

▼ from the chair

Ignatios Vakalis

## Building on success

It is with great pleasure and gratitude that I have recently accepted the position of chair of the Computer Science Department. Please permit me to introduce myself: I am **Ignatios Vakalis**,

born on the beautiful island of Lesvos, Greece (and still do not understand the expression: "It sounds Greek to me"). My educational background spans the fields of physics, computer science, and mathematics with a specialization in high-performance computing and computational science.

For the last 13 years, I have been teaching computer science and applied mathematics at Capital University in Columbus, Ohio. There, I was involved with the development of an

undergraduate curriculum in computational science with funding success through multiple grants from the National Science Foundation and the W.M. Keck Foundation.

During the 2005-2006 academic year, I served as a fellow at the Ohio Supercomputer  
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We welcome your news and photos. Please contact  
Cindy Bitto at (805) 756-7229 or [cbitto@csc.calpoly.edu](mailto:cbitto@csc.calpoly.edu)



▲ Capstone Project members try out their iPods from Intuit (from left): Professor David Janzen, Jean Francois Desjean Gauthier (CPE), Stephen McDaniel (CSC), Keian Christopher (SE), Jeff Holliday (SE) and Kenny Ray (SE).

Barely a year passed between the time **Jordan Small** graduated with a master's degree in computer science and when he returned to represent Intuit as this year's Software Engineering Capstone Project customer. Jordan and Intuit recognized the value of the hands-on approach and decided to take an active role in educating the next generation of software engineers by partnering with Cal Poly.

Since its infancy, the software engineering undergraduate program has exemplified the Cal Poly experience. Advanced undergraduate students engage in an actual project for a real customer in a three-quarter (nine-month) sequence labeled the Software Engineering Capstone Project.

"Intuit brings a tremendous amount of excitement and commitment to this project," says Professor **David Janzen**, who is teaching the course in his first year as a Cal Poly faculty member. Intuit is providing weekly contact to students and plans to participate in code reviews, usability studies, and even provide guest lecturers. "Partnerships like this are part of what makes Cal Poly special and what attracted me to come here," says Janzen.

## Teaming up with the Experts

Intuit partners with CSC on Software Engineering Capstone Project

Students worked in teams during fall quarter to elicit and document requirements and propose an initial software architecture. This quarter, they are focusing on software construction, and in the spring they will conclude with software deployment and maintenance.

The Capstone Project has served as an ideal setting for conducting empirical software engineering experiments and has resulted in a number of scholarly publications. Janzen intends to continue this tradition with his current research on test-driven development.

"We see this as a win-win-win situation," says software engineering professor **Clark Turner**. "It's good for the students, good for Intuit, and good for the faculty."

## Success ▼ from page 1

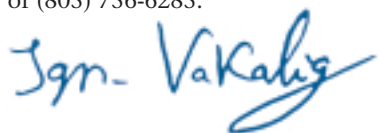
Center and worked with the Ohio Board of Regents to propagate computational science in the state of Ohio.

One of my passions is teaching. I have the chance to interact with very inquisitive students in the Theory of Computation course that I am currently teaching, and I am thrilled with the opportunity to teach a course that combines mathematical rigor and theoretical concepts in computing. These subjects are a challenge, one that I love pursuing.

Some of our initiatives for this year and the near future include:

- Development of the interactive entertainment/gaming curriculum that will create a new emphasis within our course offerings;
- Creation of a comprehensive plan for increasing the diversity of students in the department to attract more women and minorities in computing;
- Publicizing to prospective and current students the exciting opportunities that our discipline can offer because computing is becoming the fabric (not just the tool) for all science and engineering fields;
- Development of curriculum with an emphasis in computational science and simulation that can serve as a model for the CSU system;
- Increasing the funds for student scholarships;
- Creating a colloquium series with speakers of national caliber;
- Developing stronger relationships with our alumni;
- Developing new contacts and expanding our current relationships with industry for mutually beneficial projects.

I am very excited to have the opportunity and honor to join a department with rigorous and cutting edge programs, great colleagues, students, staff, and dedicated alumni. I am looking forward to meeting each and every one of you and hearing your ideas. So please stop by so we can chat or contact me at [ivakalis@calpoly.edu](mailto:ivakalis@calpoly.edu) or (805) 756-6285.



**Ignatios Vakalis** ▲ Department Chair

## IMPROVING OUR GAME

### Students, industry to benefit from game development curriculum expansion

By Zoë J. Wood  
Assistant Professor

In order to address the growing demand for technical skills and depth, and to continue to attract the best and brightest students, Cal Poly's Computer Science Department is developing curriculum related to game development.

Cal Poly's "learn-by-doing" philosophy, as exemplified by the Computer Science Department, enables its graduates to immediately contribute to industry projects. We aim to continue our tradition of "hands-on" education in the design of this new program. Currently, our computer science program offers students a number of the essential courses in game development. In addition, we are developing a curriculum tailored for those students interested in game development as a profession.

Our current curriculum focuses on interactive entertainment application

design and implementation that requires state-of-the-art knowledge of distributed computing, graphics, artificial intelligence, human computer interaction, math, and networks. Additionally, the ability to collaborate with multiple disciplines in content generation is paramount. Our goal is to provide a focused, interdisciplinary program to facilitate the creation of socially responsible, interactive entertainment technology. We plan to provide specific advantages over a traditional computer science education, including:

- Building student communication skills to effectively collaborate with multiple disciplines;
- Providing real-world, relevant applications of computer science technologies to motivate the enrollment and retention of computer science students, especially women;
- Addressing a national need for computer scientists.

Our curriculum goals include three phases:

- **Phase I:** Identify and advertise courses in the current Cal Poly course offerings that would be useful for students interested in game development;
- **Phase II:** Augment the current computer science courses with a handful of courses targeted towards educating students about game development;
- **Phase III:** Work with our industrial advisory board to further design a program that is strongly rooted in computer science but which offers, in addition to the traditional computer science education, a program that is tailored towards educating students about game development.

The current Interactive Entertainment Curriculum Development Committee is composed of myself and professors **Michael Haungs** and **Aaron Keen**. This curriculum work is generously supported by the **Gary Bloom** grant. For more information, please visit [www.csc.calpoly.edu/~gamedev](http://www.csc.calpoly.edu/~gamedev).



◀ Computer-generated artwork by Eric Firestone, a student in Assistant Professor Zoë Wood's game development class



In fall 2006, 52 computer science, software engineering and computer engineering majors enrolled in CSC 100, "Computer Science Orientation," a course that introduces students to the computer science major and to computer programming.

Each week, CSC 100 students were introduced to computer science applications and topics related to programming during a one-hour lecture and demonstrations presented by Professor **Lew Hitchner**. Following the lecture, students spent an hour "learning by doing" in a hands-on lab, experimenting with an application of the topics presented in lecture.

Most weeks, there were homework assignments that required use of the concepts learned in lecture and lab. The course syllabus, lecture topics, lab exercises, and homework problems are available on the course Web page at <http://www.csc.calpoly.edu/~hitchner/CSC100>.

CSC 100 students learned about and used a variety of software development environments, including Alice, Python – LEGO computer language – MATLAB, MySQL, and Turtle graphics (in Python).

The Week Six lecture and lab exercise, planned and presented by Professor **Diana Franklin**, was about computer architecture. The exercise required students to "execute a program" by playing the role of a computer that executes the LEGO computer language. Franklin adapted the idea after reading an article on using LEGOs to teaching language concepts<sup>1</sup>.

The students worked in teams of three to five students. Each team was given one of two different LEGO computer "programs," a bag of LEGO blocks, and a page with a printed two-dimensional grid. The "program" consisted of LEGO computer instructions with an "opcode" that specified color, shape, and size of a block to choose from the bag, and an "address" that specified the position at which to place the block on the grid. Grid positions were given as base four numbers. (Number bases had been studied in a previous lecture.)



▲ LEGOs serve as a useful tool in a computer architecture exercise for for CSC 100 students (from left): Zareen Rydhan, Bo Katzakian and Allen Dunlea.

## Serious play

### LEGO® lesson introduces students to CSC basics

A block that overlapped a previous block was locked on top of the other block, so that the program's "output result" was a 3D shape. A more complete explanation of the CSC 100 exercise, the research paper on which it was based, and a collection of photos is available online at <http://www.csc.calpoly.edu/~hitchner/CSC100/LEGOLab/index.html>.



Links to aforementioned programs are:

- <http://www.alice.org>
- <http://www.python.org>
- <http://www.csc.calpoly.edu/~hitchner/CSC100/LEGOLab/p19-hood.pdf>
- <http://www.mathworks.com>
- <http://www.mysql.org>
- <http://www.python.org/doc/2.4/lib/module-turtle.html>



<sup>1</sup>Cynthia S. Hood and Dennis J. Hood, "Teaching programming and language concepts using LEGOs." Published at the SIGCSE conference on Innovation and Technology in Computer Science Education, June 2005.

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**T**he Computer Science Department extends a heartfelt thanks to the following contributors for their generous support.

Your contributions make a significant difference to us! **One hundred percent** of this money goes to the department and is used to benefit both students and faculty professional development. With these contributions, we continue to keep our focus on the future.

Every effort has been made to ensure the accuracy of this listing of contributors who made donations between July 1, 2004 and July 1, 2006. Regrettably, mistakes do sometimes occur. If you find an error, please call the Computer Science Department at (805) 756-2824.

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## Success is real in 'fantasy land' for CSC alumnus

**J**im Berney (MS CSC '94) was nominated for an Academy Award in 2006 for his work as visual effects supervisor for the film, "The Chronicles of Narnia: The Lion, the Witch, and the Wardrobe." Such recognition by the Motion Picture Academy exemplifies the CSC alum's caliber of work in a very competitive industry.

Berney has worked at Sony Pictures Imageworks for over 11 years, early on as computer graphics (CG) supervisor on "Starship Troopers," "Stuart Little" and "Hollow Man" – all Oscar nominees for best visual effects in 1997, 1999 and 2000, respectively.

### ▲ "Stuart Little"

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► Jim Berney (right) and CSC Professor Chris Buckalew



He also organized and conducted a SIGGRAPH (ACM Special Interest Group for Graphics) conference course about the visual effects used in "Stuart Little."

Subsequently, Berney served as visual effects supervisor for two of the "Matrix" films, "The Lord of the Rings: The Two Towers" and "Harry Potter and the Sorcerer's Stone."

Current computer science students at Cal Poly reap the rewards of Berney's expertise when he visits their animation classes to share his experiences and discuss the variety of visual effects practiced in the movie industry.

"Only in computer graphics work can you destroy Los Angeles in one week and cut out mouse clothes the next week!" he says, referring to visual effects work in the movies "Godzilla" and "Stuart Little."

Berney visited Cal Poly last April to receive the College of Engineering Professional Achievement Award. His wife, Shelby, the couple's two boys, his parents and his father-in-law accompanied the honoree to the special event.



*Hey, CSC alums – we like hearing from you. Your professional experiences are a great source of inspiration for our current students. Send your career news and photos to Cindy Bitto at [cbitto@csc.calpoly.edu](mailto:cbitto@csc.calpoly.edu). And if you're ever back in town, be sure to look up your favorite professor and say hi!*





▲ Gigi Choy (left) and Rachelle Hom presented posters and spoke at the 2006 Spring Internet2 Member Meeting.

## THE VALUES OF A Neterternship

Students find experience rich with collaboration and contacts worldwide

By Gigi Choy (CSC '06) and Rachelle Hom (CSC '06)

In September 2005, we teamed up with two other students in the Computer Science Department, Jimson Xu and Seth Marinello. Under the supervision of Professor Franz Kurfess, we became the first Internet2 Neterternship team at Cal Poly.

The Neterternship required us to collaborate virtually with an Internet2 contact in Michigan to solve a problem identified by the Internet2 community. Our task was to create a bulk file transfer application for high performance networks that would increase data transfer rates and be easy to use for novices.

Over the next six months, our team worked closely with various contacts from Internet2 and other networking professionals around the country to design and develop our application. As participants in the Neterternship program, we were able to leverage Internet2 technology to remotely collaborate with others.

At the end of winter quarter, we successfully completed research on a backend for our application that increased data transfer rates over typical file transfer protocols by almost 2000 percent. We were also able to develop a user-centered graphical user interface for the application.

On the advice of our Internet2 contact, we submitted proposals to present posters

showcasing our work at the Spring Internet2 Member Meeting. Both poster proposals were among 15 approved posters to be shown at the meeting. In addition, we were invited to speak at the meeting to share our unique experience with others in the Internet2 community. Attending the member meeting was an appropriate culmination to our work of the past six months.

The Internet2 member meeting was a rewarding experience that helped us gain valuable contacts from around the world. We were able to share our experiences as the first Neterternship team at Cal Poly with other university representatives and encourage them to get their students involved. We feel that our participation in the Internet2 member meeting has increased awareness of the collaboration opportunities available to students.

Many people expressed interest in participating in next year's Neterternship program. We are optimistic that future Cal Poly Neterterns will have the opportunity to collaborate with students at other universities on a project. We strongly feel that all students can benefit greatly from a similar experience in the future, and we will continue to use our experiences to work towards increasing Internet2 awareness and participation among students on campus.

We are very thankful for all the support we have received from Cal Poly's Computer Science Department and Research and Graduate Programs. Without their support, we would not have gained such a wonderful experience!

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## Proud & accomplished

▼ Hats off to the CSC grads of 2006! Faculty and students gathered one last time for the spring ceremony in Alex G. Spanos Stadium.



## CSC frosh catches SURF-IT internship

**M**ichael McThrow, a CSC major, participated in the Research Experience for Undergraduates (NSF REU) program at UC Santa Cruz during the summer of 2006.

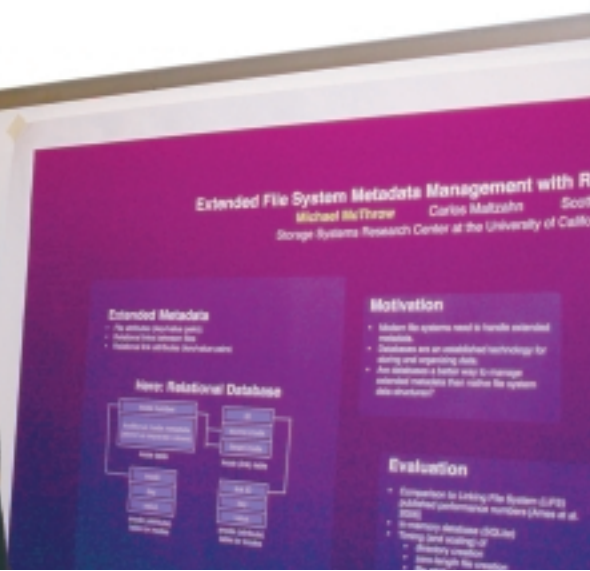
The program is called SURF-IT – Summer Undergraduate Research Fellowship in Information Technology. Research areas include bioinformatics,

graphics and visualization, wireless networks, storage systems, high-performance computing, FGPA CAD and VLSI, semiconductor and optoelectronics devices, radar and microwave.

Besides being accepted into the prestigious, competitive program that provided him with a great research experience, McThrow also received a \$4,200 stipend, housing, board and travel expenses for the two-month program.

Learn more about SURF-IT online at <http://surf-it.soe.ucsc.edu/>.

◀ Michael McThrow at a SURF-IT presentation







▲ Students gather votes during the 2006 CSC Student Fee Committee election.

## Good election turnout for fee committee

The Computer Science Department saw a record turnout of candidates for the CSC Student Fee Committee elections, held in May 2006. A total of 16 students ran for 12 positions.

The CSC Student Fee Committee controls the spending of more than \$350,000 in funding for Computer Science Department equipment and classes. This year, the committee partnered with the Computer Engineering Student Fee Committee to purchase 10 robots to be used in classes on robotics and artificial intelligence.

This year's financial plan for the student fee funds included \$350,000 to add additional sections of impacted classes, \$11,195 for the student development lab and course augmentation, and \$8,000 to increase open lab hours by augmenting student assistant funds.

Fee Committee meetings are lively and subjects are broad and diverse. By reallocating space within the CSC labs, students were able

to create a Student Development Lab for use by all students, open daily until midnight.

"I think they are using their money wisely, and are being good stewards of the student funds," Administrative Analyst **Cindy Bitto** said. Bitto helps the students keep track of their expenditures and update their spending plans as needed. "I really enjoy working with the Student Fee Committee; they are a creative and dedicated group of students."

Students will meet this quarter and again in the spring to assess the spending plan and discuss whether they need to amend it.

CSC Student Fee Committee members for 2006-07 are **Natalia Alarcon, Jason Anderson, Keian Christopher, Manh Do, Steven Eberling, Will Faught, David Kinghorn, Ryan MacConnell, Jennifer Pawlik, Patrick Thomas, John Vu and Red Wagner**. All students are either CSC or SE majors and range from sophomore through graduate students. Faculty representatives on the committee are **Lew Hitchner, Chris Buckalew** and Computer Science Department Chair **Ignatios Vakalis**.

## staff news

### Stier moves on; Bitto joins CSC

After 22 years of working as an administrative analyst in the Computer Science Department for numerous department chairs, hiring and retiring many faculty members, "and being the person everyone loved and respected beyond measure, **Ellen Stier** made the difficult decision to move on to new opportunities on campus," says her longtime colleague **Diane Nott**. "I am happy to report that she is very happy with new challenges."



Ellen Stier

Although she says Stier is a hard act to follow, Nott reports the department's good fortune in finding administrative analyst **Cindy Bitto**.

"Cindy is a good fit for the faculty and staff, and we appreciate her skills, helpful nature and commitment," says Nott, an administrative coordinator in the department.

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▲ Chris Clark with  
robotic colleagues

▶ John Bellardo  
incognito



## John Bellardo

I came to Cal Poly after finishing my doctorate at UC San Diego. While at UCSD, I extensively studied networks, with an emphasis on wireless networks, measurement, security, and deployment of large-scale test infrastructure.

I've also been involved with numerous open-source projects in the fields of networks, operating systems, and databases. I believe that curiosity and excitement are an important part of the learning process, and I strive to encourage both in my classes.

In addition to teaching, my professional interests include terrestrial and extraterrestrial networks, security, operating systems, databases, system administration, and networks.

## Chris Clark

After traveling and moving for many years, I'm excited to settle down in San Luis Obispo to join the faculty at Cal Poly.

## Welcome!

### Meet our talented new CSC faculty members

I grew up in Kingston, a small city in Canada, where I completed my bachelor's degree in engineering physics. After taking a job as a controls systems engineer, I realized my passion was for teaching and research, and I began graduate work in the Department of Mechanical and Industrial Engineering at the University of Toronto. My research concerned the use of neural networks for control of robot manipulators. There began my research in artificial intelligence as applied to robot systems.

I completed my master's and set off traveling and volunteering in South America and Southeast Asia. My return to North America landed me at Stanford University, where I completed my doctorate in aeronautics and astronautics. While studying there, I took a minor in computer science to learn more about AI and mobile robots. During this time, my research was concentrated on motion planning for multi-robot systems.

After graduating, I took a faculty position at the University of Waterloo, Canada, where I expanded my research projects to include autonomous underwater robots, multi-robot security



systems, modular and reconfigurable robots, and intelligent vehicle networks. I left the cold winters of Waterloo to join Cal Poly, allowing me to deploy my robots year round.

I hope to contribute to the Cal Poly community by developing undergraduate and graduate robotics courses and sharing my research program. If nothing else, perhaps someone will teach me how to surf.

Outside of school, I enjoy a number of different activities, including flying, scuba diving, and travel.

## David Janzen

What an honor to join the Cal Poly faculty last fall!

Professionally, my path here included a master's degree at the University of Kansas, five years developing telecommunications fraud detection systems at Sprint Corporation, seven years teaching computer science in a liberal arts college, and the last two years completing my doctorate, again at the University of Kansas.

I've also been actively consulting and delivering training courses since 2000. My doctorate research focused on test-driven development, and I plan to initially continue studying TDD and agile software development practices.

Personally, my family and I are enjoying life in California. I grew up skiing Kansas lakes and sledding Kansas hills, but we are quickly acclimating to the mountains and beaches of the Central Coast.



David Janzen's  
other passion

## Adventure awaits in Macedonia for Fulbright Scholar

By Professor Mei-Ling Liu

I am heading to the Republic of Macedonia as a U.S. Fulbright Scholar. The traditional Fulbright Scholar Program sends 800 U.S. faculty and professionals abroad each year. Grantees lecture and conduct



*SEEU's primary  
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I am, however,  
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research in a wide variety of academic and professional fields.

I will be hosted by the South East European University (SEEU), where I will join the faculty of Communication Sciences and Technologies (CST) during the university's summer semester, which runs from February through June.

I will be the first "Fulbrighter" in a technical field to visit SEEU. SEEU's primary language is Albanian! I am, however, expected to teach in English. The university is only five years old and has been a success since its inception, now competing with Macedonia's other far more established university – University Sts. Cyril & Methodius.

So as I write, I am surrounded by boxes of supplies and books that I have been preparing for the trip. Every day, I get deliveries from [www.amazon.com](http://www.amazon.com) and other online sites. I can already fill a book with how to prepare for a Fulbright mission!

For more information about the Fulbright Scholar Program, please see [http://www.cies.org/us\\_scholars/](http://www.cies.org/us_scholars/). For more information about the South East European University (SEEU), see <http://www.see-university.com/>.

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continued ▶

By Professor Hasmik Gharibyan

My current research is on women working in the computer science field. (It is well known that there is a big deficit of women in computer science in the US.)

The approach I am taking for investigating this issue is studying countries that have no gender gap in computer science, such as the republics of the former Soviet Union. The purpose of my research is to detect factors that attract women to computer science in former Soviet countries and to find out whether or not the negative factors identified in the U.S. exist there.

I started this research in early 2005 with the support of the Engineering Information Foundation (EIF), which funded the investigation for one year. So far, this study has been very productive and informative – it generated a large amount of data and led to some interesting and sometimes unexpected observations.

Some of the results of this study are summarized in the following two conference papers:

1. Hasmik Gharibyan and Stephan Gunsaulus, "Gender Gap in Computer Science Does Not Exist in One Former Soviet Republic: Results of a Study," Proceedings of the 11th ACM SIGCSE conference Innovation and Technology

## Women and Computer Science

What attracts them (or not) to this field?

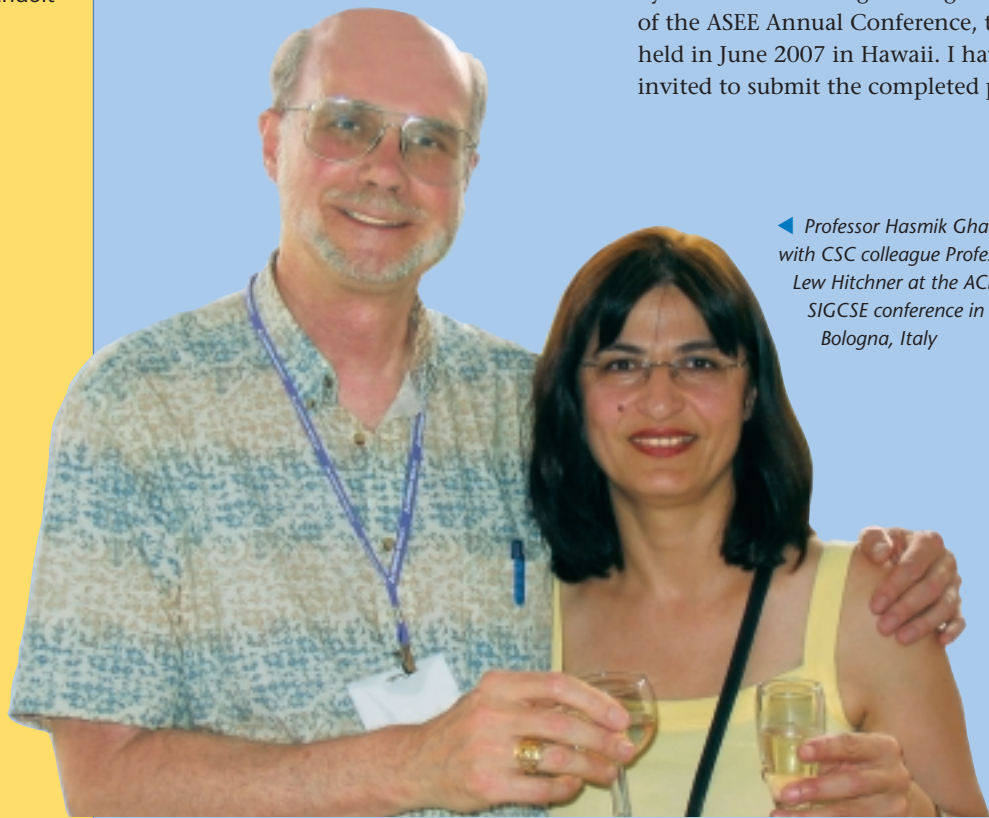
in Computer Science Education (ITiCSE06) in Bologna, Italy, June 27-29, 2006 (pp.222-226).

Note: the conference proceedings not only appeared as a separate book, but also were published as an issue of the ACM journal Inroads – SIGCSE Bulletin (volume 38, issue 3, 2006 September).

2. Hasmik Gharibyan, "Work in Progress – Women in Computer Science: Why There is No Problem in One Former Soviet Republic," Proceedings of the Frontiers in Education (FiE) conference, San Diego, October 28-31, 2006.

It is worth mentioning that I traveled to Bologna, Italy in June 2006 to present the first paper, and to San Diego in October 2006 to present the second paper.

Currently, I am working on a third paper, in which I intend to introduce some of the remaining results. The abstract of this paper has been accepted by the Women in Engineering division of the ASEE Annual Conference, to be held in June 2007 in Hawaii. I have been invited to submit the completed paper.



◀ Professor Hasmik Gharibyan with CSC colleague Professor Lew Hitchner at the ACM SIGCSE conference in Bologna, Italy



## Beachin' retreat

▼ CSC Faculty held their fall retreat last September in Avila Beach. The day included department planning and curriculum analysis. Lunch was spent in the sun having fun!



## Professor Franklin receives NSF Grant

By Professor Diana Franklin

I have been working with UC Davis and UC Santa Barbara on error-tolerant computing. Applications designed to interface with human perception, such as movies, photos, sound, etc., have inherent tolerance for error. Many packets are already dropped by phone companies and streaming video applications. We want to exploit this inherent error tolerance to save power and/or increase performance.

I received a National Science Foundation Major Research Infrastructure grant, which will provide \$45,000 in computer equipment for department research. The intent of this grant is to make Cal Poly a more attractive partner to research universities by virtue of having large-scale facilities which enable tasks appropriate for undergraduates. The equipment will be available to all Cal Poly Computer Science faculty members.

The project has completed its first phase, which is an analysis of the tolerance to data, control, and pointer errors in many perceptual applications. We presented our first publication in July 2006 using a compiler that identifies instructions that are tolerant to errors. We are currently exploring ways to exploit this error-tolerance in order to improve processor performance.



▲ Aside from her research, Diana Franklin likes to travel. Here, she enjoys a spin in a vat at a Beijing tea house.

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# Visitor from the Dream Factory

## DreamWorks R&D head captivates CSC crowd

The creative side of computer science came alive last November at a spectacular campus presentation by **Jim Mainard**, head of research and development at DreamWorks SKG. The motion picture and animation studio's film credits include such blockbusters as "Shrek," "American Beauty" and "The Terminal."

Students, faculty and staff packed Cal Poly's Spanos Theater to hear Mainard talk about "Making Films: Toilets, Hair, Nachos and Other Important Things." He also talked to students during a special session and met with computer science



*Jim Mainard*

DreamWorks to work on collaborative, student-involved multidisciplinary projects," says Computer Science Department Chair **Ignatios Vakalis**. "A number of students are very interested in the company and the technology, and will be applying for internships there."

Vakalis says a field trip to the San Francisco Bay Area studio is planned this quarter.

Jim Mainard's visit to Cal Poly was coordinated by the Association for Computing Machinery (ACM).

"The campus club did a fantastic job of handling the advertising for the event and all of the other details," says Vakalis.

professors **Michael Haungs**, **Aaron Keen** and **Zoë Wood**, who are developing interactive entertainment curriculum for the department. (See story, page 2.)

"We have initiated a great relationship with



"Shrek"  
PHOTOS COURTESY  
DREAMWORKS SKG

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