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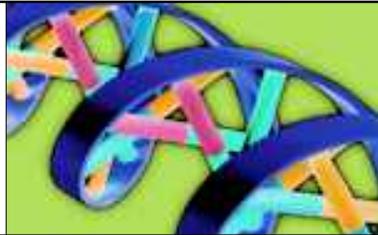
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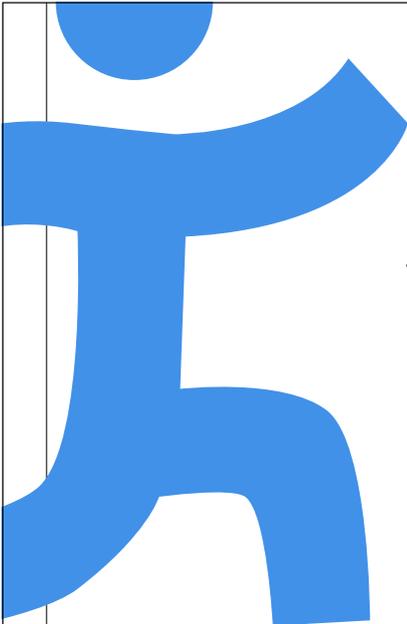
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Exciting changes happening at IHMC. In January, John Cavanaugh was inaugurated as the new president of the University of West Florida. We at IHMC are pleased to be entering a new era with the university. The energy and vision John brings will foster an exciting period of growth for the campus and will enhance and reinvigorate UWF's relationship with the Northwest Florida community in general, and downtown Pensacola in particular. We are delighted to add our voice to the chorus of welcome that has greeted the new President of the University of West Florida.

Another change is the launching of our new website at www.ihmc.us. The site is filled with information about our research, people, and activities. For those of you who want to learn more about our research, we have overviews of the research areas and some of the projects that are underway. We hope that you enjoy browsing the site and learning more about us.

This newsletter focuses on a research area central to our activities. Data mining is critical in this era of burgeoning data acquisition. Satellite sensors of various types, medical devices, and many other sources now produce prodigious amounts of data, more than we know how to process. Every single day more data is added to the total store of information than was available to the entire human race up to the start of the 20th century. Data mining is the technology of finding the patterns — discovering what really matters — in all this, and IHMC is where some of the very best people in this complex field do their work. IHMC researchers are exploring new ways to make sense of voluminous data in many critical domains.

Several of the articles illustrate connections between IHMC and the local community. IHMC was a local pioneer in bringing high-level academic research into closer relationships with the people and activities in the Pensacola region. We are collaborating with local schools and hosted recent talks by nationally prominent speakers on the broad issues of urban development and the historical context of the local architectural rennaissance. We are proud and pleased that these lectures are attracting large audiences from the local community.

I hope you have a wonderful summer.

Best Wishes,

Kenneth M. Ford, Director

Knowledge Discovery and Data Mining

"A good decision is based on knowledge and not on numbers" —PLATO

A good decision is based on knowledge and not on numbers —Plato

All of us would like to have a crystal ball to foresee the future. Instead, we must constantly make decisions based on limited information. To get by, we sculpt our experiences into models of the world. Then we use these models to anticipate outcomes.

If we could better analyze the data from our experiences better, we could make more informed decisions. Because of their capacity to analyze large quantities of raw data, computers might help in this process. It would be time-consuming, though, to teach computers much of the insight we have gained in our lifetimes.

Researchers in knowledge discovery and data mining, including IHMC's Clark Glymour and Henry Kyburg, are drawing on the strengths of both humans and computers to develop decision-making tools. The combination allows decisions to be based on both human experience and machine computation, i.e., knowledge and numbers.
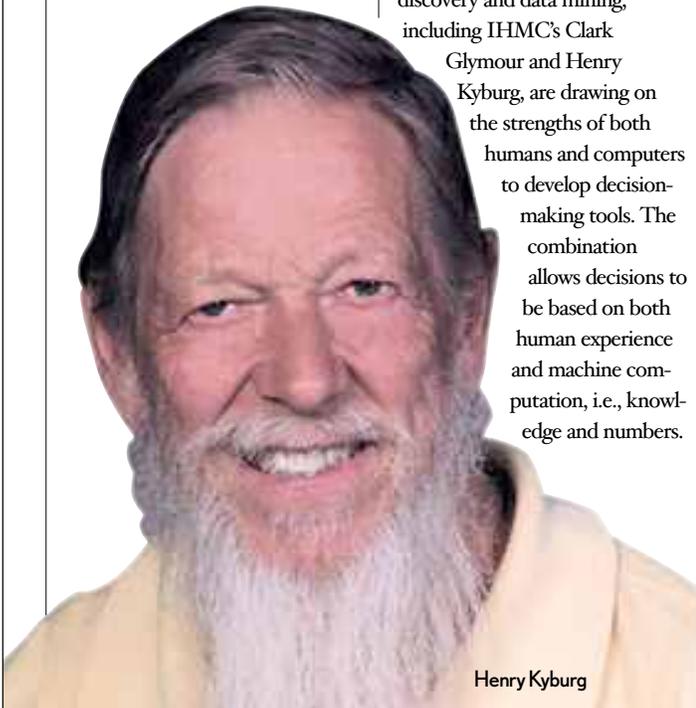
These tools can be used for a large variety of analyses—from climate change to horse racing, college admissions to stock picking. The US government is even planning to use these tools to predict future acts of terrorism.

How can these tools help us predict the future? The first step in prediction is understanding the past, the causes and effects we've seen before. Some causes may be obvious; others might be subtle, uncovered only after analysis of volumes of data. Some causes may be direct; others might act through a long chain of events.

Analyzing causes helps us create a model for predicting future outcomes. These models are based on a set of premises, or statements we accept to be true. From these premises, we infer conclusions that go beyond the

Henry Kyburg

SCIENTIST PROFILES

Henry Kyburg

Hometown: Greenwich, CT
Education: B.E. in chemical engineering, Yale University; M.A. and Ph.D. in philosophy, Columbia University
Joined IHMC in: 2001

Henry aspired to be a painter. However, his parents encouraged him to choose a major in college that would result in a lucrative career, so he became ... a philosopher? No, he was a dutiful son and majored in chemical engineering. He found engineering boring, so, after working as an engineer for a while, he rebelled by reading philosophy. That led to graduate school in philosophy at Columbia University and eventually a notable career in knowledge discovery and data mining.

Henry's work on statistical inference and its logical foundations, started in the 1950s, has earned him many honors. He is a fellow in in the American Association for Artificial Intelligence, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences.

After a semester on leave from the University of Rochester during which he worked at IHMC, he decided a joint appointment at the two institutions would be advantageous. The research at IHMC is very amenable to his philosophical approach, and he has become less and less tolerant of the hidebound views found in traditional academic departments.

The joint appointment allows him to continue his primary hobby, if one can call a working cattle farm a hobby. When he started his appointment at Rochester, he and his wife looked for a place to have a horse or so. The place they found was too big to afford without putting the land to use, so he chose to raise cattle since "they are nice and beautiful."

Henry's other hobbies include playing hockey and tennis, which he recently took up again after a 50-year hiatus. He also continues to paint occasionally, though the paintings which currently decorate his office were done by his wife.

Clark Glymour

Hometown: Butte, MT
Education: B.A.s in chemistry and philosophy, University of New Mexico; Ph.D. in History and Philosophy of Science, Indiana University
Joined IHMC in: 2000

As a child, Clark always wondered, "What can't you know?" This question began his interest in philosophy. He started college at the University of Montana, majoring in philosophy, but was thrown out during his sophomore year—for reasons he would rather not discuss (he was also thrown out of high school in Butte). He transferred his credits to the University of New Mexico where he added a second major, in chemistry.

After completing his PhD at Indiana University, he left a tenured position at Princeton to raise hogs in Oklahoma. He taught at four universities in 15 years, including a year at the University of Illinois-Chicago during the worst winter he could imagine. He finally settled down at Carnegie Mellon in 1984 when the president of the university asked him to build a philosophy department focused on logic and methodology.

Three years ago he jumped at the opportunity of a half-time position at IHMC. He had realized he was in danger of becoming a "gray eminence" at CMU and welcomed the opportunity to divide his time. Clark enjoys the lack of bureaucracy at IHMC and the freedom to work as he pleases.

He also enjoys Pensacola, particularly compared to the winter he spent in Chicago and last winter in Pittsburgh. For him, Pensacola embodies the kind of spirit that used to be more common across America, a place that reminds him of the happy part of life America in the 1950s.

Clark would change very little about his life now. However, if he could, he would love to give up six months of his life now to come back in 2050 to know how his kids turned out, or go back to 1942 to know how his parents raised him. Unfortunately, those are things he knows he can't know.

information contained in the evidence, Kyburg points out. There is uncertainty in our conclusions, therefore, even if all of our premises are true. For example, we may have a model that the average rainfall in a month is indicative of the future rainfall of that month. However, if we know that on average we get four inches of rain in May, we still don't know how much rain we will get this May.

Our models are only as good as the premises on which they rest. As we gather more information and data, our models and our belief in our conclusions can change. The better our data and models, the better our decisions.

In developing the software tools that will improve decision-making, IHMC researchers are formalizing the methods people use to analyze cause and effect. Then they teach these techniques to computers.

The intent is not to have computers displace people in the process. Instead, tools under development at IHMC aid people in their decision-making. These tools analyze the past, finding causes. And they clean the data and make it more understandable by people.

IHMC's Clark Glymour, Peter Spirtes, and David Danks, along with their colleagues, develop tools for analyzing causes. Their algorithms create causation maps, called Bayes nets, which graphically show the relationships between a variety of causes and the ultimate effect. They have

been used successfully, for example, in analyzing mineralogical data. In testing for NASA, these algorithms outperformed a human expert when searching for particular minerals in rocks, minerals which could indicate a history of an environment that supported life on Mars.

Another field where they are applying this analysis is molecular biology and the regulation of genes. Most people, even when performing scientific research, rely on Occam's razor to simplify their analysis. That is, they assume the simplest model that fits the data is correct. However, living systems are full or redundancies and complexities—simplifying assumptions frequently aren't valid.

Unfortunately, Glymour and colleagues have shown that some of the standard causal relationship algorithms are too simple for understanding complex biological systems. Bayes nets, for instance, assume sequential relationships, but biology is full of feedback loops. Additionally, the biochemical procedures for measuring gene expression are

Clark Glymour
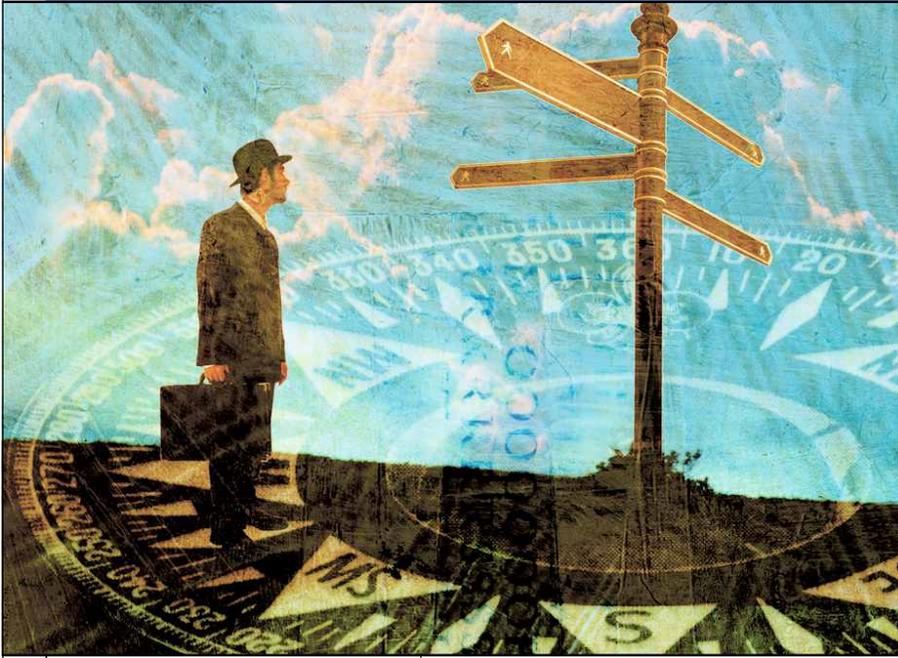
system which "polishes" data, examining interdependencies to find and fix errors.

The role of humans in decision-making is still quite central. Kyburg explains, "Embodying complex decision making into a computer system requires incorporating knowledge representation, inference, background knowledge, value judgments, and mathematical expectations. Gradually as advances are made in artificial intelligence, more and more can be off-loaded onto the computer."

Until then, many decisions will rest squarely on the shoulders of people. People vary greatly in their skill, particularly in determining causation. Some appear naturally skilled, some aren't talented but can learn, and some just seem inept at reaching correct conclusions.

■ ■ ■ **In developing the software tools that will improve decision-making, IHMC researchers are formalizing the methods people use to analyze cause and effect. Then they teach these techniques to computers.** ■ ■ ■

complex and noisy, limiting their statistical utility. Glymour and his colleagues are now developing algorithms that take into consideration some background knowledge in order to create more accurate causal models.

In many cases, however, the models need to be comprehensible as well as accurate. The models generated by many algorithms, such as those that search for Bayes nets, often are too complex to be understood by the user. However, comprehensibilty comes at the expense of accuracy. IHMC's Rattikorn Hewett and her collaborators, though, have developed a system which compresses decision tables into a form more easily comprehended by the users and yet retains accuracy comparable to many other systems.

Hewett, along with collaborators John Leuchner of IHMC and Sean Mooney and Teri Klein of Stanford Medical Informatics at Stanford University School of Medicine, applied the IHMC system to predicting the impact of genetic mutations. Mutations alter the structure of a protein, often causing health problems by preventing normal function. Typically, analysis of the effects of mutations requires many hours of laboratory experiments. Using the IHMC system, biologists can now analyze data to improve experimental design, simplifying one step on the road to better treatments or a cure.

An understanding of the data is easiest when the data is impeccable. Sometimes, though, the data is flawed, filled with human and machine errors. People often decide what data is correct based on the interdependency of the data. If a sensor gives an unexpected flat-line, for example, the researcher might check whether it is even plugged in. Or a value that is physically impossible may have been just mistakenly typed in. IHMC's Choh Man Teng and Henry Kyburg are developing a computer

What might cause this variation and how can we train people to do better? Glymour and Danks, along with Alison Gopnik at University of California, Berkeley, have investigated the strategies young children use in learning cause and effect. In addition, Danks and Craig Mackenzie of UC San Diego have carried out experiments which have disconfirmed several influential theories of human learning of causal relations. Using this improved understanding of the psychology of human causal judgment, Glymour, Spirtes, Danks, and Richard Scheines of Carnegie Mellon University are developing an automated program to train workers to infer causes in complex situations. They are exploring how much people can learn from examples or whether an explanation of the underlying mathematical concepts and theories of causation improves their causal reasoning.

People make decisions all the time with limited knowledge. Using tools under development at IHMC, they will be able to analyze the data better to improve their decision-making. Great decisions will be based on knowledge and numbers.

More information on this research is available at the IHMC website in the Psychological Foundations of Causal Judgment and Human Data-Mining (http://www.ihmc.us/research/CausalJudgment/) and Intelligent Data Understanding and Uncertain Inference (http://www.ihmc.us/research/UncertainInference/) research areas.

HAPPENINGS
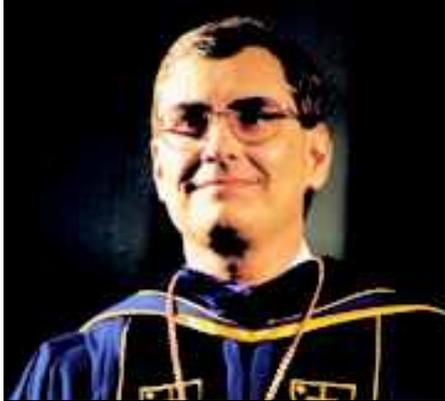
John Cavanaugh inaugurated as UWF president

WJ CLANCEY

▼ Researchers transmit data to the base using personal agents on their handheld computers.

▲ Astronaut-geologists direct the teleoperated rover to come to their position.

On January 10, John Cavanaugh was inaugurated as the fourth president of the University of West Florida. A Ph.D. psychologist, Cavanaugh most recently served as provost and vice chancellor for Academic Affairs at the University of North Carolina, Wilmington.

Board of Trustees Chairman Collier Merrill said, "The decisions we make now will reverberate in the next century. [Cavanaugh] is an intelligent, engaging man who has initiated creative solutions and created programs to meet contemporary needs."

One of the changes Cavanaugh is pursuing is an expansion of UWF's presence downtown. IHMC was a pioneer in bringing UWF to downtown. President Emeritus Morris Marx commented, "Given President Cavanaugh's emphasis on downtown, I am particularly pleased that we were able to locate IHMC in the heart of Pensacola." In addition, the Small Business Development Center is housed downtown, and UWF manages 23 historic properties.

Cavanaugh's goals for his presidency include modest growth with a focus on excellent academic programs. He said, "I was attracted to UWF because of the many quality programs, including IHMC. IHMC is an example of the "depth rather than breadth" approach I'd like to take in building the university." His leadership will be essential for the future growth of IHMC.

EXPLORATION OF MARS IN UTAH COMPLETED

A team of researchers, including IHMC's Bill Clancey, recently completed a two-week full simulation of geological exploration of Mars in Hanksville, Utah. Clancey, the project's principal investigator, said,

"We call the project 'Mobile Agents' because the computers on all-terrain vehicles and the astronauts' backpacks are moving. The people and robot have 'agents,' which are computer programs that monitor what is happening, share information over the wireless network, and provide warnings in the astronauts' headphones and over the MDRS loudspeakers." The agent system utilized the Brahms work practice simulation program, designed by Clancey and colleagues. In addition, the KAoS system, designed by IHMC's Jeff Bradshaw and coworkers, registered agents and coordinated their communication.

For more information on the simulation, please visit http://www.marssociety.com/ MDRS/fs02/crew16/. More information on the KAoS system is available at http:// www.ihmc.us/research/projects/KAoS/.

FORD CONFIRMED TO SERVE ON SCIENCE BOARD

IHMC Director Ken Ford was confirmed by the US Senate as a member of the National Science Board on March 21. The NSB governs the activities of the National Science Foundation and provides science policy advice to the President and Congress. NSF funding accounts for 20 percent of federal support to academic institutions for basic research in all scientific fields. The NSB is composed of 24 members, appointed by the President and confirmed by the Senate. Each member serves a 6 year term.

STILL AWARDED PATENT FOR THE OZ DISPLAY

David Still of IHMC and Leonard Temme of the Naval Aerospace Medical Research Laboratory were awarded US Patent 6,486,799, "Computer Based Human-Centered Display System," in November. The patent is based on OZ, a NASA-funded cockpit display which

replaces traditional dials and gauges with a symbolic display. Still drew on his knowledge of human vision, particularly the importance of peripheral vision, to design the display so that pilots can comprehend it in a single glance. Patent approval brings the technology one step closer towards taking flight.

RAJ ELECTED TO LOCAL AUVSI BOARD

Anil Raj was elected to a one-year term as one of three members of the Board of Directors of the Association for Unmanned Vehicle Systems International, Emerald Coast Chapter. This chapter was incorporated in August 2002 at a meeting at IHMC. The Board is currently focused on membership recruitment. In addition, Raj is working on developing relationships between university, corporate, and military members of the chapter in order to find areas for collaboration.

ANDRASIK SERVED AS VISITING PROFESSOR

Frank Andrasik was selected as a distinguished visiting professor at Wilford Hall USAF Medical Center in San Antonio. Each year the psychology residents choose approximately 10 psychologists they would like to come and stay in residence for a week. Andrasik served during January. In this role he consulted with residents and staff on patients they were seeing and research projects they were planning or conducting. In addition, he gave two major talks, including Grand Rounds in psychiatry.

ARRIVALS

■ ■ ■ DECEMBER 2002 THROUGH APRIL 2003

John Carff John is a senior at Escambia High School and plans to major in computer science at UWF. Currently testing CmapTools, he is also interested in robotics and 3D animation.

Gabriel Chernacov Gabriel was a senior executive for Epson American in the USA and several Latin American countries, where he pursued an interest in methodologies for introducing technology into education. At IHMC, he will work on the commercialization of CmapTools.

Michael Freed Michael is a research scientist working in collaboration with NASA's Ames Research Center. His research focuses on modeling and designing agents for complex, semi-structured tasks such as air traffic control. He will work on autonomous robots and human behavior simulation using the Apex cognitive architecture which he developed for his PhD thesis at Northwestern University.

Lucian Galescu Lucian has joined IHMC as a research scientist focused on human-computer interaction. He has extensive research experience in spoken language processing and dialogue systems gained during his PhD studies in computer science at the University of Rochester.

Matisse Gilson Matisse joins IHMC after 3 1/2 years at home with her two daughters. With a bachelor's degree in Human Sciences and a background in retail and customer service, she is now the executive assistant for Directors Ken Ford and Tim Wright.

Bill Mularie Bill is a leader in cybersecurity and information technology, having been the director of the Information Systems Office at the Defense Advanced Research Projects Agency (DARPA) as well as working at the CIA Office of Technical Services. He also served as Deputy Director for Systems and Technology at the National Imagery and Mapping Agency and founded

the National Storage Industry Consortium and the National Media Laboratory, serving as the director of the latter from 1988 to 1996. Bill held several positions in industry prior to his government work and is CEO of the Telework Consortium. At IHMC he will be the Assistant Director for National Security Technologies, assisting IHMC personnel in facilitating the transition of the national defense and intelligence technologies from Cold War approaches to human-centered cognitive technologies.

RECENT LECTURES

■ ■ ■ RETIRED GENERAL OFFERS INSIGHT INTO MILITARY FUTURE
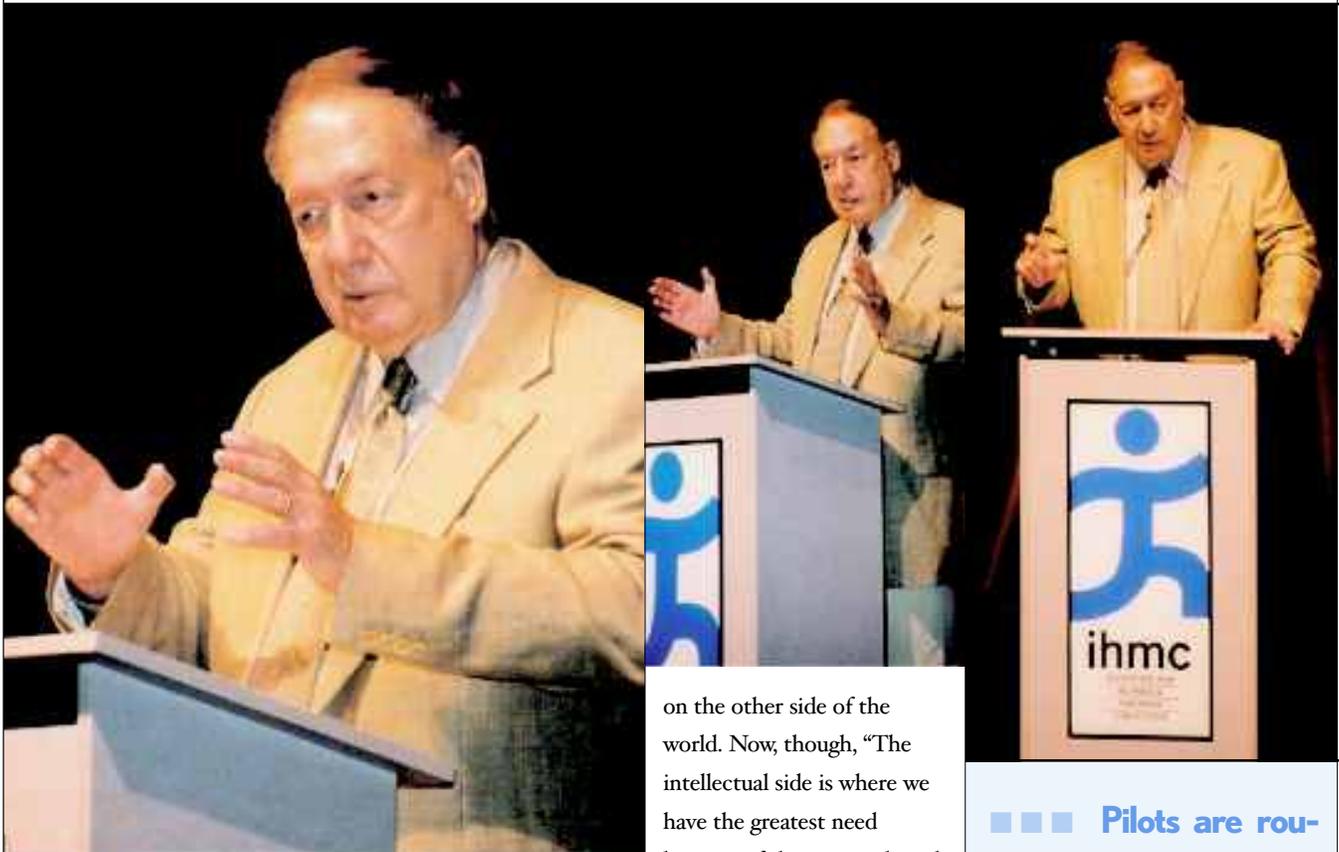
Wars of the 21st century are not about attrition but rather about changing the behavior of the enemy, said General Charles A. Horner (ret) during his talk "Men and Machines in Modern Warfare" on April 8. The IHMC-sponsored lecture was held at the Pensacola Little Theater to accommodate the more than 200 attendees.

Horner served as the Commander In Chief North American Aerospace Defense Command and the United States Space Command and Commander of Air Force Space Command prior to his retirement. During Operations Desert Shield and Desert Storm he commanded all US and allied air assets.

He described the incredible assets that the military has with current information technology. A commander can see a virtual battlefield with all troops, tanks, planes, and ships. Pilots are routinely guided to targets by soldiers on the other side of the world. Now, though, "The intellectual side is where we have the greatest need because of the new tools and technology," said Horner.

General Horner lives in Shalimar, FL, when he is not traveling as a business consultant, public speaker, and government advisor. He appeared in numerous national and foreign television programs on the 2003 Gulf War and is a defense analyst for ABC News. He is also on the UWF Board of Trustees.

To view video of this and other letures at IHMC, please visit http://www.ihmc.us/movies/index.php.

■ ■ ■ **Pilots are routinely guided to targets by soldiers on the other side of the world. Now, though, "the intellectual side is where we have the greatest need because of the new tools and technology," said Horner.** ■ ■ ■

RECENT LECTURES

■ ■ ■ ADDITIONAL TALKS BY IHMC VISITORS

Architect and urban planner addresses future of towns

"We used to know how to build a town. What happened?" asked Jaquelin Robertson during his February 12 talk "A Future for American Urbanism." A well-designed town, he contends, is one where you feel compelled to get out of your car and walk the city streets. In his urban plans Robertson strives to create such towns.

Robertson created the Master Plan and designed the town center of Celebration, Disney's community near Orlando. He recently completed the design of Watercolor, a community adjacent to Seaside, FL.

He has taught architecture and urban design at several schools, including Columbia University and Yale, and also was the Dean of Architecture and Commonwealth Professor at the University of Virginia. He is now a senior partner in the New York City based Cooper, Robertson, and Partners.

Urban planner discusses vision for Pensacola

Ray Gindroz returned to Pensacola December 5 to speak on urban design. After visiting Pensacola in May and speaking at IHMC, he developed a report on the redevelopment of downtown Pensacola, focusing on the waterfront area. He stressed the importance of integrating the waterfront with the downtown and historic districts. The lecture was held at the Gulf Power Auditorium and was sponsored by IHMC and the Appleyard Agency.

Gindroz has led several downtown and waterfront plans in cities such as Norfolk, Portsmouth, and the Brooklyn Bridge Park in New York City. His efforts focus on revitalizing cities by transforming inner city neighborhoods into traditional mixed-income neighborhoods. He also aims to attract new residential, commercial, and civic development to downtowns.

Gindroz is co-founder and principal of Urban Design Associates. In addition, he is one of the founding directors of the Institute of Traditional Architecture at the University of Miami. He has taught urban design at Yale University, Carnegie Mellon University, and the City University of New York.

Senior human factors scientist outlines principles of cognitive work

Human centered computing requires an understanding of cognitive work. David Woods, past president of the Human Factors and Ergonomics Society and co-director of the Cognitive Systems Engineering Laboratory at The Ohio State University, explained some common patterns of cognitive work and the relationships between humans and computers in his talk on December 9, entitled "The Laws of Cognitive Work". These laws are based on observations of the interaction of people with machines in "complex socio-technical contexts." He stressed that adherence to the laws is not necessary, but failure to adhere to them results in systems that create "automation surprises" (i.e., the human is unsure of what the machine is doing) and create a need for kludges and work-arounds. Respect for the laws of cognitive work is critical to designing systems that enhance the abilities of their human users.

Software agents designer presents approach for collaborations

Austin Tate, Technical Director of the Artificial Intelligence Applications Institute (AIAI) at the University of Edinburgh, discussed work on software agents and collaborations with IHMC in his talk on April 3 entitled "Human Centered Plan Representations that Computers Can Understand." AIAI's I-X research program utilizes a mixed-initiative approach for task-related cooperation between humans and computers. This approach is designed to allow humans and computer systems to jointly explore a range of options for a design, such as a new car design, or a plan, such as a military operation. He discussed a variety of joint projects between AIAI, IHMC, and others, including the CoAX military simulation (see February 2003 newsletter) and new work just started on Coalition Search and Rescue. In these collaborations, AIAI provides its task support and planning systems while IHMC provides the agent domain and policy infrastructure.

IHMC researcher describes role of belief in decision-making

Two stalwarts of philosophical debate, John Maynard Keynes and Frank Ramsey, held opposing views on the nature of belief and probability. In his March 6 talk "Are there degrees of belief?" IHMC's Henry Kyburg (see Featured Research, page 3) described the dispute and explained the significance of the debate to philosophical and psychological work. These philosophical underpinnings of probability form a critical backbone to knowledge discovery and data mining research.

Local historian explains Pensacola's urban development

Downtown Pensacola as it is today was shaped by the boom and bust of the local lumber industry, John Appleyard, a local historian, explained during his March 17 talk "The Making of Downtown Pensacola." The lumber industry boomed just after the Civil War, bringing prosperity and, hence, new construction to the town. By 1925, though, "the lumbering era was over. Pensacola fell asleep and is just now waking up."

GRANTS

Between December 2002 and April 2003, IHMC was awarded over $2.7 million for research.

■ ■ ■ DECEMBER 2002 THROUGH APRIL 2003

Development and Testing of Data Mining Algorithms for Earth Observation

PI: Dr. Clark Glymour
Amount: $204,842
Granting Agency: NASA
Duration: 11/15/02 through 11/14/04

Enormous quantities of data have been, and will continue to be, collected from observations of Earth. This data, though, is distributed through different data sets and is sparse in certain areas of interest. This grant will fund investigations of the design, development, and testing of new algorithms to improve the acquisition of information from such data. In particular, the researchers aim to improve the speed of analysis by applying results from the analysis of one data set to other data. In addition, they will explore how data in different sets can be correlated. The improved analysis will aid in the development of detailed models and predictions of the effects of current conditions on future climate change.

Cognitive Agent Architectures

PI: Dr. Michael Freed
Amount: $250,000
Granting Agency: NASA
Duration: 12/1/02 through 11/30/04

All new systems are dependent on human performance; a simulation of the human component could save time and money. Under this grant, Dr. Freed will continue his work with NASA on developing a simulation of human cognitive performance called Apex. This simulation operates in complex, dynamic, and uncertain domains such as air traffic control, and the simulated human operates close to a real human, including making human errors. Continued development of Apex is critical to meeting the objectives of several NASA programs.

Research on Human-System Technology to Address Critical Navy Needs of the Present and Future

PI: Dr. Jack Hansen
Amount: $939,000
Granting Agency: Office of Naval Research
Duration: 3/1/03 through 4/30/04

Human-system technology is a relatively new, multidisciplinary field which exploits advances in cognitive research and computer science to optimize performance of experts, expert teams, and the information systems that support them. This continuation grant funds research in advanced information displays and knowledge discovery and data mining at IHMC. Advances in visual displays will enable non-pilot operators to operate unmanned aerial vehicles successfully. Novel tactile displays will provide enhanced situational awareness in complex operational situations, such as aviation and special forces operation. Improvements in algorithms in knowledge discovery and data mining and new approaches to mathematical problems will allow optimization of problem solving and decision making.

Applications of Principled Search Methods in Studies of Climate Influences and Mechanisms

PI: Dr. Clark Glymour
Amount: $818,945
Granting Agency: NASA
Duration: 4/1/03 through 3/31/05

An understanding of the causes and impacts of long-term changes to the world's climate and weather is essential for policy planning. The majority of the statistical methods used in climate analysis have been limited. This grant will fund the application of modern statistical search methods, such as machine learning and data mining algorithms, to climate data and problems. These methods may increase the information, speed, and accuracy of these vital climate-related investigations.
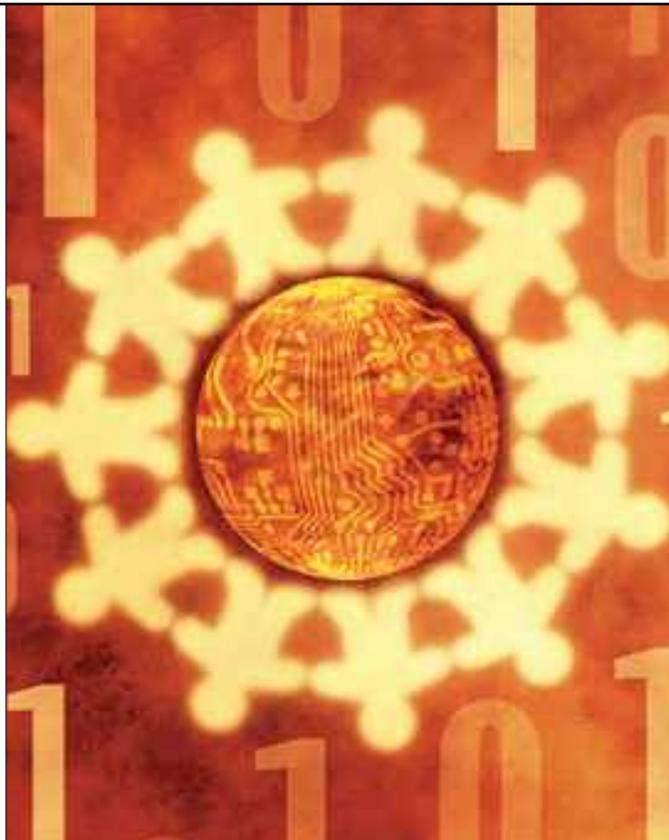
Enduring Personal Cognitive Assistant

PI: Dr. James Allen
Amount: $555,116
Granting Agency: DARPA
Duration: 04/23/03 to 04/22/04

Unprecedented advances in computer science over the last several decades, combined with the unexpectedly affordable prices of advanced technology, often leave the human side of the human-computer system overwhelmed by the power and capability of the machines on their desks or in their pockets. IHMC researchers are partnering with a team lead by SRI International to develop an Enduring Personal Cognitive Assistant (EPCA). EPCA will help users interact naturally with computers, PDAs, and other high-technology devices. IHMC researchers will develop multiple ways of communicating with the EPCA, including spoken language, gestures, sketches, and handwriting. A clear understanding of the user's intent is a key to establishing and maintaining the user's trust of his EPCA.

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LOCAL NEWS

■ ■ ■ IHMC PARTNERS WITH LOCAL SCHOOL

"...we are also building a connection with the community and helping build a more vibrant future workforce for Pensacola."

Work in Progress by
Loan e Matheus
CEDI School, Petropolis, Brasil
(translated for the IHMC Newsletter)

Hydroponics
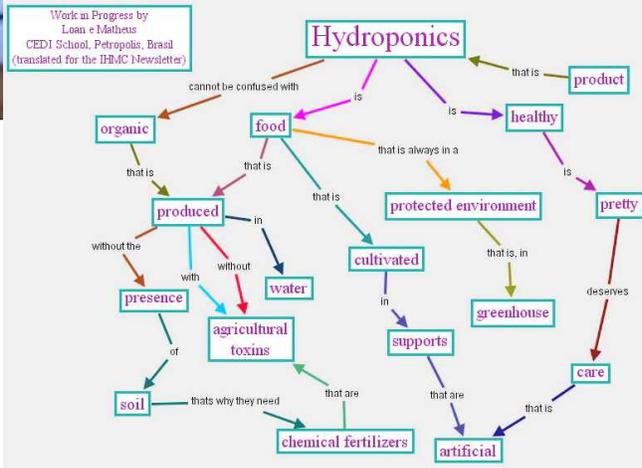
IHMC has become a "Partner in Education" with Escambia County Schools' Program for Academically Talented Students (PATS) Center. Through this partnership, IHMC aims to aid many local students by introducing IHMC's CmapTools software.

The PATS program provides enrichment for gifted students in Escambia County. Third through eighth grade students from public, private, and home schools attend one day a week, taking electives such as shadow puppetry, Japanese culture, and Greek and medieval history.

IHMC's CmapTools are a software tool for designing and sharing concept maps. Invented by IHMC's Joe Novak while at Cornell University, concept maps are visual representations of knowledge and have been shown to improve student learning. Used in schools in many countries, CmapTools allow the students and teachers to easily construct and share concept maps.

Arlene Costello, the teacher-in-charge at PATS, read about IHMC several years ago, sparking an interest in collaboration. She contacted Alberto Cañas, one of IHMC's associate directors, and learned about CmapTools. They seemed a great way of "breaking down the walls of the classrooms," she said. Unfortunately, when IHMC personnel went to install the software, they discovered that the computers were too old. She was so eager to partner with IHMC that within 48 hours she had a commitment from the county's Exceptional Student Education department for new equipment.

The first step in the partnership is a series of training sessions for teachers by IHMC personnel beginning in April 2003.

PATS teachers will then begin to incorporate CmapTools into their courses. The ease of collaboration with the tools, for example, will allow cross-communication between students attending on different days. IHMC personnel will monitor the implementation, documenting the advantages and challenges, as well as providing follow-up support for the teachers.

Gabriel Chernacov, the IHMC point-person for the partnership, is excited to work with a local school. "Not only does it provide an excellent showplace for the software, we are also building a connection with the community and helping build a more vibrant future workforce for Pensacola," he said. This partnership may become a spark for collaborations between IHMC and many other local schools.
For more information on CmapTools, visit http://cmap.coginst.uwf.edu/.

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