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INSTITUTE FOR HUMAN & MACHINE COGNITION

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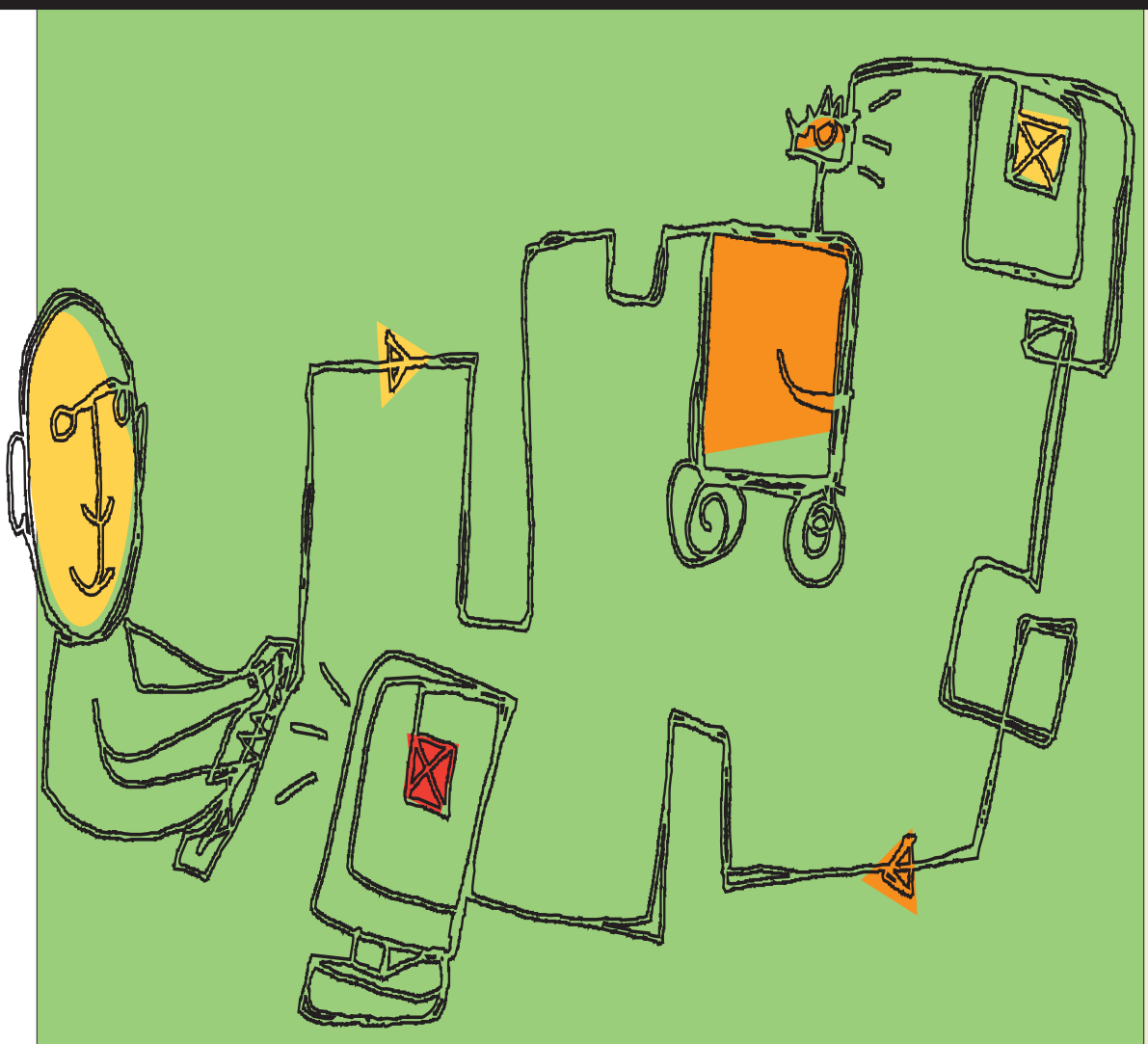

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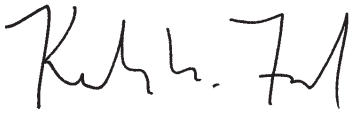
IHMC and NASA have sustained a long and extraordinary relationship that goes far beyond that usually observed between a Federal funding agency and a research organization. From its early days IHMC has worked closely with NASA in a variety of research areas. An early IHMC collaboration with NASA used the first version of our Concept Map software to model and represent the knowledge of expert rocket designers whose expertise is being lost to the agency by retirement. In more recent times NASA has supported IHMC research in such diverse areas as the use of advanced Knowledge Discovery and Data Mining (KDD) methods for improved forest fire prediction, the interaction between teams of astronauts and robotic assistants, concept map knowledge modeling and sharing tools for the new scientific field of Astrobiology, and improved cockpit display methods for the Space Shuttle and advanced aircraft.

Another important element of the partnership has been the flow of personnel between IHMC and NASA. Personally, I had the privilege of serving for one and one-half years (1997-1999) as the Associate Center Director of Ames Research Center, leading the formulation of NASA's IT research and development agenda. IHMC's Dr. Bill Clancey is currently chief scientist for Human-Centered Computing at Ames Research Center; Dr. Michael Freed conducts groundbreaking research in NASA's Cognition Laboratory. Jack Hansen, who at the time of my service to NASA was Deputy Center Director of Ames, joined IHMC at the beginning of 2001.

In addition to direct interaction of IHMC personnel, NASA frequently taps our broad scientific expertise. We have guided the Agency through collaborative studies toward new visions for future work in areas critical to NASA's mission. One such study focused on human-robot exploration of Mars, and a second investigated applications of mobile computing in space exploration. NASA also provides IHMC with offices at the Ames Research Center to facilitate research collaboration in the area of Knowledge Discovery and Data Mining.

Finally, the value that both NASA and IHMC place on our relationship is evidenced by its endurance and even growth through major changes in NASA leadership and the inevitable shifting of priorities. We at IHMC look forward to expanding this fruitful partnership to assist NASA in achieving the vision of human and robotic space exploration recently laid out by President Bush and other initiatives that the Agency may undertake in the future.



Kenneth M. Ford, Director

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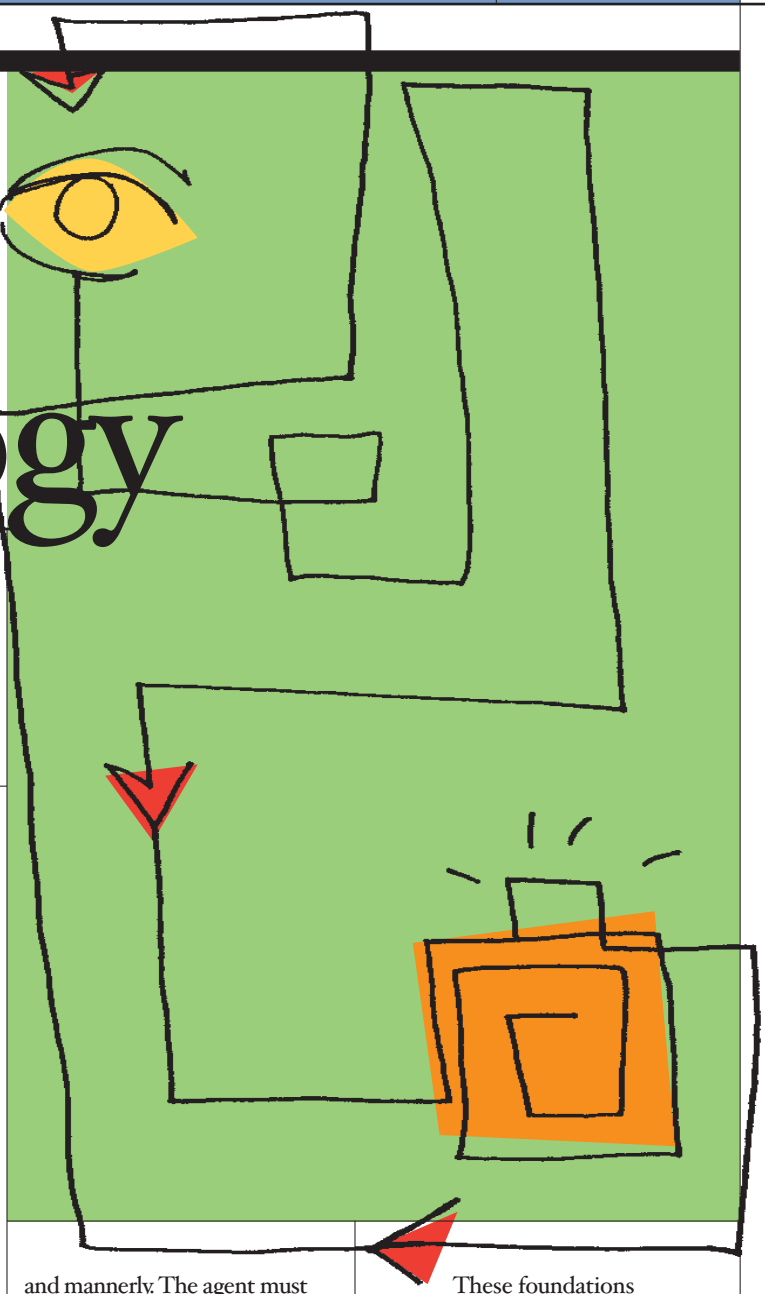
Agent Technology



"Let every eye negotiate for itself and trust no agent."

—WILLIAM SHAKESPEARE

Throughout history, people have been fascinated with the idea of automated assistants with human-like capabilities—whether conceived as embodied robotic agents like the mechanical maid in the Jetsons or else as software agents such as HAL in *2001: A Space Odyssey*. Though the benefits of such a dream are obvious, science fiction also loves to play on people's latent fears of such technology going awry, with autonomous robots overpowering their human masters. Such apprehensions, though greatly exaggerated in the public mind, cannot be completely ignored if we want the powerful software and robotic agents of the future to be acceptable to people.

Though agents like HAL are still confined to the realm of science fiction, their simpler cousins are already being deployed in an ever-wider range of settings. Computer system administrators rely on software agents to monitor for intruders. Military operations routinely depend on airborne, ground-based, and amphibious robotic agents for remote surveillance and reconnaissance. NASA has used software agents to operate satellites in deep space and is designing robotic agents as assistants to humans in future manned missions to the moon and Mars. As the next generation Semantic Web comes online, people will increasingly turn to Web agents to help negotiate its overwhelming abundance of information and services.

There are both technical and social aspects to agent acceptability. From a technical perspective, people need assurance that agents will perform reliably and efficiently, and that when something goes wrong—as it inevitably will—they have the ability to quickly intervene to put things right. From a social perspective, agents must interact with people in a way that is natural, effective, and mannerly. The agent must make its intentions and actions obvious, so people can coordinate their own plans and behavior accordingly. People signal their friends by subtle gestures, winks, and nods—agents will need to be able to indicate their thoughts with the same economy of expression.

IHMC agent researchers, including Jeff Bradshaw and Niranjan Suri, are developing theoretical and practical foundations for more trustworthy and effective agents.

These foundations include both policy frameworks and protocols for agile computing, permitting the operation of agents on foreign hosts.

Jeff Bradshaw

SCIENTIST PROFILES

Jeff Bradshaw

Hometown: Salt Lake City, UT

Education: B.S. in psychology, University of Utah; Ph.D. in cognitive science, University of Washington

Joined IHMC: 2000

Jeff intended to become a clinical psychologist, but, just before starting residency, he discovered artificial intelligence. At that time, Boeing had recently opened a research center in Seattle and, with a shrinking pool of experienced engineers, they wanted to conserve their corporate expertise by developing automated tools for knowledge acquisition and reasoning. Later, while a Fulbright Scholar in France, he became interested in the new field of agents. The success of the internet gave agents not only a lot to "think" about but also plenty to learn from and act upon. His first book on the topic, *Software Agents*, became a classic in the field.

At Boeing, Jeff led a team that developed the first versions of KAoS, which has been used in many collaborative agent experiments. From experience he learned that people are reluctant to use intelligent systems they don't trust, so KAoS was tailored to provide trustworthy services that help agents work more effectively with people.

Jeff was involved early in the creation of IHMC, but he didn't move permanently to Pensacola until his two oldest children finished high school. He enjoys working at IHMC with many of the friends he's admired and collaborated with over the years. He finds the Pensacola area a wonderful place to live.

Jeff gets the most joy and satisfaction in life from his family. He enjoys backpacking, camping, and canoeing with his four children, and traveling with Kathleen, his wife of twenty-five years. He spends Sundays and many weeknights serving his church as a lay leader for congregations in the Pensacola area. Jeff is a lover of good books and classical music.

While the paths of his research interests will fill many more years, Jeff knows what he'd like to do when he retires. Following his parents' example, he and his wife hope to spend their later years as full time missionaries in some corner of the world and continue to enjoy their children and grandchildren.

Niranjan Suri

Hometown: Hyderabad, India

Education: B.S. and M.S. in computer science, University of West Florida

Joined IHMC: 1994

Niranjan enjoys making computers do interesting things. He chose UWF for his undergraduate work because his cousin is a professor in the physics department. He stayed because of the opportunity to pursue exciting research at IHMC.

From a family of scientists, Niranjan always expected that he would become involved in research. As an undergraduate he wondered if he could create a program that would allow another program to be sent from one computer to another and run remotely. That interest became the foundation of his masters thesis, the creation of the Nomads system. Since then, Nomads has provided a mobile agents infrastructure in a number of agent collaborations.

The strength of his research has put him in an unusual position of being a principal investigator without a doctorate. On a recent trip to the University of Lancaster, England, a professor approached him with a proposal he couldn't turn down. Niranjan could convert his research into a Ph.D. dissertation and get his degree from the University of Lancaster without having to leave IHMC. He expects to finish within the next year or two.

The flexibility of IHMC appeals to him. He can advance simply on the merits of his research. Niranjan also enjoys the freedom to pursue whatever research he'd like with very little management overhead. He hopes that this flexibility and other aspects of working at IHMC will permit him to accomplish many things.

A fan of classical music, Niranjan goes to every opera and symphony performance in town. However, he can't quite get his fill, so he attends performances on his many trips, too.

He does like the small town feeling of Pensacola and living so close to work. The community here, along with the research opportunities at IHMC, has kept him in Pensacola longer than anywhere else. Although he is from Hyderabad, India, he now considers Pensacola his hometown.

The results are being used in a wide range of applications.

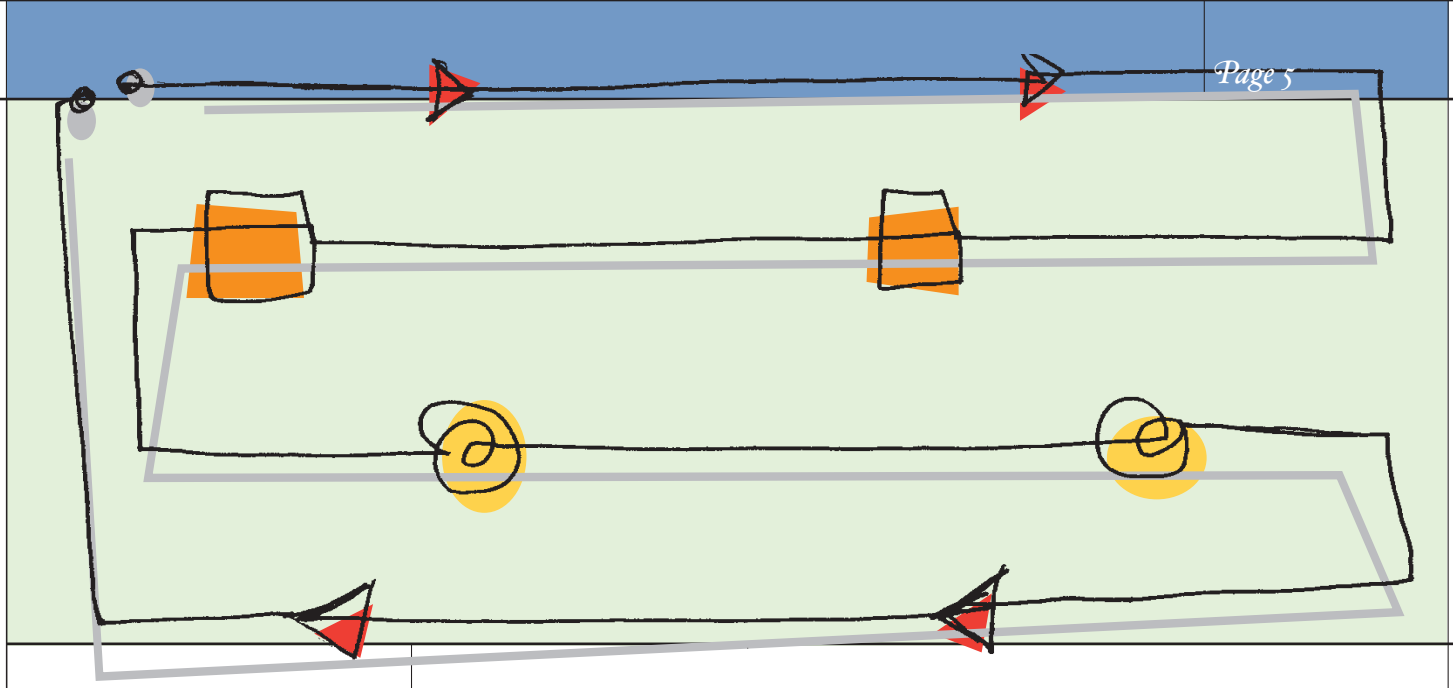
Some of the technical aspects of agent acceptability are being tested as part of projects sponsored by the Army and Navy. For example, in field exercises this August at Ft. Benning, Georgia, software developed by IHMC agent researchers must enable appropriate information to flow from sensors to soldiers, while assuring that sensitive data is not leaked to individuals lacking proper clearances. Unlike traditional security approaches that simply grant or deny access to the data, the framework supports the use of policies that specify how to transform the data in order to allow selected aspects of data to flow in different ways to different people.

In these field exercises, these robot policies are expressed and analyzed by the KAoS framework—initially conceived by Bradshaw and later developed by Renia Jeffers, Andrzej Uszok, Maggie Breedy, Matt Johnson, Hyuckchul Jung, Shri Kulkarni, James Lott, William Taysom, and Gianluca Tonti. In this application, KAoS policy services allow commanders to specify the nature of the transformation (e.g., reducing the resolution of an image or time-delaying the data) and identify code that can be deployed to achieve the transformation. IHMC's agile computing middleware—developed by Suri and his teammates Marco Carvalho, Maggie Breedy, Tom Cowin, and Raul Saavedra—discovers and takes advantage of the computing capabilities of nearby robotic platforms to ensure that only appropriate data is released.

Software developed by IHMC agent researchers also controls the movement of autonomous ground robots in order to maintain network connectivity. For example, in today's urban battle settings, when a group of soldiers run into a building, the concrete walls act as a barrier that can cause them to lose network connectivity. IHMC's agile computing middleware can detect this loss of connectivity and move a ground robot closer to the building so the soldier can stay in network range. KAoS policies are used to limit the movements of the robot so that the system does not move it inappropriately.

In other applications, IHMC agent researchers have developed approaches to ensure that software agents execute robustly and reliably. As part of an international experiment in simulated coalition operations, Suri and Bradshaw were able to successfully configure agent-based command and control components of a new

Niranjan Suri



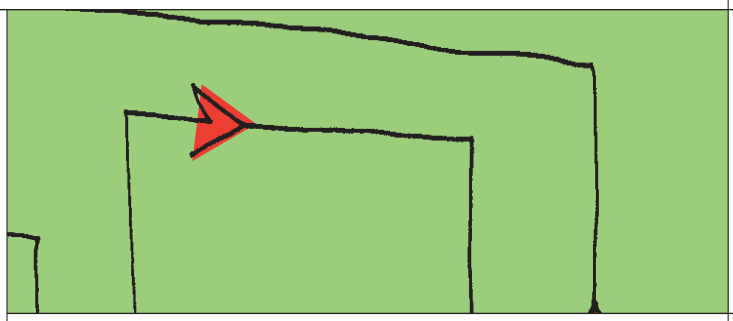
coalition partner in a fraction of the time it would have taken without the use of their technologies. In another DARPA project, over a thousand agents from different groups were interacting to assure the continuity of the military logistics pipeline. Policies were used to dynamically adapt the system to continuously varying conditions. Under a full volley of deliberate attacks and loss of computing capability, the simulated wartime environment suffered minimal loss of performance.

Trust of agents is critical, particularly for mobile agents. Mobile agents are able to move between networked host computers and can execute programs at these remote sites. One mobile agent system under development with NSF funding will provide continuous, proactive network monitoring. In modern local computer networks, security against attacks by hackers and viruses is challenging but critical. Humans don't have time to proactively check the security; most system administration is reactive, like cleaning a hard drive after infection from a virus.

The IHMC mobile agents move between hosts and routers on a network, locally fixing vulnerabilities and monitoring accessibility. In addition, they can compare activity at multiple locations to identify possible attacks. No longer will system administrators have to rely on individual users to update virus protection or run only authorized programs.

Research on making agents socially acceptable takes advantage of the interdisciplinary talents of a wide range of IHMC collaborators. For example, Paul Feltovich has investigated how to take advantage of what we know about animal and human cultures to design agents that are effective team players. In Utah, IHMC's

Only to the degree that agents show themselves to be both technically reliable and socially astute will people feel comfortable in granting them the kind of autonomy that will unlock their full potential as powerful assistants.



Bill Clancey conducts field experiments simulating exploration of Mars (see Vol 1, Issue 2, page 6). In this NASA-funded effort, KAoS coordinates agent communication. James Allen's natural human-machine interfaces also benefit from agent policies, such as dialogue-based coordination of robots searching for simulated underwater mines (see Vol 2, Issue 1, page 3) supported by the Office of Naval Research. Other efforts, including personalized office assistants, augmented cognition, and next-generation semantic web approaches, rely on natural and effective interaction between humans and agents.

Only to the degree that agents show themselves to be both technically reliable and socially astute will people feel comfortable in granting them the kind of autonomy that will unlock their full potential as powerful assistants. Motivated by the promise of that vision, IHMC agent researchers are developing new ways to help agents qualify themselves for that trust.

RECENT LECTURES

IHMC LECTURE SERIES

Mayors describe visions for urban development

Three of America's most influential mayors recently visited IHMC and Pensacola to share their insights. William Hudnut, former mayor of Indianapolis; John Norquist, former mayor of Milwaukee; and Joseph Riley, current mayor of Charleston, each addressed the ways that the design of the urban realm creates great cities.

"Our cities are precious heirlooms handed down by our ancestors," said Riley

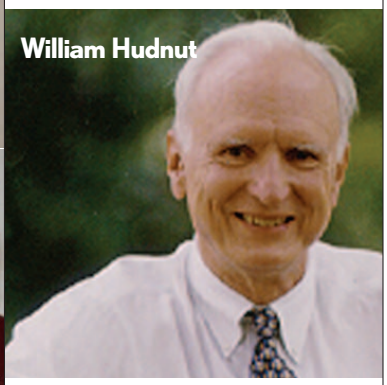
Joseph Riley

Hudnut's focus in his talk, "Halfway to Everywhere," on April 22 was on the needs of the first ring of suburbs. As metropolitan pivot points, these communities are caught between the energetic revitalization of downtowns and the growth of newer suburbs farther out. As their populations and infrastructure age, blight threatens to creep in. He proposed twelve suggestions, what he calls "urban acupuncture," for strengthening these communities, such as developing around transit, creating a sense of place, and thinking small.

Hudnut served as Mayor of Indianapolis from 1976 to 1991 where he formed partnerships that led to an exemplary downtown renewal. He currently is the Joseph C. Canizaro Chair for Public Policy at the Urban Land Institute in Washington, DC.

John Norquist

Zoning laws and highway regulations have begun to make the traditional main street illegal, noted Norquist. In his talk, "Unlocking the Value of the Urban Form" on May 6, he presented the contrast between the beauty of the traditional city and the sprawl that characterizes modern developments. Ironically, he pointed out, one main street built in the seventies encompasses many of the strengths of the traditional main street; that street is Main Street USA in Disney's Magic Kingdom. Norquist advocates a change in zoning and transportation planning to return to the appealing town centers of the past.

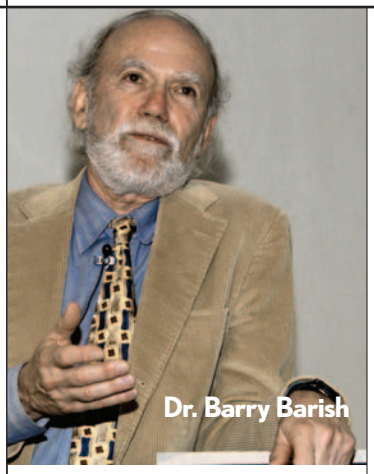

William Hudnut

The Mayor of Milwaukee from 1988 to 2003, Norquist oversaw a boom in new downtown housing. He championed the removal of almost one mile of elevated freeway, allowing a major urban infill development in the heart of the city. He is currently President of the Congress for the New Urbanism.

"Our cities are precious heirlooms handed down by our ancestors," said Riley. In his talk "Creating and Maintaining a Liveable City: Everybody's Responsibility" on June 10, he discussed how each urban project can add to or subtract from the quality of life in the city. Every citizen deserves beautiful areas in the city, and Riley has worked hard to make low income housing attractive and fit in the fabric of the city. Public areas are some of the choice pieces of property, ringed by private development.

First elected as Mayor of Charleston in 1975, Riley is serving his eighth term. Under his leadership, Charleston achieved a remarkable revitalization of its historic downtown business district. He has actively used public-private partnerships to leverage all of the city's resources in this transformation.

Barish describes efforts to detect gravitational waves


Dr. Barry Barish

Albert Einstein, as part of his theory of general relativity, predicted the existence of gravitational radiation. Dr. Barry Barish, Director of the Laser Interferometer Gravitational Wave Observatory (LIGO) and a professor of high-energy physics at the California Institute of Technology, is working to prove their existence.

In his talk, "Einstein's Unfinished Symphony: Sounds from the Distant Universe," on May 20, Barish, a member of the National Science Board, described these waves and the current technology for their detection.

Concentrations of mass (or energy) warp spacetime. Violent events, such as the collision of black holes or the explosion of supernovae, cause ripples in the fabric of space and time. These ripples, gravitational waves, can be detected on Earth and bring information about their origins. Of particular interest are the gravitational waves that occurred early in the creation of the universe. While electromagnetic radiation before 100,000 years after the big bang was absorbed, gravitational waves from within 10^{-43} seconds of the big bang should remain visible.

LIGO, an NSF-funded, joint Caltech-MIT program, aims to detect such gravitational waves. Current resolution is too poor to detect these waves, which are smaller than the diameter of a proton. With improvements to the observatory, Barish hopes to provide strong evidence for one of the remaining unknowns of general relativity.

Washington details climate model predictions

The climate on Earth has always been changing. The rate of change in the last century or so indicates to many scientists that mankind is changing the equation, accelerating the warming of the atmosphere. Dr. Warren Washington, senior scientist and head of the Climate Change Research Section at the National Center for Atmospheric Research (NCAR), reviewed climate model simulations of the recent past as well as predictions for the future in his talk, "Modeling Historical and Future Climate Change," on May 27.

The increase in computing power allows more detailed simulations of the climate. Washington's recent modeling is able to include ocean and sea ice components, better modeling effects such as El Niño and the Gulf Stream, increasing the accuracy of the models. The predictions of these models include warming of the oceans and melting of the polar ice caps, resulting in measurable increases in sea level.

Even if all nations adopt the guidelines of the Kyoto Protocol, which calls for a reduction of carbon dioxide emissions to 1990 levels, Washington cautions that we will still continue pouring large quantities of carbon dioxide into the atmosphere. Emission decreases will slow but not stop the global warming trajectory; the current levels of carbon dioxide in the atmosphere will continue to increase global temperatures.

Dr. Warren Washington

Radio show host addresses creative communities

"Great places are magnets for great people, and great people make great places," said Carol Coletta. During her talk entitled "Smart City: The Ultimate Act of Creativity" on March 4, Coletta stressed the need for cities to attract 25-34 year olds since they are the mobile class. Older groups have typically settled down and chosen a community. To attract these young adults, cities need leadership, decisiveness, and focus, or else they become like the Chevy car/truck hybrid, the El Camino: a city that doesn't know what it wants to be. The creativity, courage, and connectivity of a community are critical to its success in the new economy.

Carol Coletta

Coletta is the host of the award-winning syndicated public radio program Smart City, featuring provocative interviews with the world's smartest thinkers on urban life and opportunities for cities. In addition, she created and hosted the Memphis Manifesto Summit with Richard Florida, the first gathering of the creative class to write their call to action for cities. A Knight Fellow in Community Building for 2003 at the University of Miami School of Architecture, Coletta is frequently interviewed as an expert on urban issues by national media, including the Washington Post, National Public Radio, USA Today, the Denver Post, and The New York Times.

RECENT LECTURES

IHMC LECTURE SERIES

Allen describes natural language system

Building a conversational agent requires a concerted effort to bring work in speech recognition, natural language understanding, dialog modeling, planning, knowledge representation, and reasoning into a single coherent system. IHMC's James Allen described ongoing work on the TRIPS system, a conversational agent that can support unconstrained dialogue, during his talk, "Human Computer Interaction via Spoken Dialogue," on February 13. The robust system can perform well even with speech recognition errors and can continue the dialogue in a natural way under any circumstances.

Cañas outlines CmapTools history and future

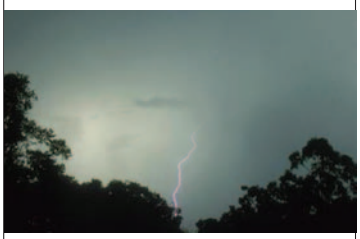
CmapTools is IHMC's software toolkit that supports the construction and sharing of knowledge models based on concept maps. In his talk, "Cmap, the Tool," on March 8, Alberto Cañas, Assistant Director of IHMC, described the transformation from the initial program to the current toolkit. The current version contains features that enable users of all ages, from elementary school children to scientists from over 150 countries, to build and share their knowledge models. He also described the research issues that are part of the current efforts.

Mathematician describes shape theory

Many computer systems, such as computer-aided design and robotic vision, must transform complex three dimensional systems into mathematical representations. Michael Leyton of the Center for Discrete Mathematics & Theoretical Computer Science, Rutgers University, presented his algebraic theory for conversion of complexity into understandability during his talk, "A Generative Theory of Shape," on March 18. His novel group-theoretic approach formalizes transfer and recoverability and major object-oriented concepts. The result is an object-oriented theory of geometry.

Researcher discusses future of physiological monitoring

Traditionally, portable physiological monitors, such as those for ECG and EEG monitoring, have been used only to perform data acquisition. Emil Jovanov, Associate Professor of Electrical and Computer Engineering, University of Alabama-Huntsville, spoke on "Ubiquitous Physiological Monitoring: Issues and Applications" on March 19. He described how recent developments in wireless and mobile technology provide a foundation for ubiquitous monitors. He presented system design ideas and possible applications for remote, ubiquitous monitoring.



Bonnlander describes fire models

Fire prediction has long assumed a connection between weather conditions and the probability of a wildfire occurring; however, the connection has not been assessed rigorously, and the key factors are unknown. In his talk, "Statistical Prediction of Wildfires in the U.S.: A Baseline Study," on March 30, IHMC's Brian Bonnlander detailed a statistical study to find causal relationships of these factors. Preliminary results indicate improved predictive abilities.

Psychologist illustrates behavior models

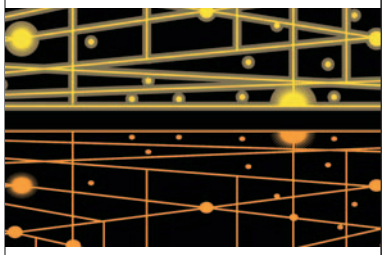
Complex behavior can emerge from simple computational models. In his talk on April 12 entitled "Model Tales: A Sampling from Three Streams of Research," Michael Prietula, Director of Research and Professor at Florida International University's School of Business, described several models he is investigating. These computational models can engage in complex behavior seen in human and animal interactions such as cooperation without consideration of reciprocity and the influences on an individual's participation within laws and norms. Such computer models can offer insight into human dynamics and organizational science.

Researcher outlines semantic interoperability requirements

Automated semantic interoperability requires architectures that support translation during the dynamic invocation of services. Mark Burstein, Director of the Human Centered Systems Group, BBN Technologies, argued in his talk, "Semantic Interoperability in Architectures for Semantic Web Services," on April 23 that this need is not met by simply introducing middle agents to translate messages between parties. He described progress in developing a model of the service invocation process that folds in translation and the development of a common architecture for interoperability.

Scientist presents behavioral modeling system

User modeling techniques are often overly simplistic and remain static. In his talk, "On User Intent and Information Retrieval," on April 29, Eugene Santos, Director of the Intelligent Distributed Information Systems Laboratory at the University of Connecticut, described a new model that captures user intent dynamically by analyzing behavioral information. This modeling approach improves efficiency, learnability, and interactivity of the information retrieval system.



Researcher describes common sense models

One of the hurdles to strong artificial intelligence systems is encoding the vast array of common-sense knowledge that people have. Dr. Henry Lieberman of the MIT Media Lab described the development and application of common sense knowledge bases in his talk, "Beating Common Sense into Interactive Applications," on May 28. A database created by students in his lab allows anyone to enter common sense information over the internet. Lieberman has used this database in a number of applications, including improved word suggestions and internet searches.

GRANTS

During April and May 2004, IHMC was awarded over $2.2 million for research.

APRIL AND MAY 2004

Agile Computing for Army Future Combat Systems

PI: Niranjan Suri

Amount: $299,490

Granting Agency: U.S. Army Research Laboratory

The United States Army's Future Combat System (FCS) will include a wide array of sensors designed to provide critical information to soldiers in combat and decision makers, regardless of their location. The sensors will vary widely in complexity, design, and mission. The sensor platforms may be ground-based, vehicle-based, aerial, or space-based. They may be fixed or mobile. They may be manned or unmanned, and they will have varying degrees of autonomy. They must communicate with a wide network of computers and other sensors through communication links that differ widely in reliability, bandwidth, power, and range. IHMC researchers will adapt the concept of agile computing to improve the FCS sensor network's capability, performance, efficiency, fault-tolerance, and survivability. By quickly adapting the flexible structure of the computer/sensor/communication network to the assets available at any moment, agile computing will enable the commanders and soldiers to gain access to crucial information reliably and quickly.

Human Systems Technology to Address Critical Navy Needs of the Present and the Future

PI: Dr. Jack Hansen

Amount: $937,999

Granting Agency: ONR

The emerging multidisciplinary field of human systems technology exploits advances in cognitive research and computer science to optimize performance of experts, expert teams, and the information systems that support them. This grant allows IHMC researchers to continue progress in several areas. Dr. David Still will direct efforts in the development of advanced visual displays that enable non-pilot operators to successfully control unmanned aerial vehicles. Dr. Anil Raj will coordinate efforts in the creation of advanced tactile displays that provide enhanced situational awareness in complex operating domains. Under the direction of Dr. Clark Glymour, IHMC researchers will design improved algorithms for Knowledge Discovery and Data Mining from large data sets, focused on enabling humans to rapidly diagnose failures in complex systems. Joint Interactive Planning is a new research area using the Institute's concept mapping expertise to facilitate distributed, interactive planning among Joint forces.

Naval Automation and Information Management Technology

PI: Dr. Jerry Pratt

Amount: $422,500

Granting Agency: ONR

Military uses of unmanned systems are growing. In future military scenarios, large numbers of unmanned ground, air, underwater, and surface vehicles will work together, coordinated by a smaller number of human operators. In order to be operationally efficient, effective and useful, these robots must have competent physical and sensing abilities, perform complex tasks semi-autonomously, coordinate with each other, and ultimately be observable and controllable in a useful and intuitive fashion by human operators. Towards this end, IHMC researchers will work with the Naval Surface Warfare Center in Panama City, FL (NSWC-PC) to further technologies in the following three areas. Dr. Jerry Pratt will lead a program in the development of unmanned underwater vehicles. Under the direction of Dr. Jeff Bradshaw, IHMC researchers will advance research in human-agent teamwork and agile computing. Dr. James Allen will adapt mixed initiative control systems for interactions with the agent and robotic systems. The IHMC efforts will complement research being done at the USF Center for Robot Assisted Search and Rescue (CRASAR) and at NSWC-PC.

Advanced Space Technology Study

PI: Dr. Ken Ford, Dr. Jack Hansen, VADM Tim Wright

Amount: $592,277

Granting Agency: NASA

The new national Vision for U.S. Space Exploration includes the "development of innovative technologies, knowledge, and infrastructures both to explore and to support decisions about the destinations for human exploration." NASA's existing Advanced Space Technology Program (ASTP) will support this objective by investing in research and technologies enabling this vision. As an independent review, IHMC will study which program content and processes will best serve the new vision for space exploration. The study will examine what new technologies are required to realize the long term vision. In addition, it will identify what processes should be employed by NASA in the selection and evaluation of program content and quality. Adequately addressing this fundamental change in vision and attendant restructuring of technology requirements and processes has broad implications for both NASA and the extramural and intramural performer communities it supports.

HAPPENINGS

EVENTS, HONORS, AND NEWS AT IHMC

IHMC and UWF sign affiliation agreement

UWF President John Cavanaugh, UWF Trustees Chair Collier Merrill, and IHMC Director Ken Ford sign the affiliation agreement.

One of the first steps in IHMC's transition to a not-for-profit public benefit corporation took place on April 30th. The Florida Institute for Human and Machine Cognition officially entered into an affiliation agreement with the University of West Florida.

The affiliation between the two entities creates a strong linkage, allowing each organization to benefit from the other's strengths. In particular, the agreement outlines the mutual sharing of facilities and the relationship of joint faculty with each entity.

As a result of its new status as a not-for-profit organization, IHMC now has the flexibility to enter into such agreements with many other universities. Of course, it is fitting that UWF is the first affiliate. Over the past fourteen years, UWF has nurtured IHMC into a world-class research institute.

IHMC scientists have taught or continue to teach at the university, and undergraduates and graduate students of UWF conduct research at IHMC. This affiliation agreement allows this seamless transfer of knowledge and talent to continue unabated.

According to IHMC's Director, Ken Ford, "This affiliation agreement between the University of West Florida and the Florida Institute for Human & Machine Cognition is an important milestone in the development of the Institute and reaffirms the close relationship between IHMC and the University from which it sprang."

In applauding the new agreement, Marny Gilluly, a UWF trustee, stated, "By creating the not-for-profit Florida Institute for Human and Machine Cognition, [the Institute] has the freedom to explore funding and external relationships with other universities and research centers while retaining a permanent relationship with the University of West Florida. In short, we have the best of both worlds."

The new relationship between IHMC and UWF allows each to focus on what it does best. The growth and new status of IHMC is a testament to the foresight of the leaders of UWF and serves as a model for universities across the nation.

IHMC hosts Florida Space Board Meeting

The quarterly meeting of the Florida Space Authority Board of Supervisors was held on May 12 at IHMC. The Authority was founded in 1989 by Florida's Governor and Legislature to coordinate and improve the climate for space-related work within the state. The board is comprised of nine members appointed by the Governor and two ex officio members from the Florida Senate and House of Representatives. IHMC's Director, Ken Ford, is on the board.

Florida's role in space exploration is not limited to simply hosting the Kennedy Space Center. Businesses throughout the state are space businesses, developing the launch vehicles and satellite components, telecommunications infrastructure, remote sensing tools, and other technology for future space endeavors. The Florida Space Authority is charged with improving the business climate for the development of these space technologies, including the construction of spaceport infrastructure and fostering research and education.

Space Board members tour Pensacola's Naval Aviation Museum

IHMC Director featured on Smart City

IHMC's Ken Ford was a guest on Smart City, a national weekly radio talk show hosted by Carol Coletta that takes an in-depth look at urban life, the people, places, ideas, and trends shaping cities. During the program "Connecting Town and Gown" on April 10th, Ford described the relationship of IHMC with the Pensacola community as a model of the role of universities and research institutes in the creation of a strong community. He stressed that the largest impact of universities on their communities is not technology transfer but the attraction and creation of talent. The show can be heard at http://www.smartcityradio.com/smartcityradio/past_shows.cfm.

FORD RECEIVES LEADERSHIP AWARD

IHMC's Director Ken Ford received this year's Pensacola Area Chamber of Commerce PACE Business Leader of the Year Award. The Pensacola Area Commitment to Excellence (PACE) awards are given each year to honor individuals in the community who have gone above and beyond the call of service in their respective fields. The business award recognizes outstanding success in business or industry through the development of a new process, product, or service or for meaningful contributions to the local business community. The award is presented to an individual who exemplifies the qualities of the business visionary. Ford was cited for his efforts not only in developing IHMC into a world-class institution but also in his tireless work on revitalization of downtown Pensacola.

ASTRONAUTS AND IHMC SCIENTISTS DISCUSS SPACE EXPLORATION

As part of their *Celebration of Science* event, the University of West Florida brought together two alumni, who are also astronauts, and Ken Ford and Jack Hansen, both of IHMC, to discuss the future of space research in a panel moderated by retired National Aeronautics and Space Administration executive JoAnn Morgan. The astronauts, Bruce Melnick and Ken Cockrell, both received master's degrees from UWF while in flight training at Pensacola Naval Air Station. In looking to the future, the panelists stressed the importance of maintaining the enthusiasm of the country for space exploration. They particularly stressed the importance of research like that conducted at IHMC for creating the new technologies that will allow further space exploration.

IN BRIEF

John Olsen received this year's Young Investigator award from the Aerospace Medical Association's Space Medicine Branch for his article "Tactile Display Landing Safety, Situational Awareness, and Workload Reduction Improvements for the Space Shuttle."

Matt Johnson has been accepted into the IEEE-RAS/IFRR Summer School on "Human-Robot Interaction." The program is limited to thirty of the top Ph.D. students and postdocs from the US and Europe and includes lectures from prominent researchers and hands-on work.

An article by **Paul Feltovich**, "Cognitive flexibility theory: Advanced knowledge acquisition in ill-structured domains," has been chosen for reprinting in the Fifth Edition of "Theoretical Models and Processes of Reading." This volume collects the most influential articles pertaining to reading practice and research.

ARRIVALS

MARCH 2004 THROUGH MAY 2004

Julie Sheppard

Julie Sheppard: Julie joins the staff of IHMC as General Counsel and Special Assistant to the Director. She will focus in the near future primarily on the transition of IHMC to not-for-profit status, working with the Board of Directors and other committees and handling the legal issues for the Institute.

She is pleased to be returning to Pensacola after working for the past two years at the University of North Florida in Jacksonville. During her previous stint in Pensacola, Julie served as the General Counsel at the University of West Florida. Other experience includes work as Counsel to the former Florida Board of Regents Office of Human Resources and Labor Relations as well as serving as an Administrative Hearings Officer.

She began her legal career in private practice with the Maine law firm of Bernstein, Shur, Sawyer and Nelson after clerking for Justice Robert C. Cauchon of the Massachusetts Trial Courts. A native of a small coastal town in New England, Julie earned her J.D. from Suffolk University Law School in Boston, Massachusetts and her B.A. from the University of Virginia.

Julie is excited to be at IHMC and working once again with many former colleagues. She is looking forward to attending the many community and cultural events, such as the summer Concerts in the Park, with her husband, Phil Turner, an architect, and their two young daughters, Marina and Delaney.

Angela Adams: A senior at UWF in interdisciplinary humanities, Angela is assisting Tracie Moore with faculty travel. After graduating this spring, she plans to obtain a masters degree.

Florian Bertele: Florian is an exchange student at UWF from the University of Ulm, Germany. He is pursuing a master's degree in computer science and working with Niranjan Suri and Marco Carvalho on the NOMADS project.

Jerod Durbin: Jerod is a junior at UWF in the Computer Information Systems program. He is working on developing the CmapTools help files.

Liza Hinkley: Liza is a UWF student majoring in anthropology. She is an assistant to Tracie Moore in coordinating IHMC travel.

James Horsley: A senior at UWF majoring in both Computer Science and Physics, James is working with Marco Carvalho to implement a series of computer based tests for potential pilots. Upon graduation he would like to pursue a graduate degree in either theoretical computer science or physics.

David Pickett: David is a student administrative assistant and is currently a senior at UWF majoring in Psychology. Upon graduation he plans to continue his education with another undergraduate degree in Business Administration or attend graduate school in psychology.

Lynne Roetzer: Lynne has a background in behavioral decision making and is working with Robert Hoffman on the ROCK-TA project. Previously she was a graduate research assistant in behavioral oncology at the University of Louisville School of Medicine where she received her M.A. in psychology.

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