



INSTITUTE FOR HUMAN & MACHINE COGNITION

ihmC

VOLUME 2 ISSUE 1

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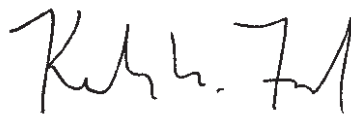
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In and around our community

Ideas are critical to innovation. IHMC takes seriously its role as a forum for ideas not only within our scientific disciplines but also in the broader community.

Central to fulfilling this role is our evening lecture series in which we hear from national leaders speaking on a wide swath of topics including: science policy, urbanism, architecture, leadership, the future of medicine, physics, and economic development, among others. In this newsletter, for example, we highlight the recent lectures by Dr. Rita Colwell, director of the National Science Foundation, and Dr. Richard Florida, author of the best-selling book, *The Rise of the Creative Class*. Over the next couple of months, IHMC will host a series of lectures by three of America's most successful mayors: Mayor Hudnut of Indianapolis (1976-1991), Mayor Norquist of Milwaukee (1988-2003), and Mayor Riley of Charleston (1975-present). As an added resource, many of the lectures, dating back to 2001, are available on our website at <http://www.ihmc.us/movies/>.

Innovation is at the heart of IHMC's success. "Old ideas can sometimes use new buildings; new ideas must use old buildings," observed urban visionary Jane Jacobs in her book *The Death and Life of Great American Cities* (1961). IHMC is located in a building that was previously a police station and jail on the edge of Pensacola's historic district. We are committed to this neighborhood, and thus it made perfect sense for IHMC to partner with the City of Pensacola and the University of West Florida to commission Ray Gindroz of Urban Design Associates to develop a master plan for Pensacola's historic district. See this issue of the newsletter for a progress report.

The ideas raised at IHMC through our lecture series and other events have spurred considerable discussion in our community. We welcome this dialogue and hope that it will lead to a shared vision for a brighter future.



Kenneth M. Ford, Director

IHMC
Institute for Human &
Machine Cognition

A University Affiliated
Research Institute

40 South Alcaniz Street
Pensacola, Florida 32502
850-202-4462 phone
850-202-4440 fax
www.ihmc.us

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Natural Language Computer Interfaces

“Now begins a torrent of words
and a trickling of sense.”

—THEOCRITUS OF CHIOS (310 BC - 250 BC)

The meeting has just ended. You remember there was something that you were supposed to get done by next Tuesday. There was a long discussion, with many pertinent details, but you only remember a few. A simple transcript would be frustrating to read, filled with ums, okays, and interruptions. Wouldn't it be nice to have a computerized assistant who could sum it all up for you?

Such an assistant is one of the goals of IHMC researchers, including Lucian Galescu and James Allen, working on natural spoken language computer interfaces. The systems they are creating must take a torrent of words, whether from a conversation in a meeting or instructions directed at the system, and make sense of them.

Recognizing the words themselves is a huge challenge. Galescu's approach uses linguistic models to assist in recognizing spoken words. Most of us have experienced linguistic models as the sentence diagrams

we did in high school, diagramming which phrases modify which words. These models are inadequate for speech recognition, however, primarily because we don't speak in proper sentences. Instead, our speech is peppered with filler words like “um” and “okay,” sentences that we restart midway, and many other “improper” sentences. A linguistic model that fully covers the range of linguistic expressions we use is difficult to obtain, if at all possible, given our limited understanding of the human communication process.



Since the computer system has the actual speech signal, though, the task becomes easier. The acoustic signal isn't always perfectly clear, however, so a model that takes into account what words tend to follow another word can help in analyzing the speech. By looking at what was just said, the computer can use such a model to generate a list of what might be said next. For example, “of” is likely followed by “the” or “a.” Then the computer can compare the prediction to the actual speech signal to determine what was said.

Galescu's models build on this simple word prediction system by incorporating hierarchical structure into a dynamical

system that can examine the speech at different levels to figure out what was said. The system can make predictions at the level of phrases, words, or even parts of words. For instance, if the last two sounds were “con” and “vers,” it is likely the next sound will be “ation,” “ing,” or “ed,” creating conversation, conversing, or conversed. At the phrase level, if the person said, “one thousand,” it is very likely the next word will be a number followed by a unit such as “hundred.” In particular, Galescu focuses his research on dealing with the unknown, words that have not been preprogrammed and therefore have no known definition or pronunciation.

Lucian Galescu

SCIENTIST PROFILES

Lucian Galescu

Hometown: Iași, România
 Education: BS in computer science, A.I. Cuza University, Iași, România; MS and PhD in computer science, University of Rochester
 Joined IHMC: 2002

Computational linguistics didn't appeal to Lucian, initially. Actually, he doesn't particularly like computers. Instead, it is very important to him that his work be related to people. It wasn't always that way, though. He initially planned to be a mathematician but then was attracted to computational logic and reasoning, what he believed to be the crux of computer science. A research experience at the University of Venice, though, opened Lucian's eyes to the excitement and importance of natural language studies.

Teaching a computer to understand English may seem a strange job for a native Romanian speaker, but it is a natural fit for Lucian. He thinks that people's professions relate to how they view the world and what preoccupies them. He himself has always been interested in language in general. He started learning English in school in the second grade, and his favorite book as a child was an encyclopedic dictionary. He even learned a little Chinese by reading product literature that came in multiple languages.

Since he is just starting his independent research career, Lucian hopes his biggest accomplishment is yet to come. It is important to him to be a part of a strong research community where even small contributions may enable someone else perhaps to have a tremendous breakthrough. He has been pleased to find such a strong community at IHMC. He enjoys the variety of people and work and the ease with which he has met other researchers.

He also enjoys being a part of the Pensacola community. Part of what he enjoys about Pensacola is that it, too, is perhaps on the cusp of exciting changes. He particularly likes that he feels that he can contribute to Pensacola's future as a member of IHMC.

James Allen

Hometown: Toronto, Canada
 Education: BS, MS, and PhD in computer science, University of Toronto
 Joined IHMC: 2002

James has always loved science and math, two areas where he feels he can know if his answers are right. Originally a math major, he switched to computer science in his junior year after taking a programming course. His interest in natural language processing was awakened in graduate school when a research group in the field was just beginning to form at the University of Toronto.

James's impact on the field of natural language understanding has been tremendous. Not only is he the author of *Natural Language Understanding*, the standard textbook for graduate students in the field, he also was editor in chief of *Computational Linguistics*, the leading journal in the field, for ten years. He is proudest, though, of receiving the University of Rochester's Award for Graduate Teaching in 1997; half of his over 20 PhD graduates have gone on to tenured or tenure track positions at prominent institutions such as University of California-San Diego and University of Washington.

Because of his love of teaching, James maintains his appointment as the John H. Dessauer Professor of Computer Science at the University of Rochester; however, his new research thrust of continuous understanding of spoken language requires a large, stable workforce, which IHMC provides. At IHMC he is a Pace Eminent Scholar and one of IHMC's five Fellows of the American Association of Artificial Intelligence, the only AAAI Fellows in Florida.

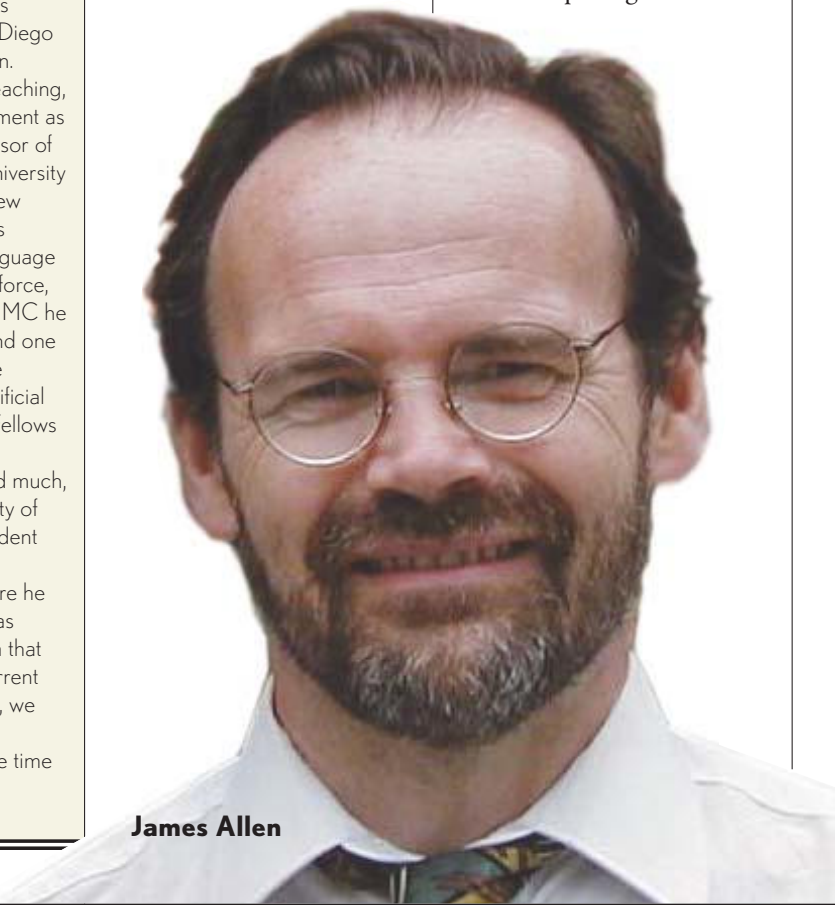
Not one to move around much, James stayed at the University of Toronto for 10 years as a student then moved straight to the University of Rochester, where he has been for 24 years. He has bought a house in Pensacola that he is busy renovating, his current hobby. With his track record, we can hope that he will make Pensacola his home for some time to come.

While simply recognizing words is useful for dictation systems, knowing what the words mean is critical for conversation systems. Dictionary definitions only go so far; the system must also understand the person's intentions. One of the focuses of Allen's work is intention recognition. In designing collaborative planning assistants, Allen integrates task models which allow the system to figure out the relationship between what a person says and what they do. The system tracks the objectives and planned solutions in the task model, helping it interpret ambiguous sentences. For example, if the user says, "Can we fly to Tallahassee?" the system searches the task model to determine if you wish to change the mode of transportation or destination or maybe start planning a new trip altogether.

Even if the computer understands you, you have to be able to understand the computer. It is not enough, though, for the computer to answer with all of the necessary details. A system which responds in an unexpected way can quickly interrupt the user's thought process;

therefore, the system's output must seem natural to the user. Many natural language generators utilize very domain-specific, handcrafted programs. Creation of such systems for each different domain, though, is quite time consuming. A more generic natural language generation system under development by IHMC's Nate Chambers relies instead on computational analysis of transcripts of spoken text to generate responses for many different domains. Like other systems, the output has the necessary information for the operator. More importantly, though, the output seems only slightly less "natural" than human speech, as ranked in preliminary studies.

One of Allen and Galescu's long-term goals is continuous understanding. "People can actually finish most of the sentences I say before I finish them," Allen says, but computers can't do that currently. Instead, computers follow a hierarchical analysis by first doing speech recognition, then linguistic analysis followed by intention recognition, then planning, and finally speech generation.



James Allen



High level comprehension doesn't happen until the sentence is done. With continuous understanding, though, the system could better analyze speech as well as begin to consider how to achieve the goal being currently stated. For instance, if someone says, "I'm thirsty," you would immediately begin to expect them to request a beverage, so you listen for beverage words. Plus you could start thinking about what drinks you have in the refrigerator. Future systems using this approach might even adapt output that is individualized to the user's current speech, perhaps switching from the King's English to locker room banter as the situation warrants.

Key to the utility of natural language systems is broad applicability. The majority of systems to date have been handcrafted for specific domains. Allen and Galescu's generic system, though, can be specialized by simply integrating domain specific information. Domains integrated into their system include hurricane evacuation from a fictional island, a 911 system, a prescription medication advisor, and, most recently, underwater mine detection.

These domains are very complex and, therefore, require mixed-initiative interaction. Most of us have had system-driven interactions such as the typical phone tree with preprogrammed questions. Such systems force the user to answer sometimes irrelevant questions or miss pertinent ones. Alternatively, fully user-driven systems require us to remember all of the necessary minutiae for completing a task. Mixed-initiative interaction, though, allows the system and user to exchange the lead in planning and meeting the goals of the task, exploiting the strengths of both the computer and the human.

Consider the underwater survey system, a joint project between IHMC, USF, and Naval Surface Warfare Center-Panama City. Allen, Chambers, and Galescu have created a system that builds and executes plans in collaboration with semi-autonomous robot agents.


■ ■ ■ **Mixed-initiative interaction, though, allows the system and user to exchange the lead in planning and meeting the goals of the task, exploiting the strengths of each.** ■ ■ ■

```
Human: Have Amigo survey this area.
Computer: O.K.
<Robot goes searching then finds an object.>
Computer: The Amigo found an interesting
object. <Shows object on the map
simultaneously>
Computer: Would you like to see the video?
Human: Yes, please.
Computer: Alright. <Shows video on screen>
Human: I need a higher resolution.
Computer: O.K. <Increases resolution>
```

In the prototype system, the underwater vehicle, which can record video and transmit information, and two water surface vehicles, which can transmit information, are all wheeled robots in the parking lot. In controlling these robots in their search for mines or, in this case, orange cones, it isn't feasible for the human to remember and keep track of all the abilities and specifications

of the robots.

As seen in the portion of the dialogue shown above, the human using the IHMC system needs to give only high-level orders, such as "I need a higher resolution." When the human later requests even higher resolution, the system, which tracks the robots' capabilities, realizes it needs a second surface robot for this task. Lacking permission to move the robot itself, the computer interrupts with the request for permission. Such self-directed planning is critical in this and other situations, like planetary exploration, where the system includes robots that can't be teleoperated due to limited bandwidth and time delays.

Conversing with computers once lay solely in the realm of science fiction. Systems under development by IHMC researchers are bringing conversing computers into scientific reality. Now computers are beginning to make sense out of our torrent of words. 

RECENT LECTURES

IHMC LECTURE SERIES

NSF Director outlines future of learning

So much of the world has changed since 1890. Then diabetics were treated with palliative care; now human insulin is grown in bacteria to provide diabetics with a high quality of life. Horse and buggy was the main form of transportation then; now we send people into space.

Not the classroom, though, where kids primarily sit at desks just as they did then. Rita Colwell, Director of the National Science Foundation, addressed the ways the NSF is trying to improve the classroom in her talk "The Emerging Science of Learning" on January 21st.

Colwell envisions a future where insights based on educational research, many of which we have now, flow directly to the educational system and improve learning in the classroom. Classrooms filled with computers would teach children based

■ ■ ■ **Colwell envisions a future where insights based on educational research, many of which we have now, flow directly to the educational system and improve learning in the classroom.** ■ ■ ■

on their strengths and cultural backgrounds. "If we could utilize computer modules to enhance the individualized learning," she said, "the teacher could then provide general concepts."

Colwell's approach is interdisciplinary, bringing together engineers, psychologists, neuroscientists, and educators to understand learning in order to improve teaching. She highlighted several ongoing projects that have these elements.

Drawing on research in psychology, education, and computer science, John Bransford at the University of Washington created an educational computer game. Students create concept

maps, an educational tool created by IHMC's Joe Novak, to explain concepts to an animated character. Tests of this system show a significant learning improvement over standard teaching practices.

Another project Colwell noted as exemplifying an interdisciplinary approach is IHMC's OZ cockpit display. IHMC's David Still drew from research on vision to create a display that improves operator performance and does away with the traditional dials and gauges.

As NSF Director, Colwell spearheaded programs in education and workforce development such as the GK-12 program, bringing graduate students in science and engineering into the K-12 classrooms, and ADVANCE, targeting those, particularly women, who are reentering the scientific workforce after a hiatus due to family responsibilities.

Colwell has served as Director of NSF since 1998. Prior to that, she was president of the University of Maryland Biotechnology Institute and Professor of Microbiology at the University of Maryland. She was a member of the National Science Board and is a member of the National Academy of Sciences, American Academy of Arts and Sciences, and the American Philosophical Society.



Raj describes tactile interfaces

IHMC's Anil Raj discussed his research on multi-sensory displays in his talk on October 24th entitled "Applications for tactile interfaces in multi-sensory displays for dynamic environments." In dynamic environments such as aviation, most information is presented to a single sensory channel, typically visual. This reliance frequently leads to mishaps due to loss of situation awareness. Raj and coworkers developed multi-sensory displays using tactile transducers to improve situation awareness. Pilots using these systems can perform complex maneuvers while blindfolded. In addition, performance under high stress and workload conditions improved.

Hoffman explores initial phases of task analysis

In developing a knowledge model for Army terrain analysis, IHMC's Robert Hoffman is investigating the utility of the initial "bootstrapping" phase. He presented his results in his talk on November 18th entitled "Knowledge Recovery." The initial phases of Cognitive Task Analysis typically consist of culling information about domain knowledge and reasoning through document analysis and informal interviews. Hoffman and his team are exploring the detail they can generate using information gleaned solely from this initial phase. With thousands of propositions concerning terrain gathered already, he foresees a large challenge in navigating such large knowledge models.



Rita Colwell



Richard Florida details economic growth model

Pensacola must carve its own niche, considering its singular attractions, to lure the creative class, the new economic driving force, according to Richard Florida. Florida, the Heinz Professor of Economic Development at Carnegie Mellon University, is the author of the best-selling book *The Rise of the Creative Class*.

Florida's research demonstrates that a key indicator of communities' economic growth today is their ability to attract and retain members of the "creative class." These workers are those who are paid to think for a living; they are engineers and scientists, architects and designers, artists and musicians, and many others. In addition to this creative core are those whom Florida terms "creative professionals" in business, health care, law, and similar fields who engage in complicated problem solving and independent judgment.

Traditional economic development focuses on the creation of jobs, particularly high-paying ones. Cities, regions, and states typically offer incentives, such as tax breaks or physical infrastructure like industrial parks, to attract new companies. Florida's research, however, shows that most of the desirable companies, particularly the high-tech ones, are drawn to the communities where the employees they need choose to live. The members of the creative class are the new natural resource. "Access to talented and creative people is to modern business what access to coal and iron ore was to steel-making," says Florida.

The creative people that employers want, the members of the creative class, are drawn to places which have what Florida terms the three Ts: technology, talent, and tolerance. A strong technological base provides a "thick" labor market, a number of exciting job opportunities, for the high-tech workers. An abundance of talent offers a peer group for the members of the creative class. Tolerance, a measure of a community's open mindedness, is an indicator of how accepting the area is to new ideas.



Richard Florida

Florida's research shows that the presence of homosexuals, artists, and foreign born people, combined into his "Diversity Index," correlates with the overall openness.

In his interviews with members of the creative class, Florida noted that "Quality of Place" is critical. Quality of place encompasses what's there, the built and natural environment; who's there, the mix of people contributing to the community; and what's going on, from street life to professional theater.

How can a city like Pensacola compete with cities like Boston, San Francisco, and Austin, known meccas for creative folks? "It's not enough to just have the ingredients," Florida said. "You need a recipe that fits you. You can't just copy somebody else's recipe. You have to be what you are." Tapping into our local resources and finding what is unique and exciting about Pensacola can further develop our community into a creative place. Each step we take along the way will strengthen our economic base.

■■■ "It's not enough to just have the ingredients," Florida said. "You need a recipe that fits you. You can't just copy somebody else's recipe. You have to be what you are." ■■■

West Point professor outlines situation awareness investigations

Military command and control systems continue to increase in complexity and data output available to users. Poorly designed systems interfere with situation awareness, resulting in poor decisions and bad outcomes. Col. Larry Shattuck, Ph.D., Director, Engineering Psychology Laboratory with the Department of Behavioral Science and Leadership at the US Military Academy in West Point, discussed



Col. Shattuck

"A Process Tracing Approach to the Investigation of Situation Awareness" in his talk on January 8th. His process tracing methods examine command and control systems using psychological and technical analysis. During a recent Army experiment, his approach provided insight into the effectiveness of current and proposed automation architecture for command and control systems.

Bradshaw surveys adjustable autonomy

Full autonomy is not the ultimate goal of software agent technologies. Instead, adjustable autonomy will provide more effective tools for improving human performance. IHMC's Jeff Bradshaw outlined different approaches to this goal in his

talk "Dimensions of Adjustable Autonomy" on January 20th. In describing the realms of the potential, possible, and permitted, he showed how the flexibility of changing autonomy as needed allows more goals to be achieved. In addition, he introduced the new paradigm of mixed-initiative interaction, where the human operator and the system exchange the responsibility for control based on their individual strengths and abilities.

Clancey details Mars exploration simulation

In his talk "Automating CapCom: Geologists Assisted by Computer 'Agents' at the Mars Desert Research Station (MDRS)" on

December 10th, IHMC's Bill Clancey described the successes and challenges of using mobile agents systems during a technology development retreat at MDRS. By analyzing Apollo astronauts' interaction with CapCom, his team developed a voice-operated computer system that monitored health, locations, and schedules. The system also recorded all conversations and automatically emailed photographs, voice annotations, and tracking data to offsite observers. As the retreat highlight, data and alerts were emailed automatically from a remote field site through the MDRS and on to scientists in California. Achieving this data transfer required infrastructure similar to that expected for interplanetary exploration.

HAPPENINGS

HONORS AND NEWS AT IHMC



Japanese consul general Ko Kodaira and IHMC's Morris Marx, wearing the Medal of the Order of the Rising Sun

IHMC's Marx honored by Emperor of Japan

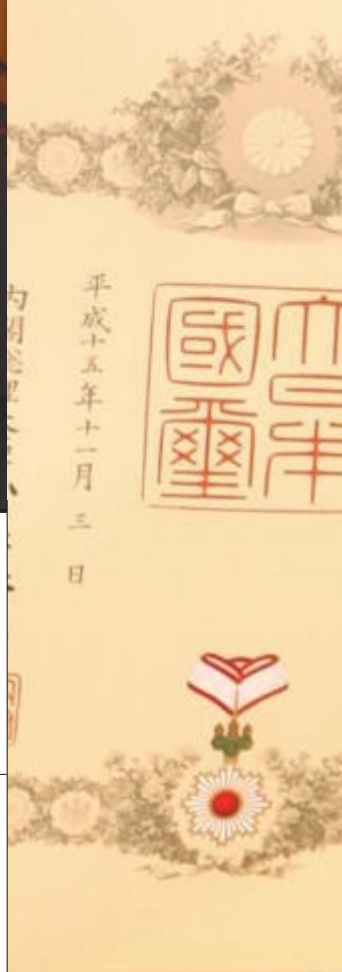
The Emperor of Japan awarded Morris Marx, a research scientist at IHMC and former president of the University of West Florida, the Medal of the Order of the Rising Sun, Gold Rays with Neck Ribbon. This recognition honors Marx's work on strengthening the ties between Pensacola and Japan.

In presenting the award to Marx, Ko Kodaira, the consul general of Japan in Miami, cited Marx's efforts to promote educational exchanges between UWF and Japanese universities. "In addition, Dr. Marx has devoted great efforts to promote educational exchanges between Pensacola and the

town of Hagiwara and between Florida and Wakayama Prefecture, thus greatly contributing to promoting cultural and business exchanges between Florida and Japan," said Kodaira.

While president of UWF, Marx established the Japan Center at UWF and, in collaboration with the University of South Florida, the Florida-Japan Linkage Institute. He also helped launch the Japan America Society of Northwest Florida.

"My goal was to provide educational opportunities about Japan to our students, faculty, and the people of our region," said Marx. "I never had any idea that these



efforts would come to the attention of the Emperor and the Japanese government."

Marx received the medal in December 2003, an historic anniversary for US-Japan and Pensacola-Japan relations. One hundred and fifty years ago, Commodore Perry arrived in Japan, opening the doors of Japan to the west. Ten years ago the student exchange program began between Pensacola and Hagiwara, and, under Marx's leadership, it grew into a strong relationship between both communities.



WORLD WIDE WEB CONSORTIUM APPROVES KEY SEMANTIC WEB TECHNOLOGIES

The World Wide Web Consortium, a group of nearly 400 organizations developing common protocols for the Web, has approved new technologies for implementing the Semantic Web by issuing a suite of twelve technical documents as W3C Recommendations, which are understood by industry and the Web developer community as Web standards. The announcement marks the emergence of the Semantic Web as a broad-based, commercial-grade platform for data on the Web. Two of the twelve documents were written by IHMC's Pat Hayes, an invited expert on two W3C Working Groups. Hayes has played a pivotal role in creating these new standards by defining the formal semantics for RDF and OWL, the basic Semantic Web interchange protocols. This large-scale effort has taken nearly three years and involved weekly teleconferencing and several international meetings of working groups of approximately 50 researchers from academia, industry, and government organizations located in 10 countries. For further information see the consortium's Semantic Web website at <http://www3.org/2001/sw/>

SUBMISSIONS DUE SOON CONCEPT MAPPING CONFERENCE

Full papers and poster abstracts are due May 1, 2004, for the concept mapping conference sponsored by IHMC and the Universidad Publica de Navarra. The conference will be held September 14-17, 2004, in Navarra, Spain. For more information, including the call for papers, please visit <http://cmc.ihmc.us>

ARRIVALS

■ ■ ■ DECEMBER 2003 THROUGH FEBRUARY 2004



IHMC's Jack Hansen receiving the IT Leadership award from Shane Robison, Hewlett Packard Executive Vice President

IHMC HONORED FOR IT LEADERSHIP

IHMC received the ITFlorida Excellence in IT Leadership-Northwest Florida Award. The award recognizes IHMC's leadership in the advancement of information technology in Florida. In particular, the judges looked for organizations which have used information technology to further economic, social, or technological development in the state. Other awardees this year, the first year of the awards, included JPMorgan Chase and NAP of the Americas. ITFlorida is an umbrella, not-for-profit, membership organization that represents Florida's diverse technology community on a statewide basis.

CLANCEY CHOSEN AS ONE OF IRISH AMERICA'S "TOP 100"

Irish America Magazine has selected IHMC's Bill Clancey as one of this year's outstanding Irish Americans for "dedication, talent, and achievements." Clancey was featured in the April/May issue (on newsstands in March) and honored at the special Gala Awards Presentation held at the New York Plaza Hotel on the evening of Tuesday, March 16th.

Bert Hartley IHMC's transition to not-for-profit status will entail many changes in business practices. IHMC welcomes Bert as the Chief Business Officer to lead the transformation.



Bert Hartley

Bert has 35 years of extensive experience in higher education leadership, having served formerly as the Associate Vice President of Financial Affairs for the University of South Alabama, Executive Vice President at the University of South Florida, and Assistant Vice President for Administration at Florida State University. For his last 10 years at USF, he provided leadership and policy direction for the wide range of support services of the University, including physical plant, facilities planning, finance and accounting, purchasing, auxiliary services, environmental health and safety, public safety, and sports facilities.

As CBO of IHMC, Bert will address many of IHMC's new corporate responsibilities. He will work on the development of various corporate plans for IHMC, business management practices, and internal controls within IHMC.

Bert stated, "IHMC is an outstanding research institute, and I look forward to contributing to its continued success in coming years. The transformation of IHMC is going to be exciting and challenging. I am thrilled to be here for the beginning of the new era."

Peter Daniels Peter is the new executive assistant for Ken Ford and Tim Wright. Previously he was with the law firm Miller, Canfield, Paddock, and Stone. He graduated with honors from the University of London with a B.Sc. in Economics.

Kim Lewis Kim graduated from PJC with an A.A. in Liberal Arts. She plans to continue her education this fall majoring in Health Service Management. She is the receptionist at IHMC's 40 S. Alcaniz St. building. Kim enjoys spending time with family and friends, reading, computer games, and attending sporting events.

Nate Matzer Nate is a senior at UWF majoring in Electrical/Computer Engineering. He is working on the tactical situation awareness system with Anil Raj. He is the captain of the 2004 UWF Autonomous Submarine Team and plans to pursue an M.S. in Computer Engineering.

Shawn McGehee Shawn is currently a senior, working on his Computer Science degree. He is working with Marco Carvalho and Niranjan Suri on the MAST project and plans to enter graduate school shortly after graduation.

Tracie Moore Tracie joins IHMC as an office manager and will handle all IHMC travel and procurement issues.

Previously she handled travel for UWF and University of Central Florida.

Matteo Robeschini Matteo is a graduate student in Electronic Engineering from the University of Ferrara in Italy. He is currently working with Niranjan Suri and Marco Carvalho on the MAST project for his masters thesis.

William Taysom William is working with Jeff Bradshaw and James Allen on visualization and agent formalisms. He received his B.S. in mathematics from BYU and his M.S. from Carnegie Mellon University in Logic and Computation.

DEPARTURES

Matisse Gilson Matisse was the executive assistant to Ken Ford and Tim Wright. She has left IHMC to spend time with her two kids while her husband is deployed to Baghdad. When he returns in the fall, they will move to Bethesda, MD, where he will begin medical school.

Robin Risk Almost everyone who came to visit IHMC met Robin, the liaison for visitors and the event planner. She now has a new son, born in early March. Her husband should receive new orders from the Marine Corps in the beginning of the summer, and she, he, and their two kids will move from Pensacola.

GRANTS

From January to March 2004, IHMC was awarded over \$1.5 million for research.

NEW GRANTS AWARDED TO IHMC FROM JANUARY THROUGH MARCH 2004



Inference from Psychological Data

PI: Dr. David Blower
Amount: \$ 17,850

Granting Agency: Naval Aerospace Medical Research Laboratory (NAMRL)

This grant will allow Dr. Blower to continue his work in applying a general theory of inference to the analysis of data gathered from ongoing projects at NAMRL. These projects will include biopsychological responses to threat, personnel selection and classification issues, analysis of personality and biographical inventory questionnaires, development of a selection system for UAV operators, and heart rate variability studies. He will present seminars on the results to NAMRL, Naval Health Research Center (NHRC), Office of Naval Research (ONR), and other interested Navy program managers and principal investigators.

Multiple Measures System for Personnel Selection

PI: Dr. Frank Andrasik
Amount: \$19,815

Granting Agency: Naval Aerospace Medical Research Laboratory (NAMRL)

New advances in psychological assessment show promise in improving personnel selection for military positions. Dr. Andrasik will work with Ms. Amanda Lords at the Aviation Selection Division of NAMRL to enhance their existing selection instrument, the "Automated Spatial Abilities Test," to a more modern, thorough evaluation system called the "Multiple Measures System." The system will present instructions and test stimuli in a reasonable, psychometrically sound manner and will be designed so that new tests can be easily incorporated into the system and that data can be analyzed off-line in novel ways. Initially the system will be used to identify candidates for flight and air crew training. Future uses may include selecting explosive ordnance disposal divers and air traffic controllers, among others.

Concept Mapping (Cmap Tools) Software and Knowledge Model Project

PI: Dr. Alberto Cañas
Amount: \$300,000

Granting Agency: Naval Education and Training Command

This project continues a long and productive relationship between IHMC and the Naval Education and Training Command (NETC). Since 1996, IHMC has been funded by NETC to research and experiment with new technologies to enhance computer mediated learning, leveraging on the Institute's expertise in knowledge modeling. Under this proposal, the CmapTools software will be extended and refined toward development of proof of concept Knowledge Models that will support NETC's efforts.

Theory and Design of Adaptable Human Information Interaction Systems for Intelligence Work

PI: Dr. Robert Hoffman
Amount: \$37,873

Granting Agency: Department of Defense

In this project, IHMC will provide consulting support to the Xerox Palo Alto Research Center pertaining to the conduct of Cognitive Task Analysis, and in particular the use of Critical Decision Method and Concept Mapping. A goal is to see if the application of these methods might suggest ideas for human-centered computing in the domain of intelligence analysis.

Human-Centered Computing for the Intelligence Community

PI: Dr. Pat Hayes
Amount: \$513,309

Granting Agency: Department of Defense

Web ontology languages have been designed primarily for machine use. The syntax is virtually unreadable by humans, even with extensive training. Moreover, the semantic subtleties of the OWL notation are forbidding in their complexity, particularly to novice users untrained in formal logic. Concept maps (Cmaps) on the other hand, are a human-oriented notation widely used in knowledge sharing, training, teaching and knowledge elicitation scenarios, and of proven utility in the DARPA Rapid Knowledge Formation project as an intuitive input modality for knowledge composition by subject matter experts with a minimal amount of formal training. This research will improve the way intelligence analysts share information with the computers on which they rely to organize and study the huge volumes of data available from diverse sources.

Work System Design and Evaluation

PI: Dr. Bill Clancey
Amount: \$471,403

Granting Agency: Department of Defense

Human-centered computing amplifies human capabilities by taking into account how people think, behave, and interact in everyday settings. Dr. Clancey will continue his work with NASA-Ames Research Center using both empirical field studies and formal modeling of work systems as a design tool for inventing new ways of doing space operations. The formal models integrate multiple views, including workflow, information processing tasks, and situated action in simulated 3-d facilities and landscapes. Clancey will focus on tools for simulating day-in-the-life operations for NASA missions, such as a Mars habitat or robots working with people on the moon. These human-centered systems will provide automation that facilitates knowledge creation, communication, and collaboration among astronauts, remote scientists, and engineers, making work and everyday life in harsh environments safer and more efficient.

Quadrupedal Robot that Can Walk, Trot, Gallop, and Jump

PI: Dr. Jerry Pratt
Amount: \$195,000

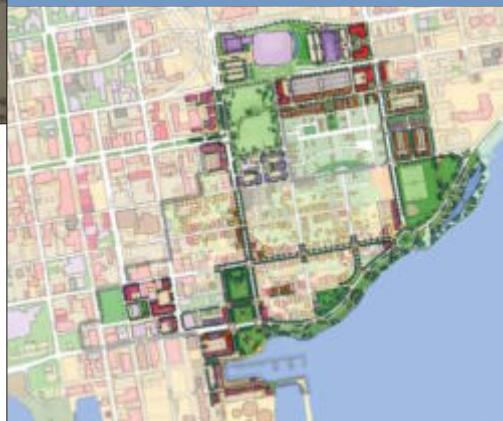
Granting Agency: US Army Tracked and wheeled vehicles have difficulty maneuvering in urban terrains, which are designed for legged locomotion. Under this grant, Dr. Pratt will partner with Yobotics, Inc., to develop a full-scale prototype quadruped robot. The robot will be able to scramble over debris, step over ledges and gaps, jump over ditches and small obstacles, and run up stairs. The initial phase will be design and control of a monopod robot, and physically realistic simulations will aid in the design. The grant will conclude with an outdoor demonstration of the functional prototype.

LOCAL NEWS

IHMC HOSTS DOWNTOWN DESIGN FORUMS



Gindroz's view down Alcaniz Street



Gindroz's vision for the Pensacola historic district

Innovation and excellence are the keys to IHMC's success now and in the future. Innovation is place-based, and our location in the downtown historic district is an important asset, particularly when recruiting highly mobile young professionals. The historic district and the surrounding areas are becoming an increasingly vibrant, human-scale urban environment - a habitat for innovation. IHMC was pleased to host a series of workshops and town meetings aimed at developing a master plan for the historic district.

Ray Gindroz, co-founder of Urban Design Associates in Pittsburgh, led the workshops as part of a study sponsored by the University of West Florida, IHMC, and the City of Pensacola, to explore improvements to the historic district and the historic properties recently acquired by UWF. During initial visits, Gindroz and his team heard from business leaders, government officials, and residents about the good and bad of the area. Residents tended to like the center of the district but had much to criticize about the immediately surrounding area. This effect, which Gindroz terms "ring around the collar," is seen in similar planning processes in other cities.

Gindroz and his team completed their study in December and suggested changes to enhance the downtown historic district experience. These suggestions included: creating mixed-use developments in the large, vacant parcels of land around the district; finding



Gindroz's vision for IHMC's new buildings

creative uses for University properties to encourage round-the-clock activity; using sensitive infill projects to bolster the heart of the district; modifying the Interstate 110 off-ramps and the intersection of Garden and Alcaniz streets to allow easier, more appealing access to the historic district; and reducing Bayfront Parkway from four travel lanes to two with turning lanes to improve waterfront access and calm traffic. The

changes to the intersection of Garden and Alcaniz streets, in particular, would impact IHMC directly. Currently, reaching IHMC from the interstate requires a u-turn or a meandering path through downtown. Under the new plan, IHMC would form a part of the gateway to the historic district.

One of the vacant parcels of land that Gindroz cited as critical for development is directly behind IHMC's primary building

and is owned by the UWF Foundation. IHMC and the Foundation are currently considering development ideas for that land. Since IHMC is out of space in its current buildings, this development is critical for the continuation of IHMC's growth trajectory.

In addition to lab space, plans include a large community lecture hall, retail spaces such as a coffee shop, and office space for other businesses. IHMC hopes to soon begin the design phase for that development.

Along with the larger, more expensive projects, Gindroz suggested some small, less expensive improvements that could lead the way toward effective public-private partnerships. In conjunction with the recently completed residential market analysis and the soon-to-be-completed review of port operations, the Pensacola Historic District Master Plan paves the way for reshaping the downtown Pensacola experience.





INSTITUTE FOR HUMAN & MACHINE COGNITION

40 South Alcaniz Street
Pensacola, Florida 32502
850-202-4462 phone
850-202-4440 fax
www.ihmc.us

