

The ICSI GAZETTE

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featured research: from scale to scans

New Research Directions at ICSI: Extreme Architecture

As a leading international research institute in computer science, ICSI is constantly improving and expanding its topics of research to keep up with the rapidly developing technology industry. In the last issue of the Gazette, we featured a new research project on genetic analysis, a timely and important issue for computer scientists and biologists alike. In this issue, we highlight Extreme Computer Architecture and a brand new method for performing research on how the brain processes information: fMRI technology.

Extreme Architecture research is being conducted by Professor Krste Asanovic of MIT, a former ICSI graduate student researcher, who is visiting ICSI during his year-long sabbatical. Along with his graduate students, who will be spending their school year visiting ICSI, Professor Asanovic is tackling several projects involving improvements to both hardware and software to make computers faster, smaller, and more energy efficient.

SCALE

The SCALE project (Software Controlled Architecture for Low Energy) is working to decrease the amount of energy necessary to run a computer. Computers are getting faster, running increasingly complex software, and requiring more energy. As a result, battery power, particularly for mobile devices, is a problem. The SCALE project is focused on improving the way software and hardware communicate, so that less energy is required to run programs.

INFINIT

The InfiNit project (Infinite Thread Machine) is improving both the speed and efficiency of computers by creating better synchronization between various processes being run on a machine. As the name suggests, the goal is to allow a massive number of threads to be run at a time. This requires improvement in the organization of the processes to increase efficiency, and waste less time when running large numbers of processes. This research has applications for artificial intelligence. AI algorithms tend to be irregular, since they attempt to map the way humans process thought. A computer capable of handling a huge number of processes simultaneously would be better equipped to process such algorithms. Eventually, these computers will form the brains of intelligent robots.



Krste Asanovic

TRANSACTORS

The TransActors project (Transactional Actors) is focused on improving chip design in such a way that the cost of developing new chips would be drastically reduced from the current cost, for something like the latest version of a video game system, of hundreds of millions of dollars per new chip design. Professor Asanovic and his group propose replacing the current model of chip design, which builds chips one gate at a time, with a new model using transactors, which are effectively equal to 100,000 gates. A complete chip design is described as a network of communicating

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as i see it by Nelson Morgan, Director

A few weeks ago I met with Michael Fourman, Chair of the University of Edinburgh's School of Informatics, and I mentioned to him that we were working on a new program with China. He replied, "Who isn't?" Add this local observation to the plethora of articles about the global importance of China, and the picture is clear: whether your focus is economic, academic, or geopolitical, it makes no sense to ignore China.

ICSI began with a Germany-Berkeley visitor program, which soon was expanded to include other European countries; currently, we have official arrangements with Germany, Switzerland, Spain, and Finland. While we have often had visitors from other countries, we have never had a formal arrangement with any Asian country. This Euro-focus was historical – it typically takes years and much work by local enthusiasts to develop such a relationship, and our roots were in the European origins of the Institute. However, the ICSI perspective has always been more open, and it now appears that there is a new opportunity. A few months ago, Associate Director Marcia Bush and I spent a week in Beijing exploring the potential for a new ICSI visitor program. Our contact there was Professor Wen Gao of the Chinese Academy of Sciences, an External Fellow of ICSI, who has been instrumental in getting a start on this idea. Professor Gao was recently described in IEEE Spectrum as one of "Ten to Watch" among China's leading technologists. With his guidance, we visited a number of academic and industrial labs, and also spoke with governmental officials about setting up a new program. As of this writing this process is still in its early stages, but we see what needs to be done in order to get it going.

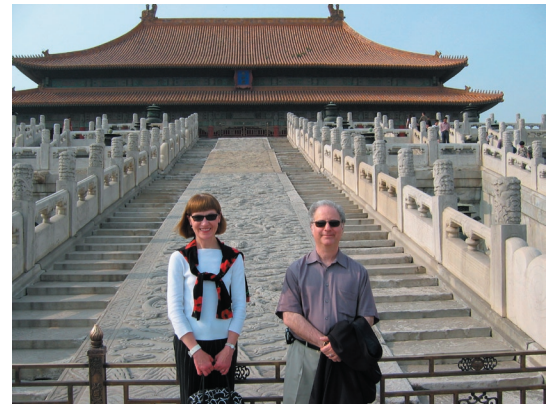


Close-up of a really Great Wall

It was our first trip to China, and given our limited time we didn't make it out of Beijing. Still, it was fascinating to me. I felt that we were visiting three places at once – the historical China of the Great Wall and the Forbidden City, the Communist China with the gigantic pictures of Chairman Mao still present, and the aggressively Capitalist China with quickly expanding companies and laboratories. I recall salespersons eagerly pushing products celebrating their ancient traditions, and rewarding me with a Chairman Mao pin when I agreed to buy... all in all it was a stimulating visit, and I look forward to deepening our contacts there.

Incidentally, the food was great.

We are also starting to discuss extending our ties to Edinburgh, where ICSI alum Steve Renals is the current head of the Center for Speech Technology Research (CSTR), which is celebrating its



Intrepid ICSI visitors Bush and Morgan in Beijing

21st birthday this year. We are already working together (along with such partners as IDIAP, DFKI, and TNO) in the European Union 6th Framework "Integrated Project" called Augmented Multiparty Interaction (AMI). AMI features a strong visitor program that complements our other programs from European countries. However, we see great opportunities for a new visitor program specifically with Scottish universities, and in particular with the University of Edinburgh. Stay tuned.

This issue of the Gazette features an interview with an outstanding alum, Domenico Ferrari. Domenico was the original second-in-command at ICSI; at the time the position was called "Deputy Director". He was instrumental in establishing an Italian visitor program, which brought us many remarkable visitors for almost a decade. He also was well-known for his prescient studies of the use of the internet for streaming media. He is a great guy and we hated to lose him, as he ultimately chose to go home to his native Italy.

This issue also features a new project headed by another great alum, Krste Asanovic. Krste did his PhD here in the '90's, and is now a tenured professor at MIT in the area of computer architecture. He was the author of the vector processing chapter in Patterson and Hennessey's classic computer architecture text and is now doing his sabbatical at ICSI.

I'd like to offer my public congratulations to ICSI Networking Group Leader Scott Shenker, who was awarded the 2006 IEEE Internet Award; recall that ICSI Networking researcher Sally Floyd won the 2005 Award. Kudos to you both!

Finally, the recent birth announcements: congratulations to ICSI's Mary Penilla on her new baby boy, born June 2nd. Around the same time, I had similar announcements in my own family – each of my three children had a child (on May 29, June 7, and June 20). Altogether a productive month.

news briefs

AUGUST 2005

An article about Richard Karp, head of the Algorithms Group, appears in the August-October 2005 issue of the French journal *Les Dossiers de la Recherche*. Author Claire Kenyon, a professor at Brown University, discusses Karp's contributions to the area of NP complete problems, the work he for which is most well known, but adds, "there are few areas in computer science where he has not made an important contribution." A second article in the journal, entitled "What is P=NP" discusses Karp's contributions to demonstrating the significance of the P=NP problem which, roughly speaking, asks whether all the combinatorial problems in a very large class called NP can be solved by efficient algorithms. One of Karp's contributions in this area was showing that 21 well-known problems are NP-complete. This implies that, if any one of them can be solved efficiently, then all the problems in NP can be solved efficiently.

JULY 2005

FrameNet Release 1.2 is now available for licensing. FrameNet is a semantically rich, machine-readable lexicon of English and a corresponding set of annotated sentences for use in advanced natural language processing (NLP) applications. FrameNet draws on more than two decades of research into the semantics of natural language by Charles Fillmore of ICSI and the University of California at Berkeley. "Professor Fillmore's theory of Frame Semantics provides a way to recognize when different words and expressions are being used to describe the same concept," said Collin Baker, FrameNet project manager. "Humans instantly understand that 'Mary sold

John that book for \$20 dollars' and 'John bought that book from Mary for \$20' are two ways of expressing the same basic idea, but to develop NLP applications like question answering and machine translation you need a formal, computational representation of this fact; that's what FrameNet provides."

JUNE 2005



Scott Shenker

Scott Shenker, head of the Networking Group and Vice President of ICSI, has been selected to receive the 2006 IEEE Internet Award, for contributions toward an understanding of resource

sharing on the Internet. This award is presented annually for exceptional contributions to the advancement of Internet technology for network architecture, mobility and/or end-use applications. Sally Floyd of the Networking Group received the 2005 award.

Clarissa, a voice-enabled procedure browser developed by NASA Ames, ICSI, UCSC and Xerox Research



CLARISSA developer Manny Rayner

Center Europe, was successfully tested for the first time on the International Space Station on June 27th by astronaut John Phillips. To the best of our knowledge, this is the first use of a spoken dialogue system in space. During the test, Phillips completed the interactive Clarissa training procedure, which exercises all the main system functionality. ICSI's Manny Rayner worked on the development of Clarissa and is thrilled that it is now working in space.

Members of ICSI's Speech Group recently participated in the Rich Transcription Spring'05 evaluation, RT-05S, sponsored by the National Institute of Standards and Technology (NIST). This annual evaluation targets the automatic processing of audio recordings from meetings, establishing benchmarks in core recognition capabilities. ICSI submitted systems for both the speech transcription task (or "Speech-to-text") and the speaker segmentation and tracking task ("Speaker Diarization"), and performed very well in both categories. The creation of these systems was a team effort in collaboration with SRI International. Official results were made publicly available by NIST at the recent MLMI'05 (Machine Learning and Multimodal Interaction) conference in Edinburgh in July.

Professor Wen Gao of the Chinese Academy of Sciences has been named ICSI's newest External Fellow. Professor Gao was recently described in IEEE Spectrum as one of "Ten to Watch" among China's leading technologists. He heads a China-led international group developing a royalty-free video standard called AVS. He will be working with us to develop China-ICSI collaborations.

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featured alum: Domenico Ferrari

Professor Domenico Ferrari may not be a familiar name to many at ICSI, but without him, it is likely that the Institute would never have made it to Berkeley. In 1985, Ferrari, then Chairman of the Computer Science division of Electrical Engineering and Computer Science at UC Berkeley, was approached by Ron Kay regarding Norbert Szyperski's idea to start an international center for computer science research in the United States. Szyperski, as the director of GMD (the German Federal Laboratory for Computer Science), had asked Mr. Kay to contact the top American computer science centers. Ferrari says, "I immediately loved the idea, and decided I would do everything I could to attract the new institute to Berkeley." He enlisted the support of his colleagues and the administration at UC Berkeley, and together they wrote a proposal to the GMD. In 1986, Berkeley was selected as the location for the future International Computer Science Institute.

More than two years (and many bureaucratic struggles) later, ICSI was founded as a joint project of UC Berkeley's EECS department and GMD. Ferrari's Networking Group became one of the cornerstones of the Institute, as it continues to be today. In addition, Dr. Jerome Feldman, ICSI's appointed Director, asked Ferrari to be Deputy Director, a position that would also involve negotiating a research agreement with Italy. He accepted the position, despite having reservations about taking on an administrative position. The opportunity to include his native country in the new international institute he had helped to inaugurate was too good to turn down. His efforts soon led to talks with Italy, followed by a 1989 visit from Professor Antonio Ruberti, Italian Minister of Universities and of Scientific and Technological Research, to discuss Italian sponsorship of the institute. The Italian program developed as a result and was one of ICSI's first international programs. Also in 1989, Ferrari formed the Tenet group at ICSI and UC Berkeley, which designed and tested two real-time protocol suites, and experimented with them on several high-speed networking testbeds. In 1990, Ferrari became ICSI's



Photo Courtesy of Domenico Ferrari

Domenico Ferrari

Vice President, a position he maintained, along with leading the Networking Group, until his return to Italy in 1995.

Domenico Ferrari and his wife had first arrived in Berkeley in 1970, intending to stay for a one-year visit to UC Berkeley. They were still in Berkeley in the mid 90's when a major economic crisis in the State of California resulted in budget cuts that forced UC Berkeley to offer a wave of early retirements. Taking advantage of the opportunity, they returned to Italy where Ferrari has continued to work in academia.

Upon arrival in Italy, he joined the Catholic University in his hometown, Piacenza, a city of 100,000 people 70 km South East of Milan (on the main spine of Italy, that connects Milan to Rome and Naples going through Bologna and Florence). Since there is no Computer Science department, he was hired by the School of Economics to set up a (small) research center called CRATOS (Center for Research on the Applications of Telematics to Organizations and Society). CRATOS was founded by Ferrari in October 1995.

At the end of 1997, Ferrari started working on an educational project intended to complement the CRATOS research program: a Master's Program in

Management in the Network Economy (MiNE), which he set up with the help of UC Berkeley's School of Information Management and Systems (SIMS), in particular Professor Hal Varian, Dean of SIMS. The formula of the MiNE Program was new: ten basic courses taught by mostly Italian instructors, twenty core courses taught mostly by American and English instructors, ending with a three month company internship, a total duration of 11 months, and English as the exclusive language. Each course, with few exceptions, consists of 15 lecture hours, all concentrated in one week, for obvious practical reasons, as the instructors include professors visiting from top universities, professionals from Silicon-Valley and similar areas, and opinion leaders. Since its inception, the MiNE Program has graduated nearly 100 students from all over the world, and has almost completed its fifth edition.

Ferrari maintains his position as the Director of the MiNE Program today, as well as the Director of CRATOS. CRATOS conducts research (supported primarily by the European Union and by the Emilia-Romagna Regional Government) in such fields as e-learning, e-health, e-government, e-logistics, and knowledge management. As a Distinguished Professor of Computer Science, he also teaches courses in General Computer Science and Electronic Payment Systems and Network Security to economics and business students.

“Domenico Ferrari may not be a familiar name to many at ICSI, but without him, it is likely that the Institute would never have made it to Berkeley.”

Ferrari's research interests continue to be focused on computer networking, including the creation, design, and analysis of communication protocols and services for real-time traffic on packet-switching, integrated-services

networks and internetworks; algorithms for multimedia communication services on integrated-services networks; the invention and design of innovative Internet services; the study of new business applications and new social applications of telematics; and the construction of tools to allow an Internet user to create and manage a virtual network for the purposes of a specific group. He has published numerous papers on these and related topics, which are listed in his bio on the CRATOS website (http://cratos.pc.unicatt.it/english_version/staff/ferrari/ferrari.htm). The success of CRATOS and the MiNE Program, as well as the ICSI Networking Group which Ferrari founded, illustrate his leadership ability and commitment to the advancement of the field of computer networking.

news briefs

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Congratulations to Mary and Martin Penilla! Their second child, a baby boy, was born on Wednesday, June 2nd at 9:30 pm. He was five pounds nine ounces at birth and nineteen inches long.



Aaron Penilla

Research on the Witty Worm by Vern Paxson, Nick Weaver, and Abhishek Kumar continued to make headlines in June. After the write-up by Robert Lemos appeared online in Security Focus in late May, the research was highlighted on CNETnews.com, ZDnet, monstersandcritics.com, New Scientist magazine and P2Pnet.net.

Following the Science write-up of color naming research by Terry Regier, Paul Kay, and Richard Cook, several publications including New Scientist magazine and The Guardian published summaries of the results of the study. ICSI's Paul Kay is known for his work on color naming, with Brent Berlin. The new study, with Terry Regier, builds on his prior research about color naming universals and shows that strong universal tendencies in color naming exist in languages of both industrialized and non-industrialized societies.

MAY 2005

The Proceedings of the National Academy of Sciences published a paper on color naming worldwide by Terry Regier, a frequent ICSI visitor; Paul Kay, a senior researcher in ICSI's AI Group; and Richard Cook, an ICSI postdoctoral researcher. On May 23, a write-up about this research appeared on Science Magazine's online daily news site, sciencenow.com, in an article called "Carving Up the Rainbow".

A paper analyzing the Witty worm by ICSI security experts Vern Paxson and Nick Weaver, along with former ICSI intern Abhishek Kumar,

was the focus of an article by Robert Lemos on Security Focus online on May 24.

A recent study co-authored by Dr. Eran Halperin of ICSI, with scientists at Perlegen and UC San Diego, was reviewed in MIT's Technology Review magazine. The project, the first of three studies featured in "From The Lab: Biotech" by Monya Baker in the June, 2005 issue, is described as a "gene map shortcut" which uses a subset of SNPs to describe human genetic variation.

Professor Dan Klein of the UC Berkeley Computer Science Faculty is ICSI's newest Faculty Associate. Professor Klein's area of expertise is natural language processing, and he will be affiliated with the Speech Group.

ICSI's speaker recognition group, a subset of the Speech Group, participated in the 2005 speaker recognition evaluation conducted by the National Institute of Standards and Technology (NIST). These evaluations are an important contribution to the calibration of technical capabilities and are of interest to researchers working on the general problem of text-independent speaker recognition worldwide. ICSI's submitted system was one of the top performers in the core test condition. The effort was led by staff scientist Nikki Mirghafori and showcased work of students Kofi Boakye, Dan Gillick, Andy Hatch, and Steve Stafford, with important contributions from SRI's Speaker Recognition team.



Nikki Mirghafori of the Speech Group

Congratulations to Dr. Barry Chen who received his Ph.D. in Electrical Engineering from UC Berkeley in May. While working toward his doctorate, Barry was also a graduate student researcher with ICSI's Speech Group. Congratulations, Dr. Chen.

Nicholas Weaver, network security expert at ICSI was quoted in an article on worm attacks on instant messaging in New Scientist. The article appears on page 26 of the May 14, 2005 issue.

APRIL 2005

Eric Fosler-Lussier has been named an ICSI External Fellow. He is a Professor in the Computer Science and Engineering department at Ohio State University. Fosler-Lussier is a former graduate student researcher and postdoctoral researcher with ICSI's Speech Group, and as an External Fellow will collaborate with ICSI on speech projects.

ICSI cybersecurity research by Vern Paxson and Nicholas Weaver of the Networking Group is featured in an article on Creative Match, a UK search engine featuring user submitted content.



Chairman Shankar Sastry

Professor Shankar Sastry, Chairman of the ICSI Board of Trustees and a Professor of Electrical Engineering and Computer Science at UC Berkeley, has been named the new director of the UC Berkeley-based Center for Information Technology Research in the Interest of Society (CITRIS).

in memorium: pedro lizcano



It is with deep regret that we announce the death of our friend and colleague, Dr. Pedro Lizcano, member of ICSI's Board of Trustees and head of ICSI's Spanish program. In addition, Pedro was Professor in the Department of Telematics Engineering, Universidad Carlos III de Madrid, Director of Telefonica R&D, Barcelona, and a member of CICYT. He is greatly missed.

featured research, cont.



AI Group Postdoc Lisa Aziz-Zadeh

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transactors, where each transactor contains input and output queues connected to other transactors and some local state. The functionality of a transactor is specified as a set of guarded atomic actions, which can modify the local state and the input and output queues. This high-level description provides sound formal semantics for verification, but can also be synthesized directly into high-quality circuits.

New Research Directions at ICSI: fMRIs Provide Evidence to Support Neural Theory of Language

fMRI

The Neural Theory of Language (NTL) project (<http://www.icsi.berkeley.edu/NTL>) is an ongoing interdisciplinary research effort at ICSI and UC Berkeley that attempts to

explain how brain functions work together to understand and learn language. NTL brings together researchers from linguistics, computer science, psychology, and neuroscience to help answer the question of how specific neural structures of the human brain shape the nature of thought and language.

NTL researchers have pioneered the building of computational models and theories of language that illustrate how language and thought are related to other neural systems, including perception, motor control, and social cognition. A fundamental hypothesis that has emerged from NTL research is the theory of “Embodied Simulation Semantics”, the proposal that much of understanding and reasoning involves mental simulation that selectively recruits neural circuits underlying perception, motor control, emotion, and social cognition.

There has been some recent physiological evidence supporting ICSI’s Neural Theory of Language (NTL). Embodied Simulation Semantics states that humans understand language by mentally simulating it. When we see or hear the words, John kicked the ball, according to

this theory, the words activate some of the same centers of the brain that are related to performing or observing the action of John kicking a ball.

Until recently, it was not possible to test this theory; however, with new fMRI (functional MRI) technology, scientists are able to observe brain function over time and actually see which centers of the brain are activated (based on blood flow to different regions of the brain during the performance of a task). ICSI researchers are among the early scientists to use this technology for research into the embodiment of language.

Lisa Aziz-Zadeh, a new postdoctoral researcher at ICSI, has been using fMRI to observe brain functions of test subjects while they listen to sentences being read. Professor Srinivas Narayanan, head of the AI Group, says, “NTL theories have always attempted to tightly couple neurally plausible computational models with experimental evidence. Lisa’s expertise in fMRI imaging techniques and in TMS takes our research to the next level in closing the model-experiment gap.” The results of the fMRI scans she performs are compared to brain activations of the same subjects while they observe actions. According to the NTL, similar areas of the brain should be activated when observing actions or hearing those actions described. So far, Aziz-Zadeh’s results are very encouraging, as there is a large overlap between the linguistic test condition and the known brain activity of subjects observing scenes.

Future experiments hopefully will show that this tendency exists for other centers of the brain, such as the region known to be active for observation of faces, known as the fusiform face area (FFA). According to NTL, the FFA should process both visual face recognition and language pertaining to faces. Thus in the current study, subjects both observe faces and listen to sentences pertaining to faces. Another ongoing experiment attempts to ascertain if abstract and metaphoric uses (such as “World Bank aid pulled Thailand out of recession”) also elicit activation of the underlying sensory-motor structures.

visiting scholars

Since its inception, ICSI has had a strong international program consisting primarily of ties with specific countries. Current formal agreements exist with Finland, Germany, Spain, and Switzerland.

FROM FINLAND

Matti Kaariainen (Algorithms)
Teemu Koponen (Algorithms)
Pauli Ristola

FROM GERMANY

Mesut Guenes (Networking)
Hans-Guenther Hirsch (Speech)
Rene Beier (Algorithms)
Thomas Schmidt (AI-FrameNet)
Jan Scheffczyk (AI-FrameNet)

FROM SPAIN

Alberto Amengual (AI)
Acenscion Gallardo (Speech)
Juan Montero (AI)
Jose Manuel Pardo (Speech)
Pedro Ruiz (Networking)
Carlos Subirats (AI)

FROM SWITZERLAND (IM2)

Michael McGreevy (Speech)
Matthias Zimmermann (Speech)

AMI (EUROPEAN UNION)

Mateu Aguilo (Speech)
Xavier Anguera (Speech)
Matthew Aylett (Speech)
Robert Eklund (Speech)
Marc Ferras (Speech)
Joe Frankel (Speech)
Frantisek Grezl (Speech)
Rosa Martinez (Speech)
Michael Pucher (Speech)

In addition, we often have visitors associated with specific research and projects.

XORP

Andrea Bittau
Bruce Simpson
Marko Zec

NETWORKING INTERNS

Christian Kreibich
Juan Caballero
Martin Casado
Scott Crosby
Qianni Deng
Halldor Gylfason
Michael Hoisie
Arthur Liao
Christopher Portka
Barath Raghavan
Runting Shi
Shuheng Zhou

NETWORKING VISITORS

Alice Cheng
Qianni Deng
Eric Friedman
Stefan Gotz
Vijay Ramachandran
Yun Shi
Jacky Wang
Klaus Wehrle
Chauncey Zheng

FRAMENET

Kyoko Ohara

EXTREME ARCHITECTURE

Krste Asanovic
Rose Liu
Heidi Pan



Mateu Aguilo



Ascenscion Gallardo



AMI Visitors Matt Aylett and Robert Eklund



Jose Manuel Pardo

publications listing

- M. ALLMAN, E. BLANTON AND V. PAXSON.** *An Architecture for Developing Behavioral History. Proceedings of Steps to Reducing Unwanted Traffic on the Internet (SRUTI), 2005.*
- J. ANG, Y. LIU AND E. SHRIBERG.** *Automatic Dialog Act Segmentation and Classification in Multiparty Meetings. 2005 IEEE International Conference on Acoustics, Speech and Signal Processing, Philadelphia, PA, 2005.*
- X. ANGUERA.** *XBIC: Real-Time Cross Probabilities measure for speaker segmentation. ICSI Technical Report TR-05-008, August 2005.*
- X. ANGUERA, C. WOOTERS, B. PESKIN AND M. AGUILO.** *Robust Speaker Segmentation for Meetings: The ICSI-SRI Spring 2005 Diarization System. Proceedings of NIST MLMI Meeting Recognition Workshop, Edinburgh, 2005.*
- H. BALAKRISHNAN, S. SHENKER AND M. WALFISH.** *Peering Peer-to-Peer Providers. International Workshop on Peer-to-Peer Systems 2005.*
- D. BERGEMANN, T. EISENBACH, J. FEIGENBAUM AND S. SHENKER.** *Flexibility as an Instrument in DRM Systems. 2005 Workshop on Economics of Information Security.*
- E. BLANTON AND M. ALLMAN.** *On the Impact of Bursting on TCP. Proceedings of the Passive and Active Measurement Workshop, Boston, MA, March 2005.*
- K.A. BOAKYE.** *Speaker Recognition in the Text-Independent Domain Using Keyword Hidden Markov Models. M.S. Thesis, University of California at Berkeley, May 2005.*
- O. CETIN.** *Language Modeling in the ICSI-SRI Spring 2005 Meeting Speech Recognition Evaluation System. ICSI Technical Report TR-05-006, 2005.*
- O. CETIN AND M. OSTENDORF.** *Multi-rate and variable-rate. 2005 IEEE International Conference on Acoustics, Speech and Signal Processing, Philadelphia, PA, 2005.*
- Y. CHAWATHE, S. RAMABHADRAN, S. RATNASAMY, A. LAMARCA, S. SHENKER AND J. HELLERSTEIN.** *A Case Study in Building Layered DHT Applications. Sigcomm 2005.*
- B.Y. CHEN.** *Learning Discriminant Narrow-Band Temporal Patterns for Automatic Recognition of Conversational Telephone Speech. Ph.D. Thesis, University of California at Berkeley, May 2005.*
- B.Y. CHEN, Q. ZHU, N. MORGAN.** *Tonotopic Multi-Layered Perceptron: A Neural Network for Learning. 2005 IEEE International Conference on Acoustics, Speech and Signal Processing, Philadelphia, PA, March 2005.*
- E. COHEN, E. HALPERIN AND H. KAPLAN.** *Performance aspects of distributed caches using TTL-based consistency. Theoretical Computer Science, 331(1):73-96, 2005.*
- S. DHARMAPURIKAR AND V. PAXSON.** *Robust TCP Reassembly in the Presence of Adversaries. Proceedings of USENIX Security Symposium 2005.*
- H. DREGER, C. KREIBICH, V. PAXSON AND R. SOMMER.** *Enhancing the Accuracy of Network-based Intrusion Detection with Host-based Context. Proceedings of Conference on Detection of Intrusions and Malware and Vulnerability Assessment (DIMVA), 2005.*
- A. FARIA AND D. GELBART.** *Efficient Pitch-based Estimation of VTLN Warp Factors. Proceedings of Eurospeech 2005.*
- M. FELDMAN, J. CHUANG, I. STOICA AND S. SHENKER.** *Hidden-Action in Multi-Hop Routing. ACM E-Commerce Conference (EC'05), June 2005.*
- M. FERRAS FONT.** *Multi-Microphone Signal Processing for Automatic Speech Recognition in Meeting Rooms. M.S. Thesis, Universitat Politècnica de Catalunya (UPC, Barcelona, Spain), July 2005.*
- R. FONSECA, S. RATNASAMY, J. ZHAO, C.T. EE, D. CULLER, S. SHENKER AND I. STOICA.** *Beacon Vector Routing: Scalable Point-to-Point Routing in Wireless Sensor networks. Networked Systems Design and Implementation 2005.*
- D. GILLYCK, S. STAFFORD, B. PESKIN.** *Speaker Detection Without Models. 2005 IEEE International Conference on Acoustics, Speech and Signal Processing, Philadelphia, PA, March 2005.*
- M. GUENES.** *CosMos - Communication Scenario and Mobility Scenario Generator. ICSI Technical Report TR-05-003, 2005.*
- E. HALPERIN AND E. HAZAN.** *Estimating Haplotype Frequencies Efficiently. Proceedings of RECOMB 2005, p. 553-568, 2005.*
- E. HALPERIN, G. KIMMEL AND R. SHAMIR.** *Tag SNP Selection in Genotype Data for Maximizing SNP Prediction Accuracy. Proceedings of the International Conference on Intelligent Systems for Molecular Biology (ISBM) 2005. Also in Bioinformatics 21: i195-i203, 2005.*
- M. HANDLEY, E. KOHLER, A. GHOSH, O. HODSON AND P. RADOSLAVOV.** *Designing Extensible IP Router Software. Networked Systems Design and Implementation 2005.*
- J.L. HARDY, C. FREDERICK, P. KAY AND J.S. WERNER.** *Color naming, lens aging and grue: What the optics of the aging eye can teach us about color language. Psychological Science 16: 321-327, 2005.*
- A.O. HATCH, B. PESKIN, A. STOLCKE.** *Improved Phonetic Speaker Recognition Using Lattice Decoding. 2005 IEEE International Conference on Acoustics, Speech and Signal Processing, Philadelphia, PA, March 2005.*
- J. HELLERSTEIN, V. PAXSON, L. PETERSON, T. ROSCOE, S. SHENKER AND D. WETHERALL.** *The Network Oracle. Bulletin of the IEEE Computer Society Technical Committee on Data Engineering, 28(1), March 2005.*
- B.A. HOCKEY AND M. RAYNER.** *Comparison of Grammar Based and Statistical Language Models Trained on the Same Data. Proceedings of the AAAI Workshop on Spoken Language Understanding, Pittsburgh, PA, July 2005.*
- M. HOLMBERG, D. GELBART, U. RAMACHER AND W. HEMMERT.** *Automatic Speech Recognition with Neural Spike Trains. Proceedings of Eurospeech, Lisbon, September 2005.*
- P. KAY.** *Color categories are not arbitrary. Cross Cultural Research, 39: 72-80, 2005.*
- P. KAY.** *Argument structure constructions and the argument-adjunct distinction. In H. Boas and R. Fried, eds. Grammatical Constructions, Amsterdam: Benjamins, pp. 71-98, 2005.*
- Y. KIM, R. GOVINDAN, B. KARP AND S. SHENKER.** *Geographic Routing Made Practical. Networked Systems Design and Implementation 2005.*

publications

- Y. LIU, E. SHRIBERG, A. STOLCKE, B. PESKIN, J. ANG, D. HILLARD, M. OSTENDORF, M. TOMALIN, P. WOODLAND AND M. HARPER.** *Structural Metadata Research in the EARS Program.* 2005 IEEE International Conference on Acoustics, Speech and Signal Processing, Philadelphia, PA, March 2005.
- Y. LIU, E. SHRIBERG, A. STOLCKE AND M. HARPER.** *Comparing HMM, Maximum Entropy and Conditional Random Fields for Disfluency Detection.* In Eurospeech 2005, Lisboa.
- Y. LIU, A. STOLCKE, E. SHRIBERG AND M. HARPER.** *Using Conditional Random Fields For Sentence Boundary Detection in Speech.* Proceedings of ACL 2005, Michigan, 2005.
- Y. LIU, A. STOLCKE, E. SHRIBERG AND M. HARPER.** *Using Conditional Random Fields For Sentence Boundary Detection in Speech.* Proceedings of ACL, Ann Arbor, MI, pp. 451-458, 2005.
- N. MORGAN, Q. ZHU, A. STOLCKE, K. SONMEZ, S. SIVADAS, T. SHINOZAKI, M. OSTENDORF, P. JAIN, H. HERMANSKY, D. ELLIS, G. DODDINGTON, B. CHEN, O. CETIN, H. BOURLARD AND M. ATHINEOS.** *Pushing the Envelope - Aside.* IEEE Signal Processing Magazine, Vol. 22 No. 5, pp. 81-88, September 2005.
- S. NARAYANAN.** *Computational Cognitive Semantics.* Proceedings of the Natural Language Understanding and Cognitive Science (NLUCS) Conference, Miami, FL, 2005.
- C. PELAEZ-MORENO, Q. ZHU, B. CHEN AND N. MORGAN.** *Automatic Data Selection for MLP-based Feature Extraction for ASR.* Proceedings of Eurospeech 2005.
- S. RATNASAMY, S. SHENKER AND S. McCANNE.** *Towards an Evolvable Internet Architecture.* Sigcomm 2005.
- M. RAYNER, N. BOUILLON, N. CHATZICHRISAFIS, B.A. HOCKEY, M. SANTAHOLMA, M. STARLANDER, H. ISAHARA, K. KANZAKI AND Y. NAKAO.** *A Methodology for Comparing Grammar-Based and Robust Approaches to Speech Understanding.* Proceedings of INTERSPEECH 2005, Lisbon, Portugal. September 2005.
- M. RAYNER, B.A. HOCKEY, N. CHATZICHRISAFIS, K. FARRELL AND J.M. RENDERS.** *A Voice-Enabled Procedure Browser for the International Space Station.* Proceedings of the 43rd Annual Meeting of the Association for Computational Linguistics (interactive poster and demo track), Ann Arbor, MI, June 2005.
- M. RAYNER, B.A. HOCKEY, J.M. RENDERS, N. CHATZICHRISAFIS AND K. FARRELL.** *Spoken Language Processing in the Clarissa Procedure Browser.* ICSI Technical Report TR-05-005, April 2005.
- T. REGIER, P. KAY AND R.S. COOK.** *Focal Colors are Universal After All.* Proceedings of the National Academy of Sciences, May 2005.
- T. REGIER, P. KAY AND R.S. COOK.** *Universal foci and varying boundaries in linguistic color categories.* In B. Barra, L. Barsalou and M. Bucciarelli, eds. Proceedings of the 27th Annual Meeting of the Cognitive Science Society, 2005.
- S. RHEA, B. GODFREY, B. KARP, J. KUBIATOWICZ, S. RATNASAMY, S. SHENKER, I. STOICA AND H. YU.** *OpenDHT: A Public DHT Service and Its Uses.* Sigcomm 2005.
- E.E. SHRIBERG.** *Spontaneous Speech: How People Really Talk and Why Engineers Should Care.* To appear in Proceedings of Eurospeech, Lisbon, 2005.
- E. SHRIBERG, L. FERRER, S. KAJAREKAR, A. VENKATARAMAN AND A. STOLCKE.** *Modeling Prosodic Feature Sequences for Speaker Recognition.* Speech Communication, 2005.
- S. SINHA AND S. NARAYANAN.** *Model-based Answer Selection.* Workshop on Textual Inference for Question Answering, American Association for Artificial Intelligence, AAAI 2005, Pittsburgh, 2005.
- S. STAFFORD.** *The Sequential GMM: A Gaussian Mixture Model Based Speaker Verification System that Captures Sequential Information.* M.S. Thesis, University of California at Berkeley, May 2005.
- J. STRIBLING, I. COUNCILL, J. LI, M. FRANS KAASHOEK, D.R. KARGER, R. MORRIS AND S. SHENKER.** *OverCite: A Cooperative Digital Research Library.* International Workshop on Peer-to-Peer Systems, 2005.
- A. STOLCKE, X. ANGUERA, K. BOAKYE, O. CETIN, F. GREZL, A. JANIN, A. MANDAL, B. PESKIN, C. WOOTERS AND J. ZHENG.** *Further Progress in Meeting Recognition: The ICSI-SRI Spring 2005 Speech-to-Text Evaluation System.* Proceedings of NIST MLMI Meeting Recognition Workshop, Edinburgh, 2005.
- L. SUBRAMANIAN, M. CAESAR, C.T. EE, M. HANDLEY, M. MAO, S. SHENKER AND I. STOICA.** *HLP: A Next-generation Interdomain Routing Protocol.* Sigcomm 2005.
- A. VENKATARAMAN, Y. LIU, E. SHRIBERG AND A. STOLCKE.** *Does Active Learning Help Automatic Dialog Act Tagging in Meeting Data?* Proceedings of Eurospeech 2005.
- M.A. WEBSTER AND P. KAY.** *Variations in color naming within and across populations.* Behavior and Brain Science, 2005.
- Q. ZHU, A. STOLCKE, B.Y. CHEN AND N. MORGAN.** *Using MLP Features in SRI's Conversational Speech Recognition System.* Proceedings of Eurospeech 2005.
- Q. ZHU, B. CHEN, F. GREZL AND N. MORGAN.** *Improved MLP Structures for Data-Driven Feature Extraction for ASR.* Proceedings of Eurospeech 2005.



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