Burger and Keckler awarded Sloans

UTCS is proud to announce that Doug Burger and Steve Keckler are both recipients of Alfred P. Sloan Research Fellowships. The fellowships will support their work in building a Tera-op microprocessor (**www.cs.utexas.edu/users/cart/trips**).

"The Sloan Research Fellowships were established in 1955 to provide support and recognition to young scientists, often in their first appointments to university faculties, who were endeavoring to set up laboratories and establish their independent research projects with little or no outside support. Financial assistance at this crucial point, even in modest amounts, often pays handsome dividends later to society. The Program Committee reviews nearly 500 nominations each year

(left – right) Steve Keckler, Doug Burger

Nell Dale tapped for Karlstrom

Dr. Nell B. Dale, Senior Lecturer and member of the UT Department of Computer Sciences since 1975, received the Association for Computing Machinery's prestigious Karl V. Karlstrom Outstanding Educator Award for "changing the study of computer programming to focus on problem solving and software engineering principles, and away from language syntax."

Always an innovator and trailblazer, Nell received her Ph.D. in Computer Sciences at The University of Texas, being one of the first three Ph.D. candidates accepted in the department's Ph.D. program. She was originator and director of the Women in Science Program at the university in the early '80s and has been a mentor to students and colleagues throughout her career. Her current research interest is in the area of computer science education as an academic discipline, having co-chaired five dissertations in the area. She has authored or co-authored 19 Computer Science textbooks, many in multiple editions. Although currently retired from full-time teaching, she continues to write textbooks.

Intel donates advanced networking equipment

(left – right) Rob Ibieta, Intel University Program Manager; Harrick Vin, UTCS Associate Professor; and Raj Yavatkar, Intel Senior Software Architect.

On November 6, 2001, Intel and UTCS officially launched their Intel Internet Exchange Architecture (IXA) Lab with a donation of some of Intel's most advanced PC and networking equipment. The donation will equip the university with a state-of-the-art facility to enable research and course development on Intel's family of IXP(R) network processors. Students and faculty will be able to access a computer network that can be configured to execute a large variety of communication and networking functions. "The fascinating aspect of network processors," states Dr. **Raj Yavatkar**, senior software architect for Intel's network processor division, "is the fact that based on the software that is developed for them, these devices can perform very different tasks." Visit **www.cs.utexas.edu/lasr** for more information.

New Research Lecture Series

(left – right) Jayadev Misra and E. Allen Emerson

The department held its the first annual Visions of Computer Sciences Research Lecture on Friday, January 25, 2002. A different research project will be spotlighted each year. Two of our distinguished professors, E. Allen Emerson and Jayadev Misra, presented their visions of how formal methods will affect other areas of Computer Science.

The Case Against a Grand Unification Theory
by Jayadev Misra

Great challenges exist in developing and teaching the principles of software design. General theories for software design are too weak to be of value to the practitioners. Specialized theories that are developed for specific domains should play a central role, along with the structuring principles that bind the theories together.

Jayadev Misra, Schlumberger Chair in Computer Sciences

Jayadev Misra's research interests are in the areas of distributed computing and foundations of programming theory. His primary focus, at present, is applying formal methods in practice, particularly in the specifications and designs of synchronous and asynchronous systems. Dr. Misra is a Fellow of the IEEE and ACM. He was a Guggenheim Fellow during 1989.

Models: Moore and More
by E. Allen Emerson

As computers become ubiquitous, methods for ensuring correct program behavior become increasingly important. Classic manual proof-theoretic techniques have been studied for three decades, the extraordinary mathematical demands placed on programmers hinder their practical applicability. For two decades, I have been developing an alternative, automated model-theoretic approach to program reasoning. One manifestation is model checking, a fully algorithmic method for checking that a finite model of a program meets a temporal logic specification. An obvious criticism is the state explosion problem; but, surprisingly, this has turned out to be much less severe in practice than expected.

E. Allen Emerson, Endowed Professor in Computer Sciences

E. Allen Emerson's research interests center around formal methods for establishing program correctness. He is co-recipient of the ACM Kanellakis Theory and Practice Award for the invention of symbolic model checking. He also serves as an editor for leading formal methods journals including ACM *Transactions on Computational Logic*, *Formal Aspects of Computing*, and *Formal Methods in Systems Design*.

Focus on research

Large-Scale Phylogenetic Analysis

The goal of phylogenetic analysis is to reconstruct the evolutionary history of different taxa (e.g., species, genera). Recent advances in molecular biology and genomics have provided biologists with molecular data at an unprecedented rate and scale. New approaches are necessary because the most accurate analyses are obtained through solving (or attempting to solve) NP-hard optimization problems. Furthermore, any such analysis can return hundreds or thousands of trees. Finally, some taxa evolve down networks rather than down trees. Our research uses discrete algorithms, graph theory, probability theory, and experimental performance analyses. Below we describe just three of several ongoing projects in the group.
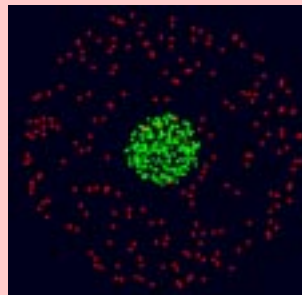
1. Genome Rearrangement Phylogeny:

Whole genomes evolve via events, such as inversions, transpositions, deletions, and duplications, that change the order and content of genes within genomes. Such events are relatively rare, compared to nucleotide substitutions, and thus contain significantly stronger phylogenetic "signal". O u r group works on developing new methods for reconstructing phylogenies on whole genomes. The software suite GRAPPA, a result of collaboration with Bernard Moret and David Bader at the University of New Mexico, is several orders of magnitude faster than the previous best software for this kind of problem.

Genome rearrangement phylogeny for the 13-taxa Campanulaceae cpDNA dataset. Restriction maps for Trachelium (upper left). Strict consensus of the 216 most parsimonious trees (right). Visualization of the 216 most parsimonious trees in the central core of dots; the outer dots represent random trees (lower left).

2. Absolute Fast Converging Methods:

Statisticians are interested in the sequence lengths needed by methods to reconstruct trees under Markov models of evolution. Our new "absolute fast converging methods" are methods that recover the true tree from polynomial lengths. Our experimental performance analyses show that our new methods greatly out perform other polynomial time methods with respect to topological accuracy, especially on big trees.

3. Visualization and Clustering of Sets of Phylogenetic Trees:

When a phylogenetic analysis of a dataset produces thousands of equally good trees, biologists summarize the information in the analysis with a consensus tree. We replace the traditional one-consensus approach with multi-consensus methods using clustering of trees, and develop tools for visualizing the distributions of trees in tree space.

Faculty

Computer Science
Tandy Warnow
Nina Amenta
Bernard Moret (U. New Mexico)
David Bader (U. New Mexico)
Katherine St. John (CUNY)
Tamara Munzner (Compaq)

Biology
Robert Jansen
Randy Linder
Linda Raubeson (Central Wash. U)

http://www.cs.utexas.edu/users/phylo

Turing Scholars in Computer Sciences

In fall 2002 the Department of Computer Sciences will launch the Turing Scholars Honors Program with an inaugural class of 40 incoming freshman. This comprehensive program is designed to challenge our top undergraduate students by giving them an intensive, accelerated curriculum that
- begins with a newly designed freshman sequence,
- includes special courses on functional programming and CS research, and
- continues with special honors sections of popular upper-division courses.

This program anticipates training future leaders of academia and industry by getting these students involved in individualized research projects as early as their junior year.

Interested high school seniors are encouraged to apply for entrance into the program.

Please visit the homepage at **www.cs.utexas.edu/honors** for more information.

Turing Scholars Program
The University of Texas at Austin
Department of Computer Sciences
Taylor Hall 2.124 Austin, TX 78712
honors@cs.utexas.edu

UTCS holds annual open house

"It is our pleasure to welcome you to the 2002 Department of Computer Sciences Faculty/Graduate Student Open House." And so it began—the department's annual open house for prospective graduate students. A forum for everyone—faculty, graduate students, and visitors—to learn about the new knowledge being created by UTCS faculty and advanced graduate students.

Twelve invited guests attended the open house; nine accepted admission to UTCS. Among the universities represented were Brown, BYU, CMU, Cornell, Harvard, Harvey Mudd, Michigan, and Rice.

Prospective graduate students were able to schedule meetings with faculty on Friday afternoon and, of course, attend the ever popular *rap session* where prospective graduate students and current graduate students meet to discuss what it's *really* like to be a UTCS graduate student—no faculty or staff allowed.

On Saturday, UTCS graduate students provided guided tours and other activities to give invited guests a taste of Austin—a wonderful place to live.

The department wishes to thank **IBM** and **Schumberger** for their generous support of this event.

Lorenzo Alvisi, UTCS Associate Professor, talks with one of the guests at the open house held on March 22 – 23, 2002.

New graduate students plunge into research

One of the department's goals is to involve new graduate students in research much earlier in their academic career. On May 3, 2002, the department hosted a poster session in Taylor 3.128 to showcase the results of the students' research labors. The first-year graduate students displayed posters and were available to discuss their research with guests. Faculty and graduate students voted on "Best Poster." The winners were presented with a certificate and an honorarium. (left – right) Rezaul Chowhury, Honorable Mention; Subramanyam Mallela, 1st Place; Nitya Ranganathan, 2nd Place; Serita Van Groningen, Honorable Mention; and Paolo Ferraris, Honorable Mention. Professor Vijaya Ramachandran was chairman of the event.

Nell has been active in the ACM's Special Interest Group (SIG) on Computer Science Education, serving as board member, vice-chair, and chair. In 1990 and 2000, she served as general chair and general co-chair respectively of the SIGCSE Technical Symposium. In 1996, she received the prestigious SIGCSE Award for Outstanding Contributions to Computer Science Education, and gave the keynote address at the ACM/SIGCSE Technical Symposium in Philadelphia. This award, presented annually, recognizes distinguished contributions to the field of Computer Science education throughout a career. Edsger W. Dijkstra, UTCS; and David Gries are also past winners.

John R. White, Executive Director and CEO of ACM, stated "Professor Dale has improved the lives of many women by retraining them for successful careers in Computer Science." The awards committee noted that her textbooks are now the standard models for Computer Science textbooks at universities and colleges nationwide. The committee also praised Nell for organizing courses that have prepared and developed high school and post-secondary educators. Nell is the first woman to receive the award.

to arrive at a final selection of 104 Fellows." (http://www.sloan.org/programs/fellowship_brochure.shtml)

Doug Burger earned his Ph.D. in 1998 from the University of Wisconsin at Madison. His research interests are computer architecture, microprocessor and VLSI design, memory systems, high-performance microarchitectures, and application-specific embedded systems.

Steve Keckler earned his Ph.D. in 1998 from MIT. Steve's research interests are computer architecture, microprocessor and VLSI design, parallel computing, instruction-level parallelism, and embedded systems.

News Briefs

Faculty and Students

Doug Burger was awarded the 2002 Texas Excellence Teaching Award for the College of Natural Sciences.

Doug Burger and **Steve Keckler** were both awarded 2001 College of Natural Sciences Teaching Excellence Awards. The awards recognize the college's many exceptional faculty. Each awardee receives a $500 honorarium. Past UTCS recipients are **Gordon Novak**, **Vicki Almstrum**, and **Vladimir Lifschitz**.

Doug Burger, Steve Keckler, **Karu Sankaralingam**, and **Ramdas Nagarajan** won the UT Co-op Best Research Paper Award for 2002.

Mike Dahlin received a 2002 **IBM** Faculty Partnership Award in support of his research on wide-area-network data replication.

Edsger W. Dijkstra was awarded a 2002 Integration of Computers and Communications (C&C) Prize for his pioneering contributions to the establishment of the scientific basis for computer software through creative research in basic software theory, algorithm theory, structured programming, and semaphores.

UTCS received a $91,000 equipment donation from **Intel Corporation** which will be used to support the proposed instructional lab, the Real-time Systems Lab, and the Robotics Lab.

Benjamin Kuipers was appointed a guest professor at the University of Science and Technology of China, Hefei, China. Visit USTC's homepage at **www.uestc.edu.cn/e-ver/index.php** for more information on USTC.

Risto Miikkulainen and **Jim Bednar** received a grant from the **National Institutes of Health** to develop Computational Modeling of Cortical Maps," In addition to the basic research component, the goal is to develop a general software tool for simulating cortical maps, made available to the research community.

J Strother Moore received a $25,000 donation from **Rockwell Collins** in support of the ACL2 Projects Lab.

Intel Foundation awarded **Hrishikesh Murukkathampoondi** (ECE) a 2002 – 03 Ph.D. fellowship in the amount of $30,330.00. Steve Keckler is his Ph.D. supervising professor.

Gordon Novak, Jr., was a finalist for the Friar Centennial Teaching Fellowship. This fellowship was established by the UT Board of Regents on August 12, 1983. The first award was given during the 1987 – 88 academic year.

Yale Patt was awarded the 2002 Texas Excellence Teaching Award for the College of Engineering; the 2000 – 01 Outstanding Lecturer of the Year, ACM Distinguished Lecturer Program; and the 2001 Eyes of Texas Award for excellence in service to The University of Texas at Austin.

Seth Pettie won the Best Student Paper Award at the International Colloquium on Automata, Languages and Programming (ICALP 2002) held at Malaga, Spain. The title of his paper was "A Faster All-pairs Shortest Path Algorithm for Real-weighted Sparse Graphs." His Ph.D. advisor is Vijaya Ramachandran.

Jasleen Kaur Sahni, a UTCS LASR doctoral candidate, was awarded the UTCS J.C. Browne Graduate Fellowship in recognition of her outstanding academic achievement. The fund-drive for this fellowship was inaugurated in conjunction with the symposium honoring James C. Browne in January 2000. Jasleen's award was the first presentation of this fellowship. Her Ph.D. advisor is Harrick Vin.

Kenneth Stanley and **Risto Miikkulainen** won a Best Paper Award at the Genetic and Evolutionary Computation Conference (GECCO-02) for their paper "Efficient Reinforcement Learning through Evolving Neural Network Topologies."

Harrick Vin received an **Intel Corporation** equipment donation valued at $99,000 in support of the Intel Internet Exchange Architecture Curriculum Lab.

Outstanding TAs

All of our teaching assistants are outstanding. They work long hours for little pay. Each year the department honors the "best of the best" UTCS teaching assistants. Based on faculty recommendations, the stars last year were **Tal Tversky**, Outstanding Teaching Assistant; **Jeffrey Michael Napper**, T.A. Service Commendation; and **Mikahil Y. Bilenko**, T.A. Service Commendation. A plaque and honorarium were presented at the annual UTCS Staff and T.A. Recognition Reception that was held on December 13, 2001.

Staff

UT recognizes service

UT celebrated its 41st Annual Staff Recognition Program on May 1, 2002, at the Frank C. Erwin, Jr., Special Events Center. The reception honored employees with 10 years or more of service at UT as well as employees who were recipients of the President's Excellence Awards. UTCS staff honored were: **Dianne M. Driskell** (15 yrs.), **Katherine Utz** (10 yrs.), and

Agnes C. Yu (10 yrs.).

Naivar recognized for staff excellence

Gem Naivar received the 2001 UTCS Staff Excellence Award. Gem was recognized at the annual UTCS Staff and T.A. Recognition Reception on December 13, 2001. Gem joined UTCS as a workstudy in 1990. She left the department and rejoined it as a Senior Office Assistant in the main office in 1995. In September of 1998, she moved to the UTCS Accounting Office as an Accounting Clerk II and was promoted in January 2000 to Accounting Clerk III. She became an Administrative Assistant for Doug Burger, Steve Keckler, Calvin Lin, and Tandy Warnow in June 2000. She currently works with Doug, Steve, Calvin, and Kathryn McKinley. Gem enjoys reading and gardening, and spending time with her son, Caleb, and her husband, Chris.

Arrivals

Yadi Chujachi, Administrative Associate, Undergraduate Office
Stephanie Shaffer, Program Coordinator, External Affairs

Promotions

Barbara Heine, Procurement Officer, Facilities

Departures

Norma Anderson, Administrative Assistant, External Affairs
Rusty Cloyes, Administrative Associate, Undergraduate Office
Colleen Morgan, Procurement Officer, Facilities
Steve Thomas, Program Coordinator, External Affairs

Alumni

Sabine Bildstein (B.S. '00) was first female overall in the Danskin Triathlon Series, June 2002, Austin, Texas. (750ms/20Kb/5Kr). Visit **www.geocities.com/sbbildstein/ AthleticResume062002.html** for more information on Sabine's outstanding athletic accomplishments.

Congratulations to **Albert Cheng** (Ph.D. '90) on the release of his new textbook *Real-Time Systems: Scheduling, Analysis, and Verification* (John Wiley & Sons), 2002. His Ph.D. supervising professors were J.C. Browne and Aloysius Mok.

Carlos Pacheco (B.S. '01) was awarded a Paul & Daisy Soros Fellowship for New Americans. Fellows receive a $20,000 maintenance stipend plus half tuition for up to two years of graduate study at any institution of higher learning in the United States.

Geoffrey G. Xie (Ph.D. '96), Assistant Professor of Computer Science at the Naval Postgraduate School, Monterrey, California, has been promoted to Associate Professor. Simon Lam was his Ph.D. supervisor.

Alums!

We would love to hear from our alumni about what you are doing. If you have access to e-mail, send a message to *news@alumni.cs.utexas.edu* with your updates. If you don't have access to e-mail, please send your updates to the address listed below.

Publications Office
Department of Computer Sciences
Taylor Hall, Room 2.124
The University of Texas at Austin
Austin, TX 78712-1188

If you are a UT-CS graduate and would like to have your web homepage or your e-mail address included on the UT-CS web homepage, send e-mail to: *accounts@alumni.cs.utexas.edu* and include your name, degree, year of graduation, and URL (no URL needed for e-mail).

The UTCS newsletter uses address labels from the Texas Exes alumni association. The alumni association will change your address by telephone (512-471-3819 or 1-800-369-0023) or visit their web page at **http://www.utexas.edu/friends/.**

If you also wish to change your address with the Registrar's Office, (1) send their office a letter with your SS# and signature on it, or (2) if you had an electronic student ID, you may change your address on the web. The URL is listed below.

Office of the Registrar
The University of Texas at Austin
Austin, Texas 78712
ATTN: Records
(512) 471-7701
http://www.utexas.edu/student/registrar/rose/

L⊚⊚K

The University of Texas at Austin is included as one of 21 "best buys" among public colleges and universities in the 2003 "Fiske Guide to Colleges." The guide coupled the quality of an institution's academic offerings with the cost of attendance to compile its list of best buys among public and private colleges and universities. Twenty-two private institutions were included on the list. Visit **http:// www.utexas.edu/news/** for more UT news.

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- Have access to leading research by outstanding faculty and advanced graduate students.
- Be invited to the **Honors Reception** and **Open House**.

Your annual membership dues will support the department in many ways, including scholarships and fellowships for students, travel support, start-up equipment for new faculty, and annual assemblies for students, faculty, and guests.

For more information contact:
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