

# INTER CONNECTIONS

A Report on Interdisciplinary Computing at the  
University of Maryland Institute for Advanced Computer Studies

Spring 2001

## UMIACS and Computer Science Faculty Win \$6.5 M in NSF ITR Awards

**O**n September 13, 2000, NSF announced the first set of awards under the new Information Technology Research (ITR) initiative which attracted over 1,400 proposals nation-wide. The UMIACS and Computer Science faculty secured an impressive five awards, three of which were for large multi-disciplinary projects. Brief summaries of the winning projects, together with the University of Maryland PIs, are provided next.



*High resolution meshes that provide sufficient detail of the ear are needed for numerical modeling of human spatial hearing. Shown in the image is a high resolution mesh of a dummy that is often used in hearing research.*

### *Personalized Spatial Audio via Scientific Computing and Computer Vision - Larry Davis and Ramani Duraiswami.*

Humans are very good at discerning the spatial origin of sound using a mixture of cues in disparate environments ranging from open spaces to small crowded rooms. This ability helps us to interact with others and the environment by sorting out individual sounds from a mixture, and helps us to survive by warning us of danger over a wider region of space compared to vision. For a given source location and frequency content, the sound is scattered by the person's torso, head and pinnae, and is received differently at the two ears, leading to differences in the intensity and spectral features of the received sound. These effects are encoded in

an extremely individual "Head Related Transfer Function" (HRTF) that depends on the person's anatomical features (structure of the torso, head and pinnae). This project will use and develop numerical methods to compute individualized HRTFs from accurate 3-D surface models of the body. We will use multi-view, multi-frame computational vision techniques to extract the surface models from imagery. We will then use boundary element methods employing fast

multipole/transform techniques and parallel processing to compute the HRTFs from the surface models. The resulting HRTFs will be used in demonstrations of virtual reality, augmented reality, and teleconferencing. This project will provide a scientific foundation for Human-Computer Interaction applications of audio rendering.

*Collaborative Research for a National Center for Empirical Software Engineering Research – Vic Basili and Marv Zelkowitz.* A necessary step for building more reliable systems, on time and within budget, is to establish an institutionalized empirical discipline for understanding causal relationships among the processes, components, and technologies that affect the building of software systems. The empirical research and infrastructure required to construct this discipline is too much for any one organization, or even for several organizations working in isolation, to achieve. The purpose of this project is to establish a Center for Empirical Software Engineering Research (ESER), that will be a collaboration between the University of Maryland, the University of Southern California (USC), Mississippi State (MSU), Nebraska-Lincoln (UNL), and the Fraunhofer Center-Maryland (FCMD). The initial focus will be on COTS integration and software quality improvement. The critical issues for ESER are combining individual contributions to scale up for applicability to complex systems and packaging them to combine effectively with other ESER contributions. Our long-range vision is to create a critical-mass community of academic (and affiliated industry) researchers capable of creating an institutionalized discipline of empirical software engineering research.

*Real-time Capture, Management and Reconstruction of Spatio-Temporal Events – Hanan Samet.* With the advances in embedded processors, low cost sensor technologies, and wireless communication, unprecedented amounts of diverse types of information about the real world and its activities are being generated. Much of the information is spatio-temporal in nature; concerning objects dispersed in

*Cont. on p. 2*



# Welcome to the Spring 2001 issue of *Interconnections*

Many exciting events have occurred since the Summer 2000 issue. In particular, the UMIACS research programs grew at an impressive rate, including new projects funded by over \$22M in additional grants and contracts and the establishment of the *Computer Graphics and Visual Informatics Laboratory* (CGVIL) under the leadership of Dr. Amitabh Varshney. In this issue, we highlight the research programs of the CGVIL and the new projects funded under the NSF Information Technology Research (ITR) initiative, the NSF Research Infrastructure program, and the DARPA award to identify humans at distance.



We also report on the research progress in two major on-going projects. The first involves the research activities of the *Language and Media Processing Laboratory* (LAMP) that conducts interdisciplinary research in natural language processing, information retrieval, and document and video processing. The second relates to our involvement in the *National Partnership for Advanced Computational Infrastructure* (NPACI), led by the San Diego Supercomputer Center (SDSC). This partnership is one of the two major partnerships funded

by NSF under the Partnership for Advanced Computational Infrastructure (PACI) program, the successor to the Supercomputer Centers program.

I am quite pleased to report on our success in recruiting two outstanding faculty members jointly with the Department of Computer Science. Dr. Bill Arbaugh, who just graduated from the University of Pennsylvania, will be leading our new research programs in information security and privacy, and Dr. Amitabh Varshney, who left Stony Brook to join us as an Associate Professor, is an internationally known researcher in computer graphics and scientific visualization. In addition, Dr. Doug Oard, an Assistant Professor in the College of Information Studies, joined UMIACS last August to work with the faculty in the CLIP and HCIL labs, and Dr. Nail Gumerov joined UMIACS as a research scientist to work on the modeling and computation of acoustic fields near the human head.

I hope you will enjoy reading this issue of *Interconnections*. As always, I look forward to your comments and suggestions about any of the UMIACS programs.

Joseph JaJa

## *ITR Awards cont.*

space and time, and interacting and communicating with each other and their surroundings. An infrastructure that facilitates real-time capture, storage, processing, display, and analysis of the information generated will truly revolutionize a wide variety of application domains. This project will explore next generation database management system technology that provides effective support for information processing in highly distributed and dynamic sensor-enriched environments. The approach taken will be end-to-end, which will allow seamless access to information dispersed across a hierarchy of storage, communication, and processing units – from sensor devices, where data originates, to large data banks where the information generated is stored for analysis and mining.

*Knowledge Discovery in Historical Semistructured Data - Sudarshan S. Chawathe.* The vast majority of data used by scientists, engineers, and decision makers resides in a poorly structured collection of reports, memos, and other documents in a myriad of file formats. The increasing densities and falling prices of storage devices make it practical to store for perpetuity all such data that crosses a scientist's electronic desktop. However, current technology, which focuses on either fully structured or completely unstructured databases, cannot be effectively

adapted to extracting knowledge from a large historical semistructured database. The goal of the proposed research is to develop suitable formulations of the knowledge discovery problem for historical semistructured databases and to develop, implement, and evaluate solutions. A Personal Information History Assistant application serves as a test-bed for this research.

*Visualization and Interaction with Large Graphics Datasets over Networks - Amitabh Varshney.* This project will focus on the efficient visualization, interaction, and manipulation of large-scale graphics datasets over networks. In particular, we plan to develop techniques that will decrease latency, reduce bandwidth, and increase the interactivity for large graphics datasets over networks. The main technical vision is to build a distributed rendering system that (a) takes advantage of the respective powers of image-based and object-based rendering for visualization of large-scale graphics datasets, (b) is well-suited for visualization-assisted collaboration and interaction across limited bandwidth links, and (c) takes into account the client, server, and network resources to deliver the best overall performance including times to transfer and render a dataset. The proposed work plan also seeks to develop tools for use in synchronous and asynchronous learning environments that use three-dimensional datasets.

## Druin on Fox 5 News and in the Pittsburgh Post-Gazette

Allison Druin and Ben Bederson appeared on Fox 5 News on November 9 during a report focusing on whether computers are bad for children. Their work in the Human-Computer Interaction Laboratory was highlighted to show the positive effect of technology on kids.

Allison Druin's work with children as design partners was also featured in a June 20 article in the Pittsburgh Post-Gazette (<http://www.post-gazette.com/magazine/20000620toys3.asp>) and reprinted in a shorter version in the Montgomery Journal on June 22. The article focused on the benefits of teamwork between children and adults as they combine technology and play to create high-tech toys. "Children... will challenge an adult's ideas and push that adult to be more creative," Druin says. Referring to adults, 8 year-old Alex remarks, "You have to be patient with them, since they only know what adults know."

For more information on children as design partners, see <http://www.umiacs.umd.edu/~allisond/kidteam/>.



*The Intergenerational Design Team at work.*

## Ben Shneiderman Interviewed

In an interview in the ACM Ubiquity online magazine, Ben Shneiderman points out that in spite of some progress, there is a great need for usability in computing: "User expectations and dependency on technology have grown much faster than the quality of the user interfaces. I think that has more users being more frustrated, more of the time." Shneiderman says that such user frustration often is unnecessary if the interface is designed with diverse users in mind. Shneiderman was the founding chair of the ACM Conference of Universal Usability, CUU 2000, held November 16-17 to address usability issues.

To see the interview in its entirety, please go to <http://www.acm.org/ubiquity/>.

## Ben Bederson's Work in ComputerWorld & New Scientist

An article on Ben Bederson's work on zoomable user interfaces (ZUIs) appeared in the June 26 issue of the ComputerWorld. Another article on the same topic appeared in the August 12 issue of New Scientist, [http://www.newscientist.com/news/news\\_225135.html](http://www.newscientist.com/news/news_225135.html).

Bederson utilizes zooming technology in Jazz, a Java software development tool which may be downloaded for free from <http://www.cs.umd.edu/hcil/jazz/>.

KidPad, a children's storytelling tool, is another Jazz application which can be downloaded from <http://www.cs.umd.edu/hcil/kidpad/>.

## Jim Hendler on NPR

Jim Hendler (Computer Science and UMIACS) appeared September 12 as a guest on National Public Radio's "Tech Tuesday" with guest host Melinda Penkava to discuss the latest Artificial Intelligence developments. Other guests on the show were Jordan Pollack, computer scientist at Brandeis University and Curt Supplee, Washington Post writer and editor.

# New DARPA Funded Research on Identifying Humans at Distance

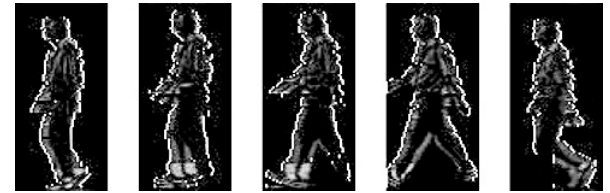
The Defense Advanced Research Projects Agency (DARPA) has awarded a multi-year research grant to computer vision researchers in UMIACS to develop algorithms for identifying humans at distances of 50 to 100 feet. The research team, led by Prof. Rama Chellappa (Electrical and Computer Engineering and UMIACS), consists of Profs. Larry Davis, Yiannis Aloimonos, Azriel Rosenfeld, research scientists and graduate students. The research goal is to develop methods for recognizing humans using facial and gait information extracted from images collected by multiple cameras. The team will be using the UMIACS Keck laboratory, which is equipped with 64 cameras, to collect data that will enable the researchers to evaluate the robustness of the algorithms to pose and illumination variations.

Planned research on face recognition will build on the team's prior work using the discriminant analysis of principal components and the recent work on feature-based verification algorithms. For recognizing moving humans from video, we will incorporate the real-time W4 tracking system developed by Prof. Davis's team in a

simultaneous tracking and Bayesian recognition/verification framework using the sequential importance sampling technique. The research on gait analysis will build on prior work on periodicity analysis of human motion using correlation masks, higher-order bispectra and continuous hidden Markov models.



*Poses in the walk cycle of a person for the contour image.*

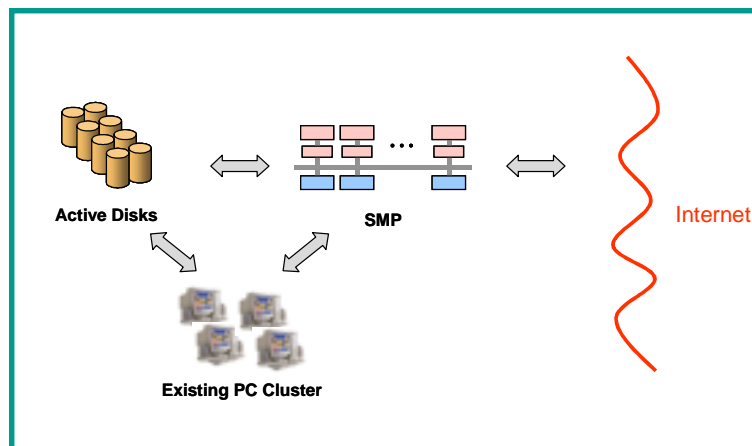


*Silhouettes of the walking person used for gait-based recognition.*

## NSF Research Infrastructure Award

A UMIACS team led by Pete Keleher (CS and UMIACS) recently received a \$860,000 Research Infrastructure Award from NSF. Research Infrastructure awards are used to buy large-scale equipment to enable new advances in the research programs of a number of faculty. In this case, the award

is to purchase a large-scale shared-memory multiprocessor (SMP), an array of "active disks" (cheap PCs with large amounts of storage), and fast (Gigabit) interconnects. This equipment will be used to support a broad program of research into system support for enterprise applications.



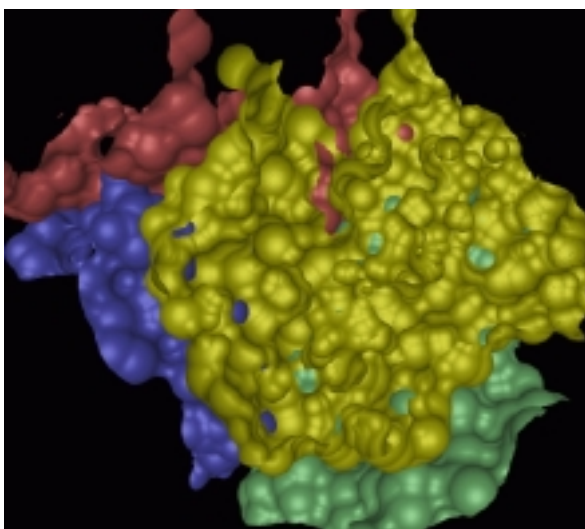
This infrastructure will enable UMIACS to establish a leading research program in the computing technologies used to support enterprise applications. These applications include database servers, file servers, multimedia servers, and "enterprise application" servers. Our research group will eventually consist of at least thirteen faculty members (the equipment will initially support 10 current faculty and approximately 35 graduate students and post-docs), including several new systems faculty to be hired over the next several years.

# Computer Graphics and Visual Informatics Laboratory Established

The Computer Graphics and Visual Informatics Laboratory has been established to support research in improving efficiency and usability of visual computing applications in science, engineering, and medicine. The laboratory will foster research in the design of algorithms and data structures for reconciling realism and interactivity for very large graphics datasets, the rapid access to distributed graphics datasets across memory and network hierarchies, and the study of the influence of heterogeneous display and rendering devices over the visual computing pipeline.

The Computer Graphics and Visual Informatics Laboratory will initially support research in visual computing technologies and tools in support of the following representative driving problems: study of biological molecules, mechanical CAD datasets, and access to distributed three-dimensional graphics datasets.

*Protein folding* and *rational drug design* are two representative Grand Challenge problems in the study of biological molecules that are hard-to-model, difficult to analyze, and computationally intensive. Virtual environments offer a powerful interaction environment for exploring such datasets in real time, enabling superior insights into the underlying biochemical processes. An important goal of such virtual environments is to provide a high bandwidth human-computer interface to convey the rich multi-dimensional information space. The recent successes in the human genome sequencing have taken us a step closer to the goal of designing novel therapeutic drugs. One of the goals of this laboratory is to develop visual informatics tools and technologies that



*Molecular Interface between Four Domains of Transthyretin Molecule.*

will give scientists deeper insights in understanding the relationships between form and function in various proteins.

The last decade has witnessed a significant research effort in visualization and interaction with mega models that arise in mechanical CAD. These models have several million primitives and have their source in digital masters of automobiles, buildings, aircraft, and submarines. Technologies for efficient visualization and interaction with such mega models that our laboratory will develop will help streamline the design process and also allow visual feedback from the mechanical, manufacturing, and maintainability simulations earlier in the design phase, thereby allowing rapid correction of any design flaws and reducing the time-to-market for new products.



*Auxiliary Machine Room of a Notional Submarine from the Electric Boat Division of General Dynamics.*

The new laboratory will also further research in developing novel rendering primitives that are well suited for *visualization-assisted collaboration and interaction across limited bandwidth links*. The goals will be to investigate techniques that allow streaming 3D transmission and resource-aware rendering.

One of the infrastructure projects being undertaken by the Laboratory includes building a wall-sized *Responsive Display* that will allow multiple users to engage in collaborative explorations of large datasets from the above applications for which conventional monitors are too small and do not offer enough resolution.

The laboratory is headed by Prof. Amitabh Varshney (Computer Science and UMIACS). For more information visit <http://www.cs.umd.edu/~varshney> or email [varshney@cs.umd.edu](mailto:varshney@cs.umd.edu).

# LAMP Laboratory

Imagine searching for news about economic developments in China and being able to retrieve relevant news stories from Chinese news services *automatically translated into English*. Now imagine expanding such search and retrieval capabilities to other media including hard copy documents, faxes and even video and having it delivered anytime and anywhere!

The Language and Media Processing Laboratory (LAMP) was established to provide an interdisciplinary environment dedicated to providing these capabilities to the Machine Translation, Information Retrieval, and Document and Video Processing communities. LAMP researchers use techniques from statistics, linguistics, and computer science to rapidly build broad coverage, semantically categorized dictionaries for use in Machine Translation and Information Retrieval systems, and to develop new translation algorithms.

In particular, work in the Laboratory has focused on:

- ◆ Translation of Chinese, Spanish, and Korean.
- ◆ Using the web to create large databases of parallel language translations that can be used to rapidly build sentence analyzers for other languages.
- ◆ Production of broad coverage dictionaries with 200k-600k entries per language.
- ◆ Coupling sentence analysis to semantic interpreters for Chinese and Chinese/English translators in order to provide high quality translations.

These technologies have also been applied to related applications in information retrieval.

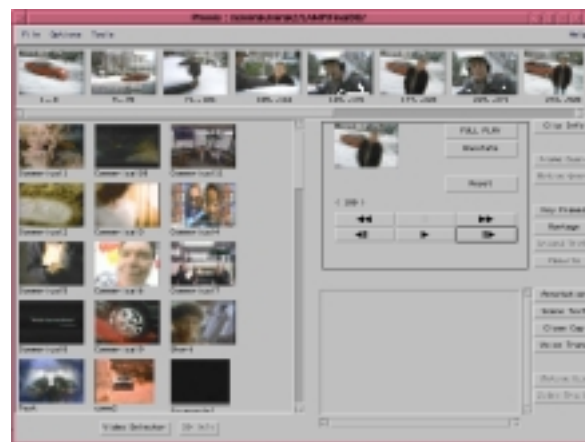
For documents that exist predominantly on paper we often require conversion (or OCR – optical character recognition) to an electronic text representation. This is important for machine translation and many other tasks. Existing packages are not adequate when we have documents which are handwritten, come from low density languages, have irregular layouts, contain mixed style and sized text, or are degraded by photocopying, faxing, or scanning. In our research, we have focused on providing technologies to perform both traditional tasks such as page segmentation, classification and conversion of low quality documents as well as more specific challenges such as enhancement and signature verification. We have also worked on developing the infrastructure for large scale testing by developing tools for dataset creation and evaluation methodologies for both segmentation and foreign language character recognition.

One focus of research is factoring in what the user will do with a document after conversion. We are studying the

effects of imperfect conversion on both monolingual and cross-lingual information retrieval and on machine translation

Our work on video analysis has focused on enabling content-based access to video collections. We have developed basic tools for the segmentation and classification of compressed video, detecting duplicates in large collections to aid in cross-language information discovery, and are working on techniques and representations for extracting higher-level program structure.

Our dependence on information access has also created the expectation that we should be able have on demand access to multimedia content. We are currently applying many of our analysis techniques to the adaptation of



The PROMIS interface is used to provide integrated results of LAMP video analysis efforts.

multimedia for transmission over low bandwidth and wireless communication links to enable multimedia access to any video “anytime, anywhere with any device”.

Members of the natural language group of the LAMP lab are led by Prof. Amy Weinberg (LAMP co-director), Prof. Bonnie Dorr, and Prof. Philip Resnik. The media processing group efforts are directed by Drs. David Doermann and Daniel DeMenthon.

For further information about our research please see <http://lamp.cfar.umd.edu> or contact any of the researchers.

# The National Partnership for Advanced Computational Infrastructure (NPACI)

The National Partnership for Advanced Computational Infrastructure (NPACI), led by the San Diego Supercomputer Center, is one of two NSF funded consortia that are building the hardware and software infrastructure supporting high-end computational science across the nation. The University of Maryland is a major partner of NPACI, contributing both as a data resource partner and as a leader in the Programming Tools and Environments (PTE), Data Intensive Computing (DICE) and Earth Systems Science (ESS) thrust areas.

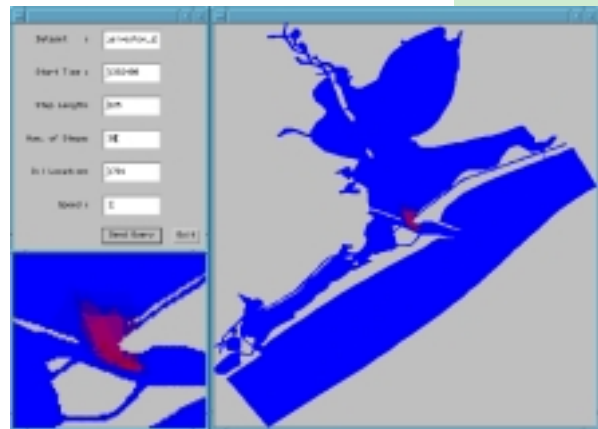
The Maryland effort, centered within UMIACS, is led by Joel Saltz and Joseph JaJa. As the leader of the PTE thrust area, Dr. Saltz is on the NPACI Executive Committee, and heads a group of researchers at several institutions developing software tools to aid in the production of high-end scientific applications. Dr. Saltz's research group is also active in the DICE thrust area, investigating software tools to aid in the storage, retrieval and processing of very large amounts (up to terabytes) of scientific data. Dr. JaJa is active in the DICE and the ESS thrust areas and also leads the Maryland effort in providing access to several terabytes of earth science data as an NPACI data partner, through the IBM High Performance Storage System hosted on an IBM SP multicomputer located in UMIACS.

The main research emphasis within the PTE and DICE areas at Maryland is on software tools to support data intensive applications. The exploration and analysis of large datasets is playing an increasingly central role in many areas of scientific research. The Active Data Repository (ADR), developed by Dr. Saltz' group, is a software system to efficiently support storage, retrieval, and processing of such large multi-dimensional scientific datasets on distributed memory parallel machines or clusters of workstations with multiple disks attached to each processor.

Additional work on tools for data intensive computing under development at Maryland concentrate on access to the vast amounts of scientific data available on archival storage systems distributed across a wide-area network, such as the Internet. Analysis of such datasets is usually performed on machines at an application scientist's local institution. Efficient storage, retrieval and processing of multiple large scientific datasets on remote archival storage systems is one of the major challenges that needs to be addressed for efficient exploration and analysis of these datasets. DataCutter is a middleware infrastructure that provides support for processing of scientific datasets

stored in archival storage systems accessible via a wide-area network. DataCutter provides a core set of services, on top of which application developers can implement more application-specific services or combine with existing wide area network services such as metadata management, resource management, and authentication services. DataCutter provides support for subsetting very large datasets through multi-dimensional range queries, and for processing such datasets efficiently in a shared distributed environment.

The ESS effort deals with the development of the software infrastructure to enable the modeling and analysis of land surface processes based on large-scale distributed, heterogeneous remotely



*Visualization of an oil spill in Galveston Bay using coupled simulation and data exploration.*

sensed data. In particular, a web-based infrastructure was set up to allow for the efficient generation of information products based on user-specification, and for integrated access, processing, and visualization of these products. Such an infrastructure is based on new tools for the automatic ingestion of data, including metadata extraction and management, and the visualization of multi-resolution data, including overlaying multiple types of imagery and applying advanced image processing algorithms. In close collaboration with researchers at SDSC, new strategies for the efficient integration of distributed large archival systems have been developed. The overall approach is currently being extended for information discovery in much richer heterogeneous environmental data, coupled with the ability to process, visualize, and fuse such data. A testbed is being set up that includes museum data, hyperspectral data, and ecological data, in addition to the various satellite data currently held at the Global Land Cover Facility (GLCF) in UMIACS. Such a testbed will be used for biodiversity and ecology studies conducted by various partners at NPACI.

## Amitabh Varshney



**A**mitabh Varshney is a new faculty member holding a joint appointment as an Associate Professor in the Department of Computer Science and UMIACS. Amitabh received a B. Tech. in Computer Science from the Indian Institute of Technology, Delhi in 1989 and a M.S. and Ph.D.

in Computer Science from the University of North Carolina at Chapel Hill in 1991 and 1994, respectively. During 1994 - 2000, he was an Assistant Professor in the Department of Computer Science at the State University of New York at Stony Brook.

Amitabh's research interests are in exploring the applications of computer graphics and visualization in science, engineering, and medicine. His work on efficient and robust computation of smooth molecular surfaces is useful in the rational drug design process through the protein folding and docking problems. He has also worked on the design and implementation of virtual walkthroughs of proposed structures, such as buildings, automobiles, and submarines. In the process he has developed new algorithms for automatically generating multiresolution object hierarchies, image-based rendering, parallel computation and simplification of radiosity meshes, and a virtual milling machine. He has also consulted and collaborated with the industry including Honda, IBM, Daimler Chrysler, General Dynamics, Periphonics, Reuters, and Interactive Simulations. Amitabh received a NSF Career Award in 1995.

Amitabh can be reached at 4407 AVW, (301)405-6761, and [varshney@cs.umd.edu](mailto:varshney@cs.umd.edu).

## Bill Arbaugh

**B**ill Arbaugh joined the Computer Science department and UMIACS after spending sixteen years with the U.S. Department of Defense - first as a commissioned officer in the Army and then as a civilian. During those years, Bill served in several leadership positions in diverse areas ranging from tactical communications to advanced research in information security and networking. In his last position, Bill served as a senior technical advisor in an office of several hundred computer scientists, engineers, and mathematicians conducting advanced networking research and engineering. Bill received a B.S. from the United States Military Academy at West Point, a M.S. in computer science from Columbia University in New York City, and a Ph.D. in computer science from the University of Pennsylvania in Philadelphia.



Bill's research interests include information systems security and privacy with a focus on embedded systems and configuration management. In his limited spare time, Bill enjoys spending time with his family and playing an occasional round of golf.

Bill's office is in AVW 4137, email [waa@cs.umd.edu](mailto:waa@cs.umd.edu).

## Doug Oard



**D**oug Oard joined UMIACS in August, 2000. He is an Assistant Professor in the College of Information Studies, where he has been on the faculty for four years since receiving his Ph.D. in Electrical Engineering from the University of Maryland. Doug's research interests focus on development of interactive

information retrieval systems, with a recent emphasis on searching foreign language collections and searching recorded speech. His work with Bonnie Dorr and Philip Resnik in the UMIACS Computational Linguistics and Information Processing (CLIP) Lab is supported by DARPA, and he is working with Ben Bederson and Allison Druin in the Human Computer Interaction Lab (HCIL) on the proposed UMIACS HCI Masters degree program. When not at Maryland, Doug can often be found flying the small plane that he keeps at the College Park Airport.

Doug's office is in 3145 AVW, tel. 301-405-5582, email [oard@glue.umd.edu](mailto:oard@glue.umd.edu).



# Nail Gumerov

**N**ail Gumerov is a new research scientist in UMIACS. He came to UMD from a private research and development company. He received his M.S. (1981) and Ph. D. (1987) from the Department of Mechanics and Mathematics of the M.V. Lomonosov Moscow University. In 1992 he received the Sc.D. degree, which is the highest scientific degree in Russia.

Since 1981 Nail held positions from Research Fellow to Principal Research Scientist in the Russian Academy of Sciences, Lecturer in the Tyumen University and Full Professor in Bashkir State University in Russia. His work was related to fluid mechanics and applied mathematics, especially to linear and nonlinear acoustics, asymptotic methods, multiphase flows, particle and bubble dynamics, mathematical modeling and scientific computing.



His research in UMIACS is related to modeling and development of efficient algorithms for computation of acoustic fields near the human head. Such modeling is important for understanding of mechanisms of human orientation in space, localization of sound sources, and generation of virtual audio reality.

Nail may be reached in AVW 3305, by phone at 301-405-8210, and by email at [gumerov@umiacs.umd.edu](mailto:gumerov@umiacs.umd.edu).

## Distinguished Lecture Series in Computational Biology, Fall 2000

**T**he newly established Center for Bioinformatics and Computational Biology in UMIACS, a joint activity involving several academic units that include Biology, Cell Biology and Molecular Genetics, Chemistry and Biochemistry, Computer Science, and Mathematics, has sponsored the following seminar series during Fall 2000:

Sept. 22, Gary Stormo, Washington University Medical School, St. Louis  
*Modeling DNA-Protein Interactions and Gene Regulation*

Oct. 11, Yun-Xin Fu, University of Texas, Houston  
*Some Computational Challenges of Population Genetics in the Post-Human Genome Era*

Oct. 20, Junhyong Kim, Yale University  
*Reconstructing the Past and Reconstructing the Cell: Geometrical Approaches to Biological Information*

Oct. 27, Graig Benham, Mount Sinai School of Medicine  
*Topologically Driven Structural Transitions in DNA: Their Mathematical Analysis and Roles in Biology*

Nov. 10, David States, Washington University Medical School, St. Louis  
*Computational Dissection of Genomic Regulatory Elements*

Nov. 17, Pavel Pevzner, University of California, San Diego  
*Combinatorial Approach to Finding Subtle Signals in DNA Sequences*

Dec. 8, David Richardson, Duke University  
*Inside Structural Genomics: Protein Packing Details to Filter and Improve 3D Data*

From past director Ben Shneiderman, Ben Bederson receives sunglasses and other paraphernalia needed to make the director job easier.

## Ben Bederson New HCIL Director

**B**en Bederson (CS and UMIACS) is the new director of the Human Computer Interaction Laboratory (HCIL). Bederson points out that the demand for HCI research and education is growing. "After decades of feature-driven development, users have come to realize that interfaces matter more than features," Bederson says. "In order to maintain our position as a



preeminent research lab, we must continue to change," he continues. Bederson's plans for the future include several new initiatives such as recruitment of new faculty and new HCI activities on campus that will ensure that HCIL continues to be a leader in the field of Human-Computer Interaction.

## Faculty News

### Vic Basili

- ◆ Invited talk: Software Process Improvement Network (SPIN) Meeting, UMBC, July, 2000.
- ◆ Invited talk: Software Measurement Implementation and Practice, A Professional Development Seminar sponsored by the Data & Analysis Center for Software (DACS), Los Alamos, New Mexico, Aug. 2000.

### Shuvra S. Bhattacharyya

- ◆ Book: S. Sriram and S. S. Bhattacharyya. *Embedded Multiprocessors: Scheduling and Synchronization*. Marcel Dekker, Inc., 2000.

### Rama Chellappa

- ◆ IEEE Signal Processing Society 2000 Technical Achievement Award.
- ◆ Editor in Chief: IEEE Transactions on Pattern Analysis and Machine Intelligence.

### Larry Davis

- ◆ Invited talk: Workshop on Real Time Vision Systems, Oulu, Finland, Aug. 2000.
- ◆ Invited talk: International Conference on Pattern Recognition, Barcelona, Spain, Sept. 2000.

### David Doermann

- ◆ Appointed to Publications & Publicity Committee of the IAPR.

### Ramani Duraiswami

- ◆ Invited talk: Fourth International Workshop on Microphone Array Systems: Theory and Practice, Harvard University, Cambridge, MA, Oct. 2000.

### Jim Hendler

- ◆ AAAI 2000 Expository Writing Award, American Association of Artificial Intelligence.
- ◆ Named Chief Scientist of DARPA's Information Systems Office.
- ◆ Invited talk: DARPATech 2000, Dallas, TX, Sep. 2000.
- ◆ Invited talk: Distinguished Speaker Series, Swiss Group on AI and Cognition, Zurich, Switzerland, Aug. 2000.
- ◆ Invited talk: American Association for Artificial Intelligence, Austin, TX, Aug. 2000.
- ◆ Keynote Speaker: National Imagery and Mapping Agency Workshop on Agent-Based Computing, McLean, VA, July 2000.

## AOL Technology Fellowship

**H**arry S. Hochheiser, doctoral student in the Department of Computer Science and graduate research assistant in UMIACS, has received a fellowship for the study of human-computer interaction from America Online, Inc. (AOL). Hochheiser's research interests include information visualization of Internet log data, computer-system usability, and the social impact of computers.



- ◆ Invited talk: Autonomous Agents, Barcelona, Spain, June 2000. [John Harty](#)

- ◆ Invited speaker. American Philosophical Association, Eastern Division Meeting, Dec. 2000.

- ◆ Book: *Agency and Deontic Logic*. Oxford University Press, 2000. [Sarit Kraus](#)

- ◆ Invited lecture: Second European Agent Systems Summer School (EASSS'00), Germany, Aug. 2000.

- ◆ Editorial board member: Artificial Intelligence Journal.
- ◆ Book: *Heterogeneous Agent Systems: Theory and Implementation*, MIT Press, Cambridge, USA, June, 2000 by V.S. Subrahmanian, P. Bonatti, J. Dix, T. Eiter, S. Kraus, F. Ozcan and R. Ross.

### Jack Minker

- ◆ Book: Minker, J. (Ed.) *Logic-Based Artificial Intelligence*, Kluwer Academic Publishers, Dec. 2000.

- ◆ Invited Lecture: Workshop on Logics for Emerging Applications of Databases, Dagstuhl Castle, Germany, July 2000.

### Dana Nau

- ◆ Invited speaker: International Summer School on AI Planning, Cyprus, Sep. 2000.

- ◆ Editorial board: Journal of Computer and Information Science in Engineering (JCISE).

### Azriel Rosenfeld

- ◆ Awarded an honorary Doctor of Humane Letters degree by his alma mater, Yeshiva University, on the occasion of the 50<sup>th</sup> anniversary of his college graduation.

### Ben Shneiderman

- ◆ Founding General Co-Chair: Conference on Universal Usability, Arlington, VA, Nov. 2000.

- ◆ Fellow of the American Association for the Advancement of Science

### V.S. Subrahmanian

- ◆ Book: *Heterogeneous Agent Systems: Theory and Implementation*, MIT Press, Cambridge, USA, June, 2000 by V.S. Subrahmanian, P. Bonatti, J. Dix, T. Eiter, S. Kraus, F. Ozcan and R. Ross.

### Amitabh Varshney

- ◆ Editorial Board Member: IEEE Transactions on Visualization and Computer Graphics.

- ◆ Editorial Board Member: International Journal of Image.

- ◆ Graphics Co-Editor: Proceedings of IEEE Visualization '00, October 2000.

### Uzi Vishkin

- ◆ Invited talk: SPIRE2000 - String Processing and Information Retrieval, Sep. 2000, A Corua, Spain.

- ◆ Editorial Board: IEEE Transactions on Computers.

### Donald Yeung

- ◆ ECE's George Corcoran Teaching Award, May 2000.

# HCIL's 17<sup>th</sup> Annual Symposium

The Human-Computer Interaction Laboratory held its 17<sup>th</sup> Annual Symposium and Open House on June 2, 2000 attended by around 200 people, several of whom also attended pre-symposium tutorials and workshops on June 1.

The event was marked by the stepping-down of Ben Shneiderman who has been the HCIL director since its inception in 1983. Shneiderman offered a retrospective of HCIL's efforts to promote user-friendly computing during the past 17 years. "We have all helped shape important technologies and made them more human-centered," Shneiderman said.

All symposium attendees were invited to a transition party in the early evening at the UMUC Inn & Conference Center.



*Ben Shneiderman was the HCIL Director for 17 years.*

## Deep Green

A workshop on the computational challenges of green plant phylogeny was held June 2 & 3, 2000, at the UMUC Inn & Conference Center. The workshop was sponsored by the Green Plant Phylogeny Research Coordination (Deep Green) Group and UMIACS and organized by Charles Delviche (Cell Biology and Molecular Genetics). Over 60 researchers attended. The workshop home page may be found at <http://www.life.umd.edu/labs/delviche/DeepGreen.html>.

## Stewart Fest

A Conference in honor of G.W. (Pete) Stewart's 60th birthday was held October 20-21, 2000 at the University of Maryland.

It celebrated his seminal contributions to numerical linear algebra research and education and his service of over 25 years at Maryland.



*Pete Stewart and Gene Golub.*

Stewart Fest was sponsored by UMIACS and the Department of Mathematics. The organizers were Robert van de Geijn, Misha Kilmer, and Xiaobai Sun, former students of Pete, assisted by Howard Elman, Dianne O'Leary, and Bob Funderlic. The conference was attended by 70 prominent researchers in the field of numerical linear algebra. The program included 15 talks and a poster session. Speakers included Jack Dongarra (University of Tennessee), Gene Golub (Stanford University), Alan Edelman (MIT), Cleve Moler (Mathworks), Charlie van Loan (Cornell), Nick Higham (Manchester), and Henk van der Vorst (Utrecht).

A banquet was held at a restaurant in Washington, D.C.'s Chinatown with Bob Funderlic (North Carolina State) as keynote speaker.

Additional information is on the conference website <http://www.cs.utexas.edu/users/rvdg/stewart2000/index.html>.

## Universal Usability



The Conference on Universal Usability, CUU2000, was held at the Hilton Arlington & Towers November 16-17, 2000. Ben Shneiderman (Computer Science and UMIACS) was the founding chair. CUU was sponsored by ACM's special Interest Group on Computer-Human-Interaction (ACM SIGCHI).

The conference goal was to bring together academic researchers, industrial developers and government practitioners to promote improved policies and better designs in information and communications technology.

CUU2000 was a great success with over 250 attendees. The organizers are already planning a second conference to be held in 18 months. For the CUU200 homepage, go to <http://www.acm.org/sigchi/cuu/>.

# Awards

May 2000 - January 2001

|  |   |
|--|---|
| J. Aloimonos   | Alternative Camera Technology – NSF   |
| R. Chellappa, J. Aloimonos,<br>L. Davis                                | Human ID – DARPA  |
| R. Chellappa   | ICMPS Workshop – DARPA  |
| R. Chellappa   | Human Tracking and Verification in Video – DARPA                                    |
| L. Davis, D. Doermann  | Activity Detection by Video Content Evaluation – NSA                                |
| D. Doermann  | Task Specific Evaluation – DARPA  |
| J. Horty   | Formal Theory of Agency Based Computing for System Evaluation – DARPA               |
| J. JaJa  | Persistent Digital Archives – NARA  |
| P. Keleher, J. Hollingsworth,<br>W. Pugh, N. Roussopoulos,<br>J. Saltz | System Support for Enterprise Application Services – NSF                            |
| D. Oard, B. Dorr, P. Resnik  | Translingual Information Access – Navy  |
| D. Perlis, D. Traum  | Handling Contradictory Data with Metareasoning – AFOSR                              |
| D. Perlis, D. Traum  | Metareasoning for More Effective Human Computer Dialogue – AFOSR                    |
| C. Plaisant, B. Bederson   | Information Visualization – Chevron   |
| P. Resnik  | Towards Smarter Statistical Translation Models – JHU                                |
| P. Resnik  | Student Research in Computational Linguistics at ACL 2000 – NSF                     |
| H. Samet   | Real-Time Capture, Management and Reconstruction<br>of Spatio-temporal Events – NSF |
| B. Shneiderman, C. Plaisant  | On-Line Survey – Westat   |
| B. Shneiderman, C. Plaisant  | Human Computer Interface Design – Census  |
| B. Shneiderman   | AOL Fellowship Support – AOL  |
| J. Townshend   | Deforestation Mapping – World Resource Institute                                    |
| J. Townshend   | Improved Algorithms - Landsat – NASA  |
| U. Vishkin, M. Franklin  | How Good Can Parallel Algorithms Really Be? – NSF                                   |
| A. Weinberg  | Fractals and Language Identification – DARPA  |
| D. Yeung, C.W. Tseng   | Uncovering and Exploiting Memory Parallels – NSF                                    |



INTERCONNECTIONS is published by the University of Maryland  
Institute for Advanced Computer Studies, UMIACS.

For additional information, visit UMIACS' web page at  
<http://www.umiacs.umd.edu> or contact

Joseph JaJa, Director  
UMIACS  
University of Maryland  
College Park, MD 20742  
301-405-6722  
[joseph@umiacs.umd.edu](mailto:joseph@umiacs.umd.edu)

