ph.D. in International Development and Economics from the University of Southern California; Masters in Administration, Planning, and Social Policy from Harvard University; and Bachelors in Sociology/Social Work from the California State University at Chico. She has received many honors and awards, including Henry Luce Scholar, Fulbright Scholar, and First Recipient of the Florida Defense Alliance Distinguished Service Award.

Pamella Dana

FEATURED TALENT

IHMC WELCOMES NEW EMPLOYEES


Gen. William L. Nyland


Sharon Heise


Jeff "Skunk" Baxter


Nate Blaylock

Gen. William L. "Spider" Nyland, USMC (ret.)

General Nyland joins IHMC as *Deputy Director for Defense Research and Development*. A former Assistant Commandant of the U.S. Marine Corps, he will act as a liaison between IHMC and the various defense-related organizations, and provide valuable advice to IHMC researchers as they pursue their efforts in support of America's national security.

Spider understands the needs of our men and women in combat because he has been there. Thus, he can help define the role that IHMC can play in helping them do their jobs more safely and effectively. He sees great potential for much of IHMC's research to help servicemen and women, and believes that some can be adapted in the near term to help those who have been wounded in Iraq and Afghanistan. He enjoys the breadth of research at IHMC and is impressed by the knowledge and passion of the researchers.

General Nyland retired from the Marine Corps in 2005 after more than 37 years of service. From 1990 until 1992, he was stationed in Pensacola and commanded the Marine Aviation Training Support Group (MATSG). He has owned a residence in Pensacola since 1990, and he and his wife consider it home. Together they have three children and three grandchildren. Spider enjoys golfing, running, reading, and tinkering.

Dr. Sharon Heise

Dr. Heise, a 20-year Air Force veteran who earned a Ph.D. at Cambridge University, is IHMC's newest *Associate Director* with dual responsibilities for research and liaison with federal agencies. During a military career that spanned Air Force science and engineering elements and also included tours at organizations such as the Defense Advanced Research Projects Agency (DARPA), Sharon focused on research aimed at transforming the way information technology enhances the war-fighting effectiveness of the United States military. Her most recent position was as *Director of the Mathematics and Information Sciences Directorate* at the Air Force Office of Scientific Research (AFOSR).

Sharon became interested in human-machine interactions while at DARPA and the Air Force Office of Scientific Research. Sharon expects that field to grow and flourish and sees IHMC as part of the vanguard. She is enjoying living in Northwest Florida, with the nice weather, beaches, and minimal traffic. Sharon likes the history of the area and is looking forward to water sports in the summer.

Mr. Jeff "Skunk" Baxter

Mr. Baxter joins IHMC on a part-time basis as *Senior Thinker*. He will be collaborating on efforts focused on defense and intelligence research. Best known as a guitarist with Steely Dan and the Doobie Brothers, he has become a specialist in terrorism, missile defense, and chemical and biological warfare. Skunk has concentrated his efforts at exploring asymmetric and nontraditional warfare. A self-taught expert, he chaired the Civilian Advisory Board for Ballistic Missile Defense. He has consulted on the Pentagon's Missile Defense Agency, the National Geospatial-Intelligence Agency, the U.S. Department of Defense, and the U.S. intelligence community, as well as for defense-oriented manufacturers including Science Applications International Corporation and Northrop Grumman.

Dr. Nate Blaylock

Dr. Blaylock has joined IHMC as a *Research Scientist*. He received his B.S. in computer science and a B.A. in linguistics from Brigham Young University and his M.S. and Ph.D. in computer science from the University of Rochester. He has previously worked at Saarland University in Saarbrucken, Germany, on spoken dialog systems, as well as for Cycorp in Austin, Texas, working on plan recognition. A native English speaker, he was a missionary in Japan, where he learned Japanese, and also is fluent in German and Spanish. Nate and his wife have three young sons.

Dr. Randy Williams

Dr. Williams has joined IHMC as the Institute's *Director of Development*, responsible for managing its ongoing capital campaign activities. Most

FEATURED TALENT

IHMC WELCOMES NEW EMPLOYEES

recently he served as president of the Sacred Heart Health Care System Foundation in Pensacola. Prior to his eight and a half years at Sacred Heart, Randy was serving as Director of Development for the University of West Florida, when asked about leading the development project at IHMC. He was excited by the chance to work at IHMC and to undertake an engaging new challenge. Randy is also a retired Naval Aviator who served in the U.S. Navy for 32 years. He and his wife have five grown children and two grandchildren.

Mr. Robert Wilson

Mr. Wilson is *Senior Project Director* at IHMC and will focus on technology commercialization and private sector relations. He is a former investment banker with more than 20 years of financing experience. Most recently he was head of Healthcare Corporate Finance at the Royal Bank of Canada, and, prior to that, he held a similar position at First Union.

Rob has been involved in more than $3 billion of funding for a wide range of companies in the biotechnology, medical technology, and healthcare service industries. He directed the national venture capital marketing effort for healthcare venture funds at all of his prior investment banking firms. He has also worked with companies that were incubated or financed by technologies from some of the nation's leading research universities including Stanford, Duke, MIT, and Harvard. In addition, Rob has served on the Advisory Boards of the Counsel for Entrepreneurial Development in the Research Triangle Park and the Royal Bank of Canada Life Science Fund.

Wilson grew up in Pensacola, and he and his wife kept a vacation home here for many years. Now that his three children have left the nest, he is happy to be back full time in "paradise." He is excited about the potential for growth in the community and believes IHMC is an integral part of the solution. He enjoys bicycling, fly fishing, and playing in his rock band, Shock and Awe.

Mr. Taylor Biggs

Taylor is a senior at the University of West Florida majoring in computer science. He joins the lab of Marco Carvalho on the Xlayer project, which involves a smarter wireless network to be used by the communication of robots. He enjoys many water sports as well as tennis and racquetball.

Mr. William de Beaumont

William is a *Research Associate* working with James Allen on natural language and mixed-initiative systems. Previously, he worked for the University of Rochester as a technical assistant, working with Dr. Allen on TRIPS. He received his B.S. in computer science from the University of Rochester. William enjoys playing music, simple electronics, and robotics. He likes computer programming so much that he does it both as work and as a hobby.

Mr. Josh Cameron

Josh is working with Anil Raj on the Alzheimer's screening test project as well as several others. A native of Pensacola, he received his B.S. in biology from the University of Virginia. He is currently taking classes at UWF in preparation for the MCAT and plans to apply to medical school in the fall.


Rob Wilson


Ryan Chilton

Ms. Michelle Bowers

Michelle is *Coordinator* for IHMC's development activities. She previously worked at Sacred Heart Hospital as *Coordinator of Donor/Board Relations*. Prior to that she worked in Valdez, Alaska. She is pursuing a degree in business administration. Michelle and her husband, Gary, have two sons, Jacob, 21, and Tommy, 19. She enjoys the outdoors, working out, and snowboarding.

Mr. Ryan Chilton

Ryan is from Pensacola and is finishing his senior year at the University of Florida. He is working with Jerry Pratt and Peter Neuhaus on mechanical design. Last semester he worked on an autonomous vehicle for DARPA's Urban Challenge. Ryan's hobbies include web design, playing tennis, practicing magic tricks, and video editing.

Ms. Elsa Fouragnan

Elsa is working toward a master's degree in cognitive engineering at the Institut de Cognitique at the University of Victor Segalen in Bordeaux, France. She is working with Anil Raj on the sensory substitution project.

Mr. Johnny Godowski

Johnny joins Jerry Pratt and Peter Neuhaus on the reconfigurable robot project. In addition, he will work with them in planning for a highway-speed legged robot. Johnny received his B.S. in electrical engineering from the University of Florida. A licensed pilot, he enjoys playing guitar and studying history and archaeology.

FEATURED TALENT

IHMC WELCOMES NEW EMPLOYEES

Mr. Koji Intlekofer

Koji will work with Matt Johnson on the control of multiple autonomous robots. He obtained a B.S. in general engineering from the University of Illinois at Urbana-Champaign where he did robotic control research. Koji studies Japanese and likes to explore.

Mr. Matt Missel

A junior at Rochester Institute of Technology, majoring in aerospace engineering, Matt is working with Jerry Pratt and Peter Neuhaus on their reconfigurable robot. He has worked as a CNC machinist previously and is originally from Rochester, NY. He enjoys outdoor activities such as camping, hiking, and kayaking.

Mr. Angelo Karavolos

Angelo joins Anil Raj on the non-invasive sensor project. He has master's degrees from the Universities of Kentucky and Illinois in the areas of engineering and biology, respectively. He is currently completing a Ph.D. double major in fiber and polymer engineering and ecological medicine. He previously served on active duty in the military and is currently a reservist with an Army Aviation group. Angelo has four patents in polymeric and biological polymers, organic semiconductors, and sensor design.

Mr. Hian Kai Kwa

Kai is working toward his masters in mechanical engineering at the University of Michigan, Ann Arbor. His work at IHMC with Jerry Pratt and Peter Neuhaus, focusing on assisting human walking, will serve as his co-op experience for his degree. Originally from Singapore, his hobbies include computer games and juggling.

Mr. Jerryll Noorden

Jerryll is a master's student at Florida Institute of Technology in mechanical engineering, specializing in mechatronics and robotics. He will be completing his thesis in the lab of Jerry Pratt and Peter Neuhaus, working on the exoskeleton project. Originally from the Netherlands and now from Curacao, Netherlands Antilles, Jerryll plays and records music, fishes, and surfs.

Mr. David Lecoutre

David is a senior at the Institut de Cognitique in Bordeaux, France, majoring in cognitive engineering. He is working with Anil Raj on technologies to monitor human performance and workload interactions. David's hobbies include sports, such as squash and biking, and going out with friends to movies and concerts.

Mr. Raffaele Quitadamo

Raffaele is from Modena, Italy, where he is pursuing his Ph.D. in information engineering at the University of Modena and Reggio Emilia. He has designed and implemented Mobile JikesRVM, a special JVM (Java Virtual Machine) capable of supporting transparent Java Thread migration among different distributed hosts running Java. At IHMC, he is working with Niranjan Suri to integrate his research prototype for mobile threads within the Agile Computing project.

Mr. Andrew Raines

Andrew joins IHMC to support coordination for events and other logistical support. A native Pensacolian, he has a masters degree in public administration and a B.A. in political science. He previously worked as United States Senator Connie Mack's Northwest Florida Regional Aide. In his free time Andrew enjoys traveling and biking.

Ms. Cathryn Schuster

A native of Gulf Breeze, Cathryn recently received her B.S. in math and physics from Tulane University in New Orleans. She is working with Anil Raj on a variety of his projects centered on augmented cognition and sensory substitution. She enjoys making stained glass and spending time outside, sailing, surfing, and running.

Mr. Greg Watkins

Greg is an electrical engineering major at the Georgia Institute of Technology. He is working with Jerry Pratt on a bipedal walker. He is from Pace and previously worked with Jerry while attending high school. Greg plays the clarinet and video games.


Matt Missel


Jerryll Noorden


David Lecoutre


Cathryn Schuster

RECENT LECTURES

IHMC's Evening Lecture Series


Howard Putnam

Putnam explores leadership

In the airline industry today, "turbulence is inevitable; misery is optional," according to Mr. Howard Putnam, former CEO of Southwest and Braniff Airlines. He discussed his approach to leadership during his lecture "People and Progress in the Turbulent Airline Industry."

At Southwest, Putnam put a strong focus on figuring out what business the company is really in. When they concluded that it was really just a form of mass transit, Southwest examined how it could be more appealing, choosing to emphasize low prices and a pleasant experience.

Key to making the company profitable and fun was getting buy-in from everyone, from the flight attendants to the ground crews to the customers. In doing so, they initiated several measures that improved the bottom line but more importantly, improved the perception of the company. An example Putnam gave was the open seating, which customers viewed as important to keeping their ticket prices low.

Putnam learned lessons from his airline experiences that other businesses can use. For example, he believes it is critical to create a clear vision and provide open and honest leadership. While he believes that the large, legacy airlines will not be able to compete with Southwest, they could apply many of his management ideas to improve their corporations.

As CEO of Southwest, Putnam and his team tripled the revenues and tripled profitability in three years. He led the visioning process at Southwest as well as further development of the "fun" culture and excellent customer service that distinguishes Southwest. Recruited by Braniff Airlines to save or restructure the financially failing airline, Putnam was the first airline CEO to take a major carrier successfully into, through, and out of chapter 11. He is the author of a book on leadership and ethics titled *The Winds of Turbulence*.

■ ■ ■ Putnam believes it is critical to create a clear vision and provide open and honest leadership. ■ ■ ■

Norman describes status of human-machine interaction

As computers get smaller, cheaper, and more powerful, engineers feel compelled to use them in almost every application. During his lecture "Cautious Cars and Cantankerous Kitchens," Dr. Don Norman pointed out some of the challenges of making helpful use of computing power.

New cars are being equipped with sensors to measure driver's attention and the position of other cars. However, each advance must be hand tuned by the engineers to take into consideration the range of situations drivers experience. For example, some cars have preset following distances. If a driver squeezes into a small gap between cars in an effort to get in a different lane, the car might suddenly brake, disturbing the driver behind. "The machines are not intelligent but rely on the intelligence of their designers," said Norman.

Norman described a new approach that generates a shared understanding. This approach, which Norman calls "natural interaction," relies on the user and the computer to do what each does best. Such interactions are optional, where the computer system does not force an action but instead offers assistance to the user.

Don Norman is cofounder of the Nielsen Norman Group, Professor at Northwestern University, and former VP of Apple Computer. He was the founding chair of the depart-


Donald Norman

RECENT LECTURES

IHMC's Evening Lecture Series

ment of cognitive science at the University of California, San Diego, and a founder of the Cognitive Science Society, where he served as Chair and editor of its journal. He is the author of *The Design of Everyday Things* and *Emotional Design*. His newest book, *The Design of Future Things*, discusses the role that automation will play in everyday places such as the home and automobile.

Grossberg explains current ideas in cognitive science

Neuroscientists can describe in detail the transfer of information from individual neurons or other aspects of how the brain works. Dr. Stephen Grossberg explained how this information is now helping describe how the mind, our experience of our world, works during his lecture "The Brain's Cognitive Dynamics; The Link Between Brain Learning, Attention, and Consciousness."

An understanding of the mind is critical for understanding many mental diseases and for improving technology. A paradigm shift is underway, toward an explanation of how real-time systems deal with the unexpected. This shift is due to a new understanding of the complementary nature of the workings of the brain as well as analysis of the impact of brain structure.

The complementary structure of the brain allows multiple pathways to analyze the same information, reducing uncertainty. Many are familiar with optical illusions, that take advantage of this and other evolutionarily useful tools, such as responding to lighting changes. Complementary learning is critical to discovering causal relations and allowing the learning of new things without forgetting old things. Grossberg explained the underlying neural structures that provide such learning and described how these structures can be used in machine learning.


Stephen Grossberg

Grossberg is Wang Professor of Cognitive and Neural Systems and Professor of Mathematics, Psychology, and Biomedical Engineering at Boston University. He is the founder and director of the Center for Adaptive Systems and founder and Chairman of the Department of Cognitive and Neural Systems. Grossberg is a leading theorist on linking mind to brain and to applying these results to problems in engineering and technology.

Kroto examines science in society

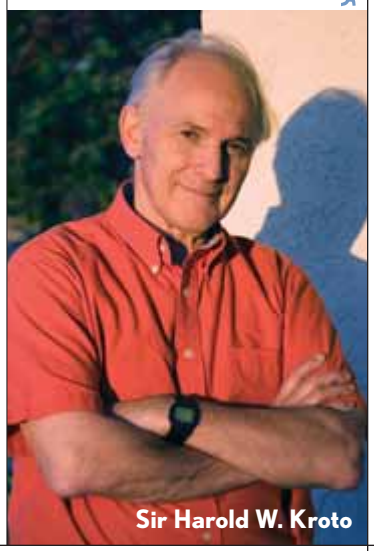
When people think of scientists, they often think of someone who looks like Einstein in his later years. Dr. Sir Harold "Harry" W. Kroto reminded the audience during his talk "Science, Society, and Sustainability" that Einstein started developing the theory of relativity when he was 17 and looked like a typical young man. This kind of misperception underlies the challenge of attracting young people to science studies today.

Kroto is very concerned about the challenge of attracting young people into science and the perception of science. He believes that "the future is in scientists' hands," and new scientific discoveries will prevent a rapid degradation of our quality of life. The media portrays scientists as abnormal, and politicians are frustrated by the doubt inherent within scientific research. Even kids' toys do not prepare them for scientific thought. Erector sets and phones that could be taken apart and fixed helped Kroto in developing an understanding of the things around him; today a broken phone is just thrown out.

During the lecture Kroto traced his interest in science from erector sets to quantum mechanics to his co-discovery of buckminsterfullerene, a form of pure carbon better known as "buckyballs." This discovery led to his receipt of the 1996 Nobel Prize in Chemistry. He described the possible uses of this form of carbon and the related nanotubes in a range of things, from solar cells to precision electronics.

Kroto has developed the Vega Science Trust, which makes TV and Internet programs to improve public awareness and understanding of science and engineering. Such a broadcast platform for the science, engineering, and technology communities enables broad communication on all aspects of their fields.

Kroto is a Francis Eppes Professor in the Department of Chemistry and Biochemistry at Florida State University. He was previously at the University of Sussex in England, where he taught for 37 years. In 2001, Kroto won the Royal Society's prestigious Michael Faraday Award.


Sir Harold W. Kroto

RECENT LECTURES

IHMC's Evening Lecture Series


Carol Coletta

Coletta provides insight into city branding

Branding a city is a unique challenge because it must reflect an enormous range of people and ambitions. Carol Coletta provided stories of branding efforts from a range of cities and offered tips on developing a brand during her lecture "Quick! Brand My City."

In creating a brand, a community must consider several factors. The brand must reflect where the city is and where it is going. Coletta stressed the importance of getting buy-in from the community. The aspirations must be realistic, however. An effective campaign will be one with a message that is different from all of the rest. A sense of geographic location is also essential.

Coletta also discussed internal factors critical for economic development. A community should examine how it looks to visitors. For example, a visitor to Pensacola is likely to fly into the airport and drive to the beach. The part of town they see on that trip should seem appealing, encouraging them to stop and take a look. In addition, communities should strive to welcome all races and classes, providing everyone the opportunity to have a voice at the table.

In creating a brand, a community must consider several factors. The brand must reflect where the city is and where it is going.

Coletta is president and CEO of CEOs for Cities, and host and producer of the nationally syndicated public radio show Smart City. She formerly served as president of Coletta & Company and as executive director of the Mayors' Institute on City Design. She is currently a candidate for a Master of Design Methods at the Institute of Design at Illinois Institute of Technology.

Turner illuminates challenges in astronomy

The images from the Hubble telescope have impressed many with the views of distant galaxies. However, in his lecture "The Dark Side of the Universe," Dr. Michael Turner explained that stars and other star stuff, like planets, make up only four percent of the universe. The rest is dark matter and dark energy.

Dark matter accounts for about one-third of the universe. It is the stuff that holds everything together, providing sufficient gravity to cluster galaxies and keep individual galaxies together. Recent data on neutrinos indicate they are part of the dark matter, but they make up only a small percentage. The rest remains to be identified.

Dark energy is even less understood. It provides the repulsive gravity that is accelerating the expansion of the universe. Turner and his colleagues have yet to find a mathematical model of dark energy. The explanations they have considered don't make logical sense to the layperson and Turner expects that the real explanation will be a stranger idea yet.

Turner is the Rauner Distinguished Service Professor and Chief Scientist at Argonne National Laboratory. He previously served as the Assistant Director of the National Science Foundation for the Mathematical and Physical Sciences. Turner is a Fellow of the APS, of the American Association for the Advancement of Science, and of the American Academy of Arts and Sciences, and is a member of the National Academy of Sciences. He is a pioneer of the interdisciplinary field that has brought together cosmologists and elementary particle physicists, and his research focuses on the earliest moments of creation.


Michael Turner

RECENT LECTURES

IHMC's Evening Lecture Series


Margaret Leinen

Leinen discusses climate change

Dr. Margaret Leinen believes that climate change has been an "exceedingly difficult concept for scientists as well as the public to grapple with." She described the challenges associated with understanding climate change during her lecture "Global Climate Change: A Long and Winding Road with Further Challenges Ahead."

The first mention of the possibility of human-induced climate change from the burning of fossil fuels was in 1896. From then, scientists have worked to document the changes in carbon dioxide levels as well as to understand what the consequences of those changes might be. Initially, Leinen explained, there was much debate over the possible impacts. The US government committed to increasing research funding on climate change in 1990. The results of this funding included the ice core data documenting temperature and carbon dioxide correlations for over 400,000 years.

Advances in computing power have increased the ability of scientists to predict the effects of changes on the climate. With improved tools and data, the confidence of scientists in predicting future climate change has increased. Leinen highlighted that, in the Intergovernmental Panel on Climate Change Fourth Assessment Report released in 2007, scientists showed a high degree of agreement that human actions are altering the climate.

Leinen is the Chief Science Officer of Climos, Inc., a start-up company leveraging natural processes to mitigate climate change. She previously served as the Assistant Director for Geosciences at the National Science Foundation. While at NSF, Leinen served as the vice chair of the Interagency Climate Change Science Program of the federal government and as the co-chair of the Joint Subcommittee on Ocean Science and Technology, which developed the first interagency assessment of national priorities for ocean research. Prior to her service at NSF, she served as the Dean of the Graduate School of Oceanography and the Dean of the College of Environment and Life Sciences at the University of Rhode Island and as the Vice Provost for Marine and Environmental Programs.

Norton describes challenges in branding places

Marketing has come a long way since Josiah Wedgwood started the idea of branding.

Dr. Dave Norton examined the evolving notion of branding during his lecture "Brand Truth: What You Have to Do Today to Differentiate."

The days when Americans bought something simply because they needed it are gone. As society became more mobile, we looked to brands to identify ourselves. The brands, such as clothing or car brands, helped newcomers indicate social status and other attributes. With leisure time becoming less relaxing and with our need to connect to the office 24/7 by phone or email, consumers started to look toward spending their money on experiences. Companies met that demand with the "brand experience," making shopping or travel into a high-experience, high-reward activity. The current phase of marketing is "brand truth," where companies explain their philosophies to consumers to build loyalty.

Norton explained how each of these kinds of branding is essential in today's marketplace. He is currently engaged in efforts to assist Pensacola in branding itself and described how other communities, such as Santa Fe, have successfully branded themselves.

Norton is internationally recognized as a cutting-edge thinker on what makes brand experiences meaningful. He is a principal of Stone Mantel, an insights agency focused on finding the marketing experiences that matter most to customers. He lectures around the country and has provided consultation to diverse organizations such as large internet companies, cities, small countries, and consumer goods companies.


Dave Norton

RECENT LECTURES

IHMC's Afternoon Lecture Series

Hancock examines human decision making

Humans perform an amazing variety of tasks, many under extreme stress. In many challenging situations, however, their performance suffers and can lead to tragic results. Dr. Peter Hancock described lessons learned from such situations during his lecture "Decision and Disaster." He focused on two famous case studies, Custer's last stand and the sinking of the Titanic, relating the human factors to current concerns, such as cell phone use in cars. Hancock is Provost Distinguished Research Professor in the Department of Psychology, the Institute for Simulation and Training, and at the Department of Civil and Environmental Engineering at the University of Central Florida.

Arkin explores human-machine teamwork

For robots to be fully integrated into human interactions, they must adapt to new environments, have varied behavior, and learn new skills. During his lecture "Behavioral Development for a Humanoid Robot: Towards life-long human-robot partnerships," Dr. Ron Arkin detailed his efforts to integrate such natural behaviors into QRIO, Sony's humanoid entertainment robot. In particular, he detailed efforts to allow the robot to learn in a real-time system. Arkin is Regents' Professor in the College of Computing at the Georgia Institute of Technology and is the Director of the Mobile Robot Laboratory.

Hoffman describes value of macrocognition

A topic in cognitive systems engineering that is receiving considerable interest is macrocognition, the performance and effectiveness of large systems. IHMC's Robert Hoffman explained how macrocognition is critical to understanding real situations during his lecture "Macrocognition." He emphasized the challenges of studying psychology in the laboratory and attempting to describe how real, complex systems act based on these controlled studies.

Hayes discusses logic and paradoxes

Paradoxes, statements that are false if they are true and true if they are false, have posed challenges in logic, mathematics, and philosophy of language. During his lecture "Russell, the Liar, and Contingent Kripke: Slaying the Dragons of Paradox," IHMC's Pat Hayes explained efforts to avoid paradoxes in logic systems. He expanded on how a new logic that he has been involved in developing, known as IKL, manages to convert paradoxes to simpler contradictions.

Taysom explores uses of dynamic languages

Modern computer programs require tools designed for rapid turnaround in creating rich, reconfigurable, interactive systems. IHMC's William Taysom explained how dynamic languages fit this role during his lecture "Dynamic Languages: The Right Tool for the Job." These languages are common in creating video games, websites, and photo editing, and Taysom argued that they should be a large part of the tools of all programmers.

Beautement explains the value of values

Human interactions at all levels, from international to interpersonal, are governed by a measurement of values. Patrick Beautement described the need for incorporating value into software agents during his lecture "Value-Driven Reasoning for Sustainability in an Uncertain World." Such software agents would be better able to interact with and assist humans in the complex environments that humans must navigate. Beautement is a senior technical consultant, formerly with QinetiQ.

Ramamoorthy describes humanoid walking

Current bipedal robots range from unpowered, but limited, passive dynamic walkers to power-hungry, but dexterous, humanoid robots. In his research, Dr. Subramanian Ramamoorthy aims to find a middle ground, a robot that incorporates natural, energy efficient motions to achieve robust walking in unknown terrains. He presented his efforts in his lecture "Encoding safe task achievement in humanoid robots and autonomous agents." Ramamoorthy is a doctoral candidate at the University of Texas at Austin in the Intelligent Robotics Laboratory, under the supervision of Dr. Benjamin J. Kuipers

Kozminsky examines concept map form

The effectiveness of a given concept map is related not only to its content but also its form. Ely Kozminsky described his research into the effect of different forms on the comprehension of concept maps during his lecture "The Effect of the Form of Concept Map Nodes on Map Usage." He showed how using different shapes for concept map elements leads to improved recall of content. Kozminsky is a professor in the Department of Education at Ben-Gurion University, Beer-Sheva, Israel, and is working with IHMC researchers to convert CmapTools to Hebrew.

FUNDING

IHMC has recently been awarded over $6.8 million in research funding

NEW FUNDING AWARDED TO IHMC

Sensory Substitution for Wounded Servicemembers

PI: Anil Raj
Source: Office of Naval Research
Amount: $3,149,374

Soldiers who suffer combat, training, or accidental injuries that damage their sensory capabilities or mobility have great difficulty returning to productive lifestyles once healed from the initial trauma. This grant will support the development of technologies for non-invasive sensory and mobility augmentation. This project, in partnership with Wicab Inc., will consist of interdisciplinary research designed to enhance the quality of current sensory substitution technologies. In addition, these technologies and others will be used to improve mobility assistance devices such as powered orthotics and prosthetics.

Team Performance and Optimization in Human-Agent Collaboration

PI: James Allen
Source: Army Research Laboratory
Amount: $1,021,336

Currently, individual robots are introduced to the battlefield on a one-by-one basis, with primary emphasis given to the collaboration between individual operators and individual robots. In the future, however, as increasing numbers of robotic ground vehicles are augmented by unattended sensors, covered by unmanned aerial vehicles, and directed by agent-based coordination systems, the battlefield will become "crowded" with human-agent systems requiring efficient coordination and communication. The goal of this project will be the initial investigation and identification of policies and strategies necessary for the efficient coordination of large human-robot systems. Under the leadership of James Allen, researchers will generate policies for maintaining "common ground" among the team members. Additionally, they will analyze and simulate models of large human-agent systems that will allow for the rapid prototyping and assessment of different deployment strategies and employment procedures.

Seamless and Secure Federation Among Highly- and Loosely-Connected Infospaces

PI: Niranjan Suri
Source: AFRL
Amount: $666,712

The critical information management needs of Air Force missions cannot be met by disconnected and self-contained infospaces, but must be addressed through new approaches to seamless infospace federation. Such a federation will require a computer architecture that accounts for security and resource management, among other issues. IHMC researchers will develop such a system based on OWL (Web Ontology Language) by creating an editor based on CmapTools and extending the KAoS policy services framework.

Biologically Inspired Security Infrastructure for Tactical Environments

PI: Marco Carvalho
Source: Army Research Laboratory
Amount: $474,850

In today's highly volatile world, various governmental and nongovernmental organizations must be able to form ad hoc groups for rapid response in times of crisis. Given the nature of their work, it is essential that such groups can be assembled quickly and function both efficiently and securely. Under this grant, researchers at IHMC will design a biologically inspired security infrastructure to enforce and maintain security policies, configuration and application integrity in networked systems, and devices deployed in tactical networks. The technology will enable future networked systems to detect improper configurations and rogue applications in their peers and automatically take preventive security measures and/or alert users about possible threats and vulnerabilities in the network.

Cognitive Assistant that Learns and Observes (CALO)

PI: James Allen
Source: DARPA
Amount: $700,000

Humans communicate and learn through a variety of modalities. Computers, however, are limited primarily to direct instruction. This funding will allow further development of the Cognitive Assistant that Learns and Observes (CALO), which is capable of learning using multiple means. While observing a user's computing tasks, such as opening programs and entering information, the system can also note verbal commands to clarify the tasks. In particular, this grant will support the development of greater capabilities for learning complex tasks and collaborative tasks. In addition, it will allow the creation of further reasoning techniques to allow the computer to better analyze its understanding and apply previous task knowledge to novel situations.

Reconfigurable Robot for Urban Operations

PI: Jerry Pratt
Source: DARPA
Amount: $422,523

Unmanned vehicles, particularly unmanned air vehicles, are becoming increasingly common in military actions. Current unmanned ground vehicles, however, are quite limited. Most cannot go wherever a soldier can; down narrow alleys, over piles of rubble, or up high ledges. This grant will fund the design of a novel reconfigurable robot platform that will be able to maneuver in a range of environments, making the robot more the peer of the soldier. The robot will be a four-wheeled articulated vehicle that can transform between a low profile four-wheel configuration and a high aspect two-wheel configuration. The design will be capable of fast locomotion on flat terrain and robust locomotion over curbs, stairs, rubble, and ledges.

Cognitive MANET System Task Order

PI: Jeff Bradshaw
Source: Raytheon Corporation
Amount: $94,890

Mobile ad hoc networking (MANET) is a system poised to exploit the interaction of many inexpensive computers to improve systems as a whole. This grant will support IHMC researchers in developing a system based on cognitive analysis, addressing issues such as centralized or decentralized control, resource scheduling, and integrated design. Additionally, the KAoS policy infrastructure will be adapted and new ontologies will be developed to support the new system.

FUNDING

IHMC has recently been awarded over $6.8 million in research funding

NEW FUNDING AWARDED TO IHMC

Courses for Intel 2007

PI: Clark Glymour, David Danks
Source: Department of Defense
Amount: $78,299

Inferring causes in complex systems such as military command and control requires a deep understanding of causal reasoning. IHMC's Clark Glymour, an expert in causal reasoning, will lead a course for the intelligence community on reasoning. Introduction to Data Driven Causal Inference will provide an overview of causality and insight into improving causal reasoning.

Controller for Continuous Interaction Sustenance of Humanoids

PI: Jerry Pratt
Source: Honda R&D Americas
Amount: $74,937

In order for humanoid robots to function successfully in human environments, they must be robust to unpredictable external forces. IHMC researchers will apply novel control strategies to improve the ability of such robots to react to unknown environments. The strategies will use simple models and analytical solutions. The control methods will be tested in the Asimo simulator as well as other simulation software.

Knowledge Elicitation Workshops in Support of the Commanders' Predictive Environment

PI: Robert Hoffman
Source: Air Force Research Lab
Amount: $55,406

Cognitive Task Analysis and Knowledge Elicitation are effective tools for planning complex tasks. Under this grant, IHMC researchers will provide training in these tools for members of the Air Force Research Laboratory's Human Effectiveness Directorate. The trainees will gain skills in applying these techniques when interviewing personnel. The tools will assist personnel in contemplating and explaining their thoughts on predictive battle space awareness.

Interactive Learning Environment for Managing Multinational, Interagency, and Other Interactions in Stability, Security, Transition, and Reconstruction Operations

PI: Paul Feltovich
Source: Army Research Lab
Amount: $25,905

Social, cultural, and organizational differences between the U.S. military, multinational forces, other U.S. and foreign government agencies, and non government organizations can degrade the effectiveness of interaction among members of these organizations who are engaged in stability, security, transition, and reconstruction operations (sometimes referred to as nation-building or peace-enforcing operations). This project will investigate the nature of these differences and their effects, and will outline approaches to training and to building technology aides that can assist commanders and other decision makers in these kinds of operations.

OZ: An Innovative Primary Flight Display

PI: David Still, Tom Eskridge
Source: Emerald Sky Technologies, LLC
Amount: $24,785

IHMC scientists have developed OZ, a human-centered cockpit display for fixed-wing aircraft. Many tests have shown this system to be easier for pilots to understand than the traditional dials and gauges that have been transferred to other digital cockpit displays. Through this grant, IHMC scientists will facilitate testing of OZ by Emerald Sky Technologies. Testing will occur both in simulation and in a general aviation aircraft to demonstrate the feasibility of providing significant performance improvements to pilot situational awareness.

Concept Mapping in the Power Industry

PI: Robert Hoffman
Source: Southern Company
Amount: $34,075

Experts in many areas have knowledge that they have accumulated over years of work and often are unable to explain how they know what they know. Concept mapping, particularly using CmapTools, is a valuable method for eliciting and representing the knowledge and reasoning of domain experts. IHMC researchers will work with domain experts at the Southern Company to generate knowledge models based on Cmap knowledge elicitation interviews. This effort will focus on IT personnel and Public Service Commission relations. They will also train Southern Company personnel to conduct similar procedures to expand and extend the knowledge elicitation, representation and re-use capabilities using Cmaps.

"Insight" CmapTools Suite

PI: Alberto Cañas
Source: Ceryph, Inc
Amount: $23,850

IHMC's CmapTools have been utilized in a variety of environments and have a range of tools that are useful for commercial applications. Ceryph, Inc., has a license for distributing CmapTools to commercial users. This grant will facilitate the transfer of the software and knowledge necessary for making changes and improvements of CmapTools at Ceryph. In addition, IHMC researchers will educate Ceryph employees on the common concerns raised by users and other institutional knowledge that will make the commercialization of CmapTools a success.

Coastal Zone Mapping and Imaging Lidar

PI: Choh Man Teng
Source: Army Corps of Engineers
Amount: $21,000

International standards for coastal surveys specify the degree of resolution of sea floor mapping. Though the sea floor typically changes in a gradual manner, variations can occur due to many causes such as reefs or shipwrecks. These variations are currently detected by human experts who visually identify these targets from survey data. IHMC researchers have designed and implemented an automated target detector to simplify coastal mapping. This funding will support the testing of the detector using survey data supplied by the South Florida Testing Facility. The results will identify any performance issues as well as indicate any possible improvements and additional features that may be incorporated.

LOCAL NEWS

Science Education

Students play handmade instruments and watch waveforms on an oscilloscope

Billy Howell explains creation of unique waveforms at Pensacola Symphony's Music for Families

Science and the Arts

With our commitment to science education in our community, IHMC is always on the lookout for opportunities to bring the excitement of science to students, particularly in venues where they least expect it. Therefore, we have partnered with local arts organizations to participate in their activities.

The Pensacola Museum of Art recently hosted an exhibit of Leonardo da Vinci's machines. The exhibit featured contemporary models of machines that Leonardo sketched in his notebooks. Leonardo's work provides an excellent opportunity to illustrate the connection between science and art.

While the Leonardo exhibit was at the art museum, IHMC held a *Science Saturday* focusing on simple machines, such as levers, pulleys, and gears. We demonstrated how Leonardo combined these machines in creative ways, developing ideas for many useful machines. A particular treat was a presentation by Nathan Gupta, who had attended *Science Saturdays* when he was younger. He showed the students a variety of simple machine displays he had built and explained the physics behind them. Following the activity, many of the students begged their parents to take them to the museum. Some even convinced their scouting troops and science clubs to make a trip, spreading their enthusiasm about what they learned at our program to other students in the community.

In addition to our *Science Saturday* program, IHMC participated in the museum's "Passport to the Renaissance" day. This free day included many activities and demonstrations for children, including fencing, crafts, and dancing. Nathan Gupta and Dax Kerchner, another teen volunteer with *Science Saturdays*, as well as a couple of other IHMC researchers staffed a table with a variety of simple machines for patrons to explore. Many who visited the table had not had the opportunity to attend our *Science Saturdays* program, but now see a connection between science and art.

In addition to our linkages with the art museum, IHMC has participated for the last several years in the Pensacola Symphony Orchestra's twice-yearly Music for Families program. This program is a shortened performance of a recent symphony production, with interpretation interspersed throughout. Prior to the performance, a number of organizations have tables for children to explore aspects of music, including an instrument petting zoo, opera costumes, and the creation of instruments.

IHMC participates in this symphony event by staffing a booth on the science of music. IHMC's Billy Howell, a musician who plays several instruments, shows students how they can see the sound they hear by using an oscilloscope. He demonstrates the differences in volume and pitch, as well as the unique waveforms of different instruments. Also at the IHMC booth, students build instruments that they can play into the microphone, observing the waveform of their own instrument.

Through partnering with other community organizations, IHMC can extend its reach to kids who may not think that science is for them. By helping students see the connection between science and the things they enjoy, we hope to raise their excitement about studying science.

Nathan Gupta watches students learn lever principles at Science Saturday

LOCAL NEWS

Science Education

5th-grade students enjoying science with hands on projects

I LOVE Science concludes first year

The *I LOVE Science* (Increasing Local Opportunities for Volunteers Enthusiastic about Science) program wrapped up a successful inaugural year. The program, begun as a partnership between former state representative Holly Benson, IHMC, Gulf Power, and the Escambia and Santa Rosa county school districts, brought volunteers into 5th-grade classrooms to lead students in inquiry science activities on a monthly basis. Volunteers from every walk of life, from IHMC researchers and other scientists and engineers to marketing professionals, architects, city staff, and stay-at-home parents, were partnered directly with teachers in every one of the nearly 250 5th-grade classrooms.

Volunteers were provided materials for leading eight activities aligned with the school curriculum. In addition, IHMC personnel provided detailed suggested scripts, background materials, and other information, as well as regular review sessions for volunteers to increase their confidence in leading activities. These resources helped most volunteers to keep their commitments to a reasonable effort, many spending under two hours preparing for each session.

Response to the program has been very positive. Many students indicated that the activities were quite fun. One student summed up what many others expressed by saying, "Science is an important part of life, and you can learn science but still have fun learning it." Teachers, too, were very pleased. Though many noted that scheduling was a challenge, they were generally glad that they persevered based on how the volunteers' visits increased students' enthusiasm for and learning of science.

The volunteers, too, were quite enthusiastic. Though many were pleased that there were sufficient materials available to ease their workload, others went above and beyond the call of duty, creating further materials for their classrooms. Many volunteers have never volunteered in schools before and were glad to have a chance to participate in a program that makes such an impact on students.

In all, the first year of *I LOVE Science* exceeded our expectations. With some refinements, we are eager to kick off the second year of the program with many returning and some new volunteers.

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