Donald Bren School of Information and Computer Sciences

2013–14 Annual Report

University of California, Irvine

From the Dean

It gives me great pleasure to introduce the 2013-14 annual report for the Donald Bren School of Information and Computer Sciences (ICS) at the University of California, Irvine. As the UC system's only computing-focused school, ICS continues to provide computer science and information technology leadership for the 21st century through research and development of emerging technologies, innovative and broad computing curricula and collaborations that address key societal needs. The pages that follow will highlight some of the notable achievements of our faculty, students and alumni.

ICS started the year by welcoming its largest-ever freshman class of more than 450 students. They are a talented group, with an average GPA over 3.9 and amazing records of achievement in high school. These new students plus our transfer students increased school enrollment to nearly 1,700 students, more than double the amount we had just three years ago. During the year, we enjoyed the energy of this amazing group. Whether creating compelling computer games for a senior capstone project, quickly developing useful mobile applications in one of the school's growing lineup of AppJam competitions or flying to Russia to compete in the world championships of the International Collegiate Programming Contest, our students continue to amaze us with their creativity and entrepreneurial spirit. We ended the academic year in June by celebrating our commencement with the first-ever graduating class of computer game science majors — and with President Barack Obama!

Our faculty continue to contribute to the advancement of science and to the economic development of California and the U.S. through their state-of-the-art research. Michael Carey and Chen Li brought in $1.1 million in public and corporate funding to continue developing AsterixDB, an open-source big data management system. André van der Hoek received a million-dollar grant from the National Science Foundation to develop tools for enabling "crowd"-progamming, and Michael Franz's novel, biologically inspired cybersecurity work was featured in *The Economist*. We were especially pleased to announce the establishment of the $1 million Robert A. and Barbara L. Kleist Chair in Informatics. Gillian Hayes, associate professor of informatics, was named the inaugural holder of the chair, which is intended to recognize and support the research, teaching and service activities of an informatics scholar of distinction focused on health and technology.

We take great pride in our achievements and hope that you will, as well, after reading this report. The progress we make is a credit to the hard work of faculty, staff and students, but it is also due in part to the contributions of alumni, corporate partners and friends. We invite you to work with us as we continue to lead the way in the computational and information sciences.

Sincerely,

Hal Stern

Hal Stern
Ted and Janice Smith Family Foundation Dean
icsdean@ics.uci.edu

ICS: By the Numbers

#23 Worldwide ranking of ICS among computer science graduate programs by *U.S. News & World Report* (2014)

UNDERGRADUATE ENROLLMENT (as of Fall 2013)

815 Computer Science + **115** Informatics + **52** Software Engineering + **241** Computer Game Science + **207** Business Information Management +

1968 Department of Information and Computer Science founded

1973 UCI LISP programming language developed at UCI

1975 Irvine Dataflow (Id) general-purpose parallel programming language started at UCI

1983 ICS alum Paul Mockapetris develops the Domain Name System architecture used on the Internet

1995 ICS graduate student Roy Fielding helps develop the HTTP protocol for web communications

2001 Institute for Software Research (ISR) founded

#5 Rank of computer science among most popular majors at UCI in 2014

PH.D. ENROLLMENT: 220 (Fall 2013)

25 Statistics
11 Software Engineering
7 Networked Systems
**45** Information & Computer Science
132 Computer Science
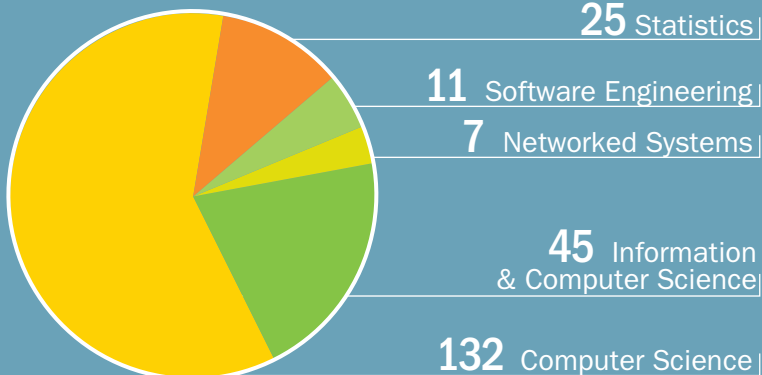
24% ICS undergraduates in Spring 2014 were women (up **11.5%** from Spring 2005)

National percentage was 13.9 in 2013, per the 2013 CRA Taulbee Survey

MASTER OF SCIENCE ENROLLMENT: 204 (Fall 2013)

Statistics **17**
Software Engineering **22**
Networked Systems **21**
Information & Computer Science **19**
Computer Science **125**

103 + **143** = **1,676**
Computer Science & Engineering | Unaffiliated/Undeclared/Other | **UNDERGRADUATE STUDENTS TOTAL**
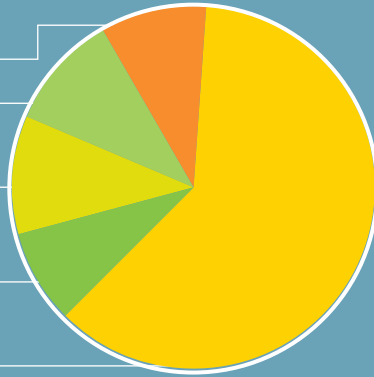
RESEARCH
2013-14

94
TOTAL NEW PROPOSALS

24
NEW ACTIVE AWARDS

$11.8 million
TOTAL EXPENDITURES

Institute for Genomics and Bioinformatics (IGB) founded
2001

Departments of Computer Science, Informatics and Statistics founded
2002

Donald Bren Hall opened
2007

2002
School of Information and Computer Sciences founded

2004
School renamed Donald Bren School of Information and Computer Sciences

2013
Institute for Virtual Environments and Computer Games (IVECG) founded

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FACULTY BY DEPARTMENT

40
Computer Science

22
Informatics

9
Statistics

ACADEMIC FACULTY

68
Tenure-Track Faculty

3
Adjunct Faculty

10
Lecturers

ENROLLMENT OVER TIME
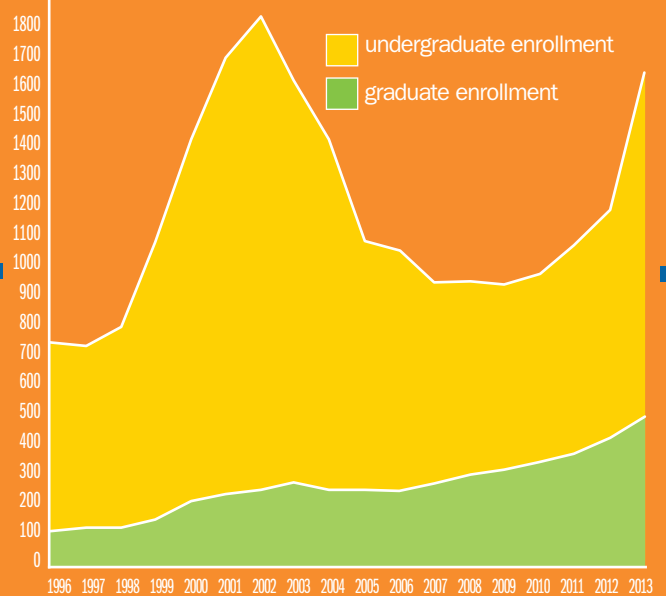
undergraduate enrollment
graduate enrollment

Ready to Play

The tiny creature whips and wriggles through the murky depths, a spiky, stylized fusion of fish and insect. After blasting its way through a series of narrow tunnels and braving an array of sinister marine monsters, it emerges into a dark, open space.

A moment's respite, perhaps? Nope.

A latticework mass embedded in the background scenery suddenly shudders to life, disgorging a gargantuan creature, all bones and blades with one pulsing red eye, bent on destruction.

game science majors at the Donald Bren School of Information and Computer Sciences. Fourteen such students would go on to become the inaugural graduates of the new degree program.

"They're an awesome class, and we're very proud of them," says computer science professor Magda El Zarki, co-creator of the program.

She expects the major to evolve. Many students have expressed an interest in specialized tracks — game systems, game design and game studies, for example. Informatics senior lecturer Dan Frost, director of

"What is *this*?" exclaims software engineer Grant Mark, sitting in front of a laptop screen in the Video Games Projects Lab at UC Irvine. "Amazing!"

The eight students responsible for spawning the beast are clustered around the same laptop in informatics lecturer Hadar Ziv's capstone-project class, showing Mark and fellow engineer Ben Deane — their mentors from Irvine-based Blizzard Entertainment — how far they've come with "Dark Current."

The game is their senior project, the culmination of their studies as the first computer

the degree program, says that faculty members have built more flexibility into the curriculum over the past four years.

"We deliberately named it computer game *science*," he says, noting that an emphasis on programming *and* user experience *and* game playing has worked well — producing graduates schooled in the entire process.

While the seniors appreciate the core technical training, they relish the opportunity to design cutting-edge games.

"The best thing about the major is the hands-on experience," says David Conley. "It's allowed
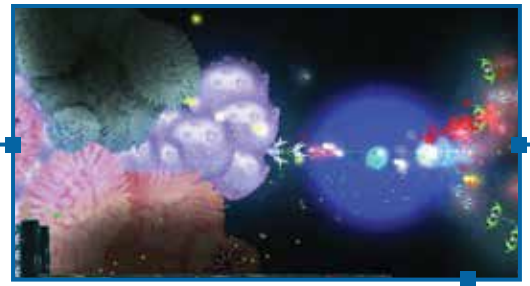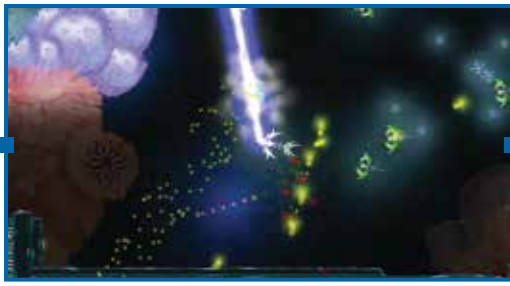
me not only to sit in class and learn but actually *apply* what I've learned. You've got a chance to make things, to create a portfolio, and not a lot of majors offer that. Three or four years ago, I wouldn't have dreamed of helping to create something like 'Dark Current.'"

Not all the senior projects are aimed at commercial entertainment. Allen Roman and Hongde Jin designed an educational product — compatible with the popular Oculus Rift 3-D virtual reality headset — about the former Elmina Castle slave fort in Ghana.

The project was challenging both technically and because of their desire not to trivialize the topic. Roman says Blizzard mentors steered them toward an approach that makes the learning more exploratory — and less of a game.

Katie Bryant, whose seven-person team created a dungeon adventure called "Ignite: The Descent," advises anyone entering the major who's keen on developing lots of games to "join the club" — meaning the Video Game Development Club. "I also learned a lot of useful things in classes," she adds.

"I know more technical, programming skills than I would have gotten just designing games," Bryant says. "When I got my internship at Blizzard, I noticed how relevant the information I was getting from my classes was."

Paul Foster, a Blizzard engineering manager who's also a senior mentor, says the technical training that the computer game science majors receive makes them a hot commodity in the industry. "From my standpoint, the program's emphasis on computer science is a key factor" in its students' appeal to employers, he says.

Internships such as Bryant's are just one aspect of the celebrated Orange County firm's deepening involvement with ICS. In addition to providing biweekly mentoring, Blizzard hosted 11 UCI interns in the summer of 2014. The company also recently donated $12,000 to the campus's computer games lab to update equipment and renew costly software licenses.

And the video game developer and publisher is interested in hiring from the class of 2014. "We're interviewing five [of the 14] students for positions with Blizzard, which is a pretty high percentage," Foster notes. "That's a good number of potential candidates."

Word has clearly gotten out on campus too: In fall 2013, total enrollment in the major reached 241 students.

As UCI's first gaming graduates prepare to enter the workforce, they're hopeful about their futures and that of the pioneering course of study.

"If I can get this much out of the major when it's so new, I can't imagine what it's going to be like a decade from now. It's going to be really, really great," Conley says. "The computer game science major has given us the resources we need to succeed at the highest possible level."

—Story by Ted B. Kissell

Page 4, left: Ben Deane and Grant Mark of Blizzard (center) give computer game science majors positive feedback on their senior projects.

Page 4, right: Professor Magda El Zarki, co-founder of the CGS major, chats with members of the Video Game Development Club.

Above: Gameplay images from "Dark Current," which made a big impression on the senior capstone project class' Blizzard mentors.

"I've been involved in research, projects, games — pretty much anything a future computer scientist could hope for to further his or her education and career. The tools we learn open doors for us to the biggest names in the industry, such as Google, Amazon and Blizzard."

Igii Enverga, Computer Science major

Department of Computer Science

With 40 full-time faculty members, more than 250 graduate students and more than 800 undergraduates, the Department of Computer Science at UC Irvine provides a world-class research environment spanning the core areas of computer science — including computer architecture, system software, networking and distributed computing, data and information systems, the theory of computation, artificial intelligence and computer graphics. We also offer highly interdisciplinary programs such as biomedical informatics, data mining, security and privacy and ubiquitous computing.

Our educational programs directly reflect the diverse research interests of our faculty. CS faculty teach most of the undergraduate and graduate courses for the degree programs in computer science. With our colleagues in the Henry Samueli School of Engineering, we offer a joint undergraduate degree in computer science and engineering, as well as the graduate program in networked systems. The major in computer game science, jointly offered with the Department of Informatics, graduated its first senior class in June 2014.

Our department collaborates with many other institutions in the United States and abroad, and its doors are always open to a multitude of visitors and collaborators from all corners of the globe.

I invite you to explore some of the highlights of the cutting-edge work our department's faculty and students have performed in the past year.

Alex Nicolau
Professor and Chair
Department of Computer Science

$7.1 million
Total Research Expenditures

64
New Proposals Submitted

68
Total Active Awards

14
New Active Awards

74%
Expenditures from Government Awards

26%
Expenditures from Industry Awards
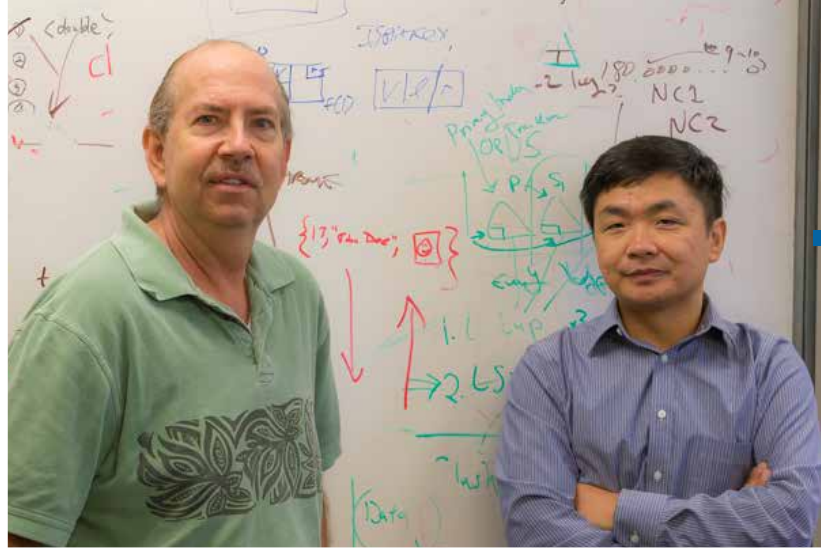
COMPUTER SCIENCE FACULTY HIGHLIGHTS

Professors **Michael Carey** and **Chen Li** received $750,000 from the National Science Foundation and nearly $400,000 from corporations — including Google, Oracle and HTC — to continue the development of their big data system, AsterixDB, which promises to be the most versatile of the platforms aimed at managing big data.

In addition to being named an ACM Fellow for his contributions to probabilistic and statistical approaches to data mining and machine learning, professor **Pahdraic Smyth** was also named director of the UCI Data Science Initiative, which will receive campus funding to enhance research and educational programs regarding how novel and complex digital data can be used to enhance science and business.

As part of the SmartAmerica Challenge, an initiative of the White House and the National Institute of Standards and Technology, professor **Nalini Venkatasubramanian** and her team developed a low-cost sensor network to provide communication and emergency response to the general public. They presented their work at the White House and then at a forum at the Washington, D.C. convention center, and they will be setting up a demonstration site at a housing development in Maryland using sensors and analysis tools developed at UCI.

In addition to continuing his cutting-edge cybersecurity research, Chancellor's Professor **Gene Tsudik** played key roles in several events around the globe during 2013-2014. He co-chaired a seminar in Germany on genomic privacy, and gave keynote talks at both the inaugural IEEE Conference on Communications and Network Security in Washington, D.C. and at the 12th International Conference on Cryptology and Network Security in Brazil.

Professor **Michael Franz** continued his development of a revolutionary concept in secure software — one that uses the concept of biodiversity to strengthen the safety of software. His "multicompiler" creates versions of the same piece of software that are functionally identical, but unique enough in their code to make them less vulnerable to viruses and other attacks. Franz has already built a prototype of the multicompiler.

STUDENT SPOTLIGHT

A team of ICS undergrads garnered an honorable mention at the Association for Computing Machinery's International Collegiate Programming Contest World Finals held in Ekaterinburg, Russia in late June. The team — consisting of **Nick Ajalat**, **Alan Castro** and **Michael Cappe**, along with coach **Gio Borje** (pictured in blue shirt) — finished 88th out of 122 teams, beating out fellow North American competitors UC Berkeley and Carnegie Mellon University, among others.

SELECTED AWARDS AND HONORS

PIERRE BALDI,
Chancellor's Professor
Named ISCB Fellow by the International Society for Computational Biology

RINA DECHTER, *professor*
2013 ACM Fellow

CHARLESS FOWLKES,
associate professor
NSF Faculty Early Career Development (CAREER) Award for "Combinatorial Interference and Learning for Fusing Recognition and Perceptual Grouping"

ALEXANDER IHLER,
associate professor
NSF Faculty Early Career Development (CAREER) Award for "Estimation and Decisions in Graphical Models"

SCOTT JORDAN,
associate dean and professor
Named chief technology officer of the Federal Communications Commission

SHARAD MEHROTRA, *professor*
Ten-year Best Paper Award from the International Conference on Database Systems for Advanced Applications for "Efficient Execution of Aggregation Queries over Encrypted Relational Databases"

ALEX NICOLAU, *professor and chair*
ALEX VEIDENBAUM, *professor*
Published in 25th Anniversary volume of the ACM International Conference on Supercomputing

PADHRAIC SMYTH, *professor*
2013 ACM Fellow; invited keynote talk at AAAI Conference on Artificial Intelligence

GENE TSUDIK,
Chancellor's Professor
Distinguished Paper Award at the 2014 Network & Distributed System Security Symposium for "Authentication Using Pulse-Response Biometrics"

> "I've taken courses that have exposed me to ubiquitous computing, information retrieval and machine learning — and given me a deeper understanding of software engineering, software architecture and programming."

Matias Giorgio, M.S. candidate, Software Engineering

Department of Informatics

Can mobile applications improve disaster response? How does constant connectivity affect family life? Where does our personal information go once information technology collects it? How can we use technology to build a sustainable natural environment?

These questions, among many others, are the domain of informatics.

Informatics concerns itself with the study of living, working and building in a digital world. Wherever technology touches people, it must be designed with ultimate care. This requires mastery of technological knowhow and a deep appreciation of the social, cultural and organizational forces at work.

The Department of Informatics at UCI is at the forefront of exploring the exciting challenges that arise from the intersection of people, information and technology. The department brings together scholars, students and practitioners to improve our understanding of technology's extraordinary impact and to create innovations that redefine how we experience the world.
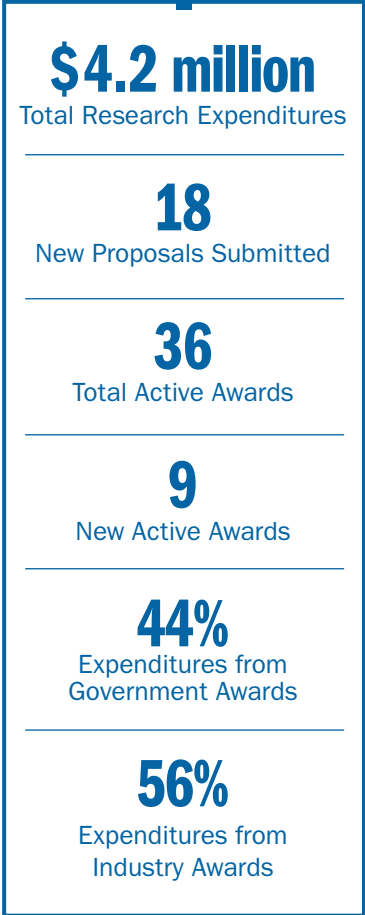
Our research is varied and cutting-edge. Just this past year, we received prestigious National Science Foundation grants to design new programming environments for "crowd" programming at massive scale; to devise novel information technology toward achieving sustainable food security; to study the opportunities and perils of how "little data" turns into "big data" in healthcare; to create new techniques for understanding, diagnosing and fixing software bugs; and to examine how the do-it-yourself maker community is leading to new models of innovation. Numerous other projects are afoot.

We could not do our work without our partners, including Google, Intel, Boeing, Children's Hospital of Orange County, Disney, Samsung and others. We always welcome new challenges and collaborations.

Today's world is profoundly digital and the possibilities ahead are enormous. Our world-renowned community of students, partners, faculty and staff is committed to reshaping the world for the better.

André van der Hoek
Professor and Chair
Department of Informatics

$4.2 million
Total Research Expenditures

18
New Proposals Submitted

36
Total Active Awards

9
New Active Awards

44%
Expenditures from Government Awards

56%
Expenditures from Industry Awards

INFORMATICS FACULTY HIGHLIGHTS

A team that included professor **Geoffrey C. Bowker** earned a $1.5 million grant from the National Science Foundation's EarthCube awards program. Titled "A Broker Framework for Next Generation Geoscience," the project brings together an accomplished team of geoscientists, social scientists, cyber-infrastructure experts and educators to explore how expert systems can improve access between scientific fields.

Bren Professors **Judith Olson** and **Gary Olson** published a new book, titled *Working Together Apart: Collaboration over the Internet*. Published by Morgan & Claypool Publishers, the Olsons' new offering reviews the latest insights into how teams work together when they are at different work sites. The Olsons also received a $397,000 NSF grant for their project "Micro-Analytics of Collaboration in Distributed Work: What Makes Collaboration Work."

Professor **Cristina Lopes** published a book titled *Exercises in Programming Style.* The book helps readers understand the various ways of writing programs and designing systems, using a simple computational task — term frequency — to illustrate different programming styles. Written for anyone who regularly practices programming, the book is designed for use in conjunction with code provided on an online repository.

Professor **Gloria Mark** received numerous accolades for her work in social computing — how individuals, groups, society and technology mutually influence each other. Her research has been featured in *The New York Times*, and in 2014, she participated in a panel at the South by Southwest (SXSW) conference on focus in the workplace. She also received a Google Faculty Research Award for a project that seeks to understand how people's focus, mood and stress change while using digital media in a real-world context.

The multi-campus Health Data Exploration Project — co-led by assistant project scientist **Matthew Bietz** — received a $1.9 million grant from The Robert Wood Johnson Foundation to create a network of researchers, scientists, companies and others to catalyze the use of personal health data for the public good. The project, a multi-campus collaboration, seeks to establish a network that will bring together companies that collect and store personal health data with researchers who mine these data for patterns and trends.

STUDENT SPOTLIGHT

Ph.D. student **Eugenia Gabrielova** received the Palantir Scholarship for Women in Technology. The scholarship supports women in the STEM (science, technology, engineering and mathematics) disciplines by aiding them in their academic careers. Gabrielova's research interests include virtual worlds, large-scale scientific data exploration and self-managing software systems.

SELECTED AWARDS AND HONORS

PAUL DOURISH, *professor*
Best Paper Award, ACM CHI Conference on Human Factors in Computing Systems

BONNIE NARDI, *professor*
Elected to CHI Academy

DON PATTERSON, *associate professor*
Ten-Year Impact Award, ACM International Joint Conference on Pervasive and Ubiquitous Computing

DAVID REDMILES, *professor*
Award for Innovation and Potential Impact, ICSE 2014 New Idea and Emerging Results

BILL TOMLINSON, *professor*
Appointed to the U.S. Environmental Protection Agency's Board of Scientific Counselors Sustainable and Healthy Communities Subcommittee

ANDRÉ VAN DER HOEK, *professor and chair*
2013 ACM Distinguished Scientist

RESEARCH CENTER LEADERSHIP AND AFFILIATIONS

California Institute for Telecommunications and Information Technology

Center for Digital Transformation

Center for Ethnography

Center for Organizational Research

Collaboration Research in Action, Design & Learning

Center for Research on Sustainability, Collapse-Preparedness & Information Technology

EVOKE Lab and Studio

Hana Ohana Research Group

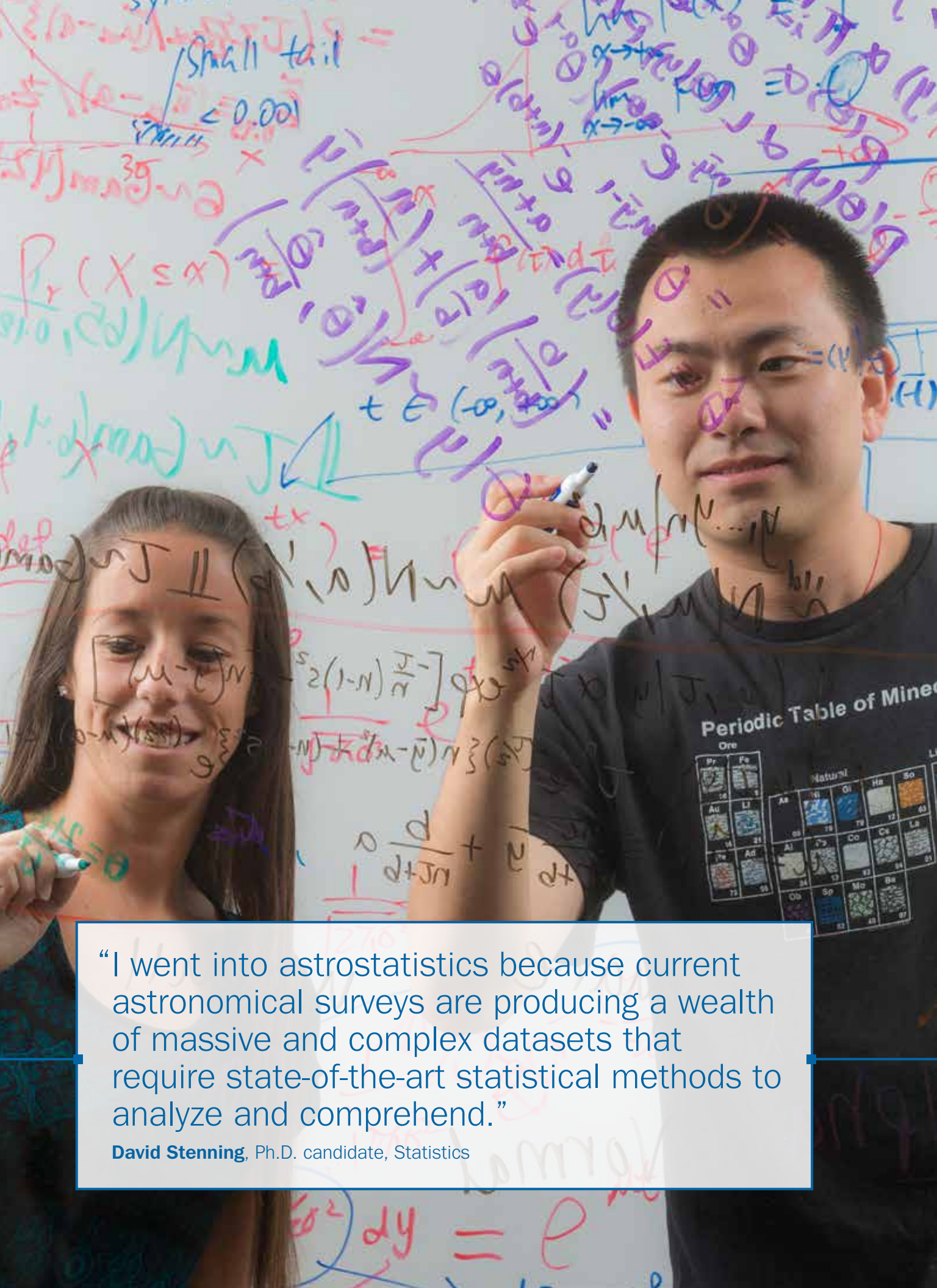Institute for Clinical and Translational Science

Laboratory for Ubiquitous Computing & Interaction

Mondego Group

Software Design and Collaboration Laboratory

Spider Lab

Social & Technological Action Research Group

"I went into astrostatistics because current astronomical surveys are producing a wealth of massive and complex datasets that require state-of-the-art statistical methods to analyze and comprehend."

David Stenning, Ph.D. candidate, Statistics

Department of Statistics

Whether it's to solve pressing societal problems, find new cures for disease, predict future trends or simply help understand the world around us, the demand for statisticians has never been greater. Interest in statistics — the science concerned with collecting, analyzing, interpreting and presenting data — has increased dramatically with the abundance of data in fields like computer science, business and marketing, medicine and the social sciences.

The UC Irvine Department of Statistics was created in 2002 to help meet this demand. With an emphasis on interdisciplinary collaborations coupled with rigorous methodological advancements, our faculty and students contribute to exciting advances in a broad range of applications, while simultaneously creating and expanding statistical methodology.

The accomplishments of our faculty and students continue to keep us at the forefront of the statistics community. We are helping to pioneer advances in the treatment of cancer and other diseases; to enhance capabilities for studying the brain; to transform understanding of climate; to analyze massive amounts of data in astronomy; to advance veterinary and human epidemiology; to create computational approaches for large social network data; to explore questions about human consciousness; to enrich the use of statistics in sports; and to investigate many other intriguing questions across the sciences; all while contributing to the advancement of statistical science.

Excellence in education is a high priority for our faculty. Whether it's helping undergraduate students understand how quantitative literacy can help them make better decisions in daily life, or helping advanced graduate students understand the latest statistical theory and methods, we bring a passion to the classroom that's based on knowing that what we teach makes a difference. Our undergraduate minor is a perfect complement to a wide range of majors, and our graduate courses in statistical methods are a popular addition to the education of Ph.D. students from across the campus. Our own statistics graduate students receive a high-quality education that prepares them for careers in business, government and academia.

We hope you enjoy the small sampling found in these pages of the many exciting activities and accomplishments of our faculty and students, and we welcome you to contact us to learn more.

Jessica Utts

Jessica Utts
Professor and Chair
Department of Statistics

$467,000
Total Research Expenditures

13
New Proposals Submitted
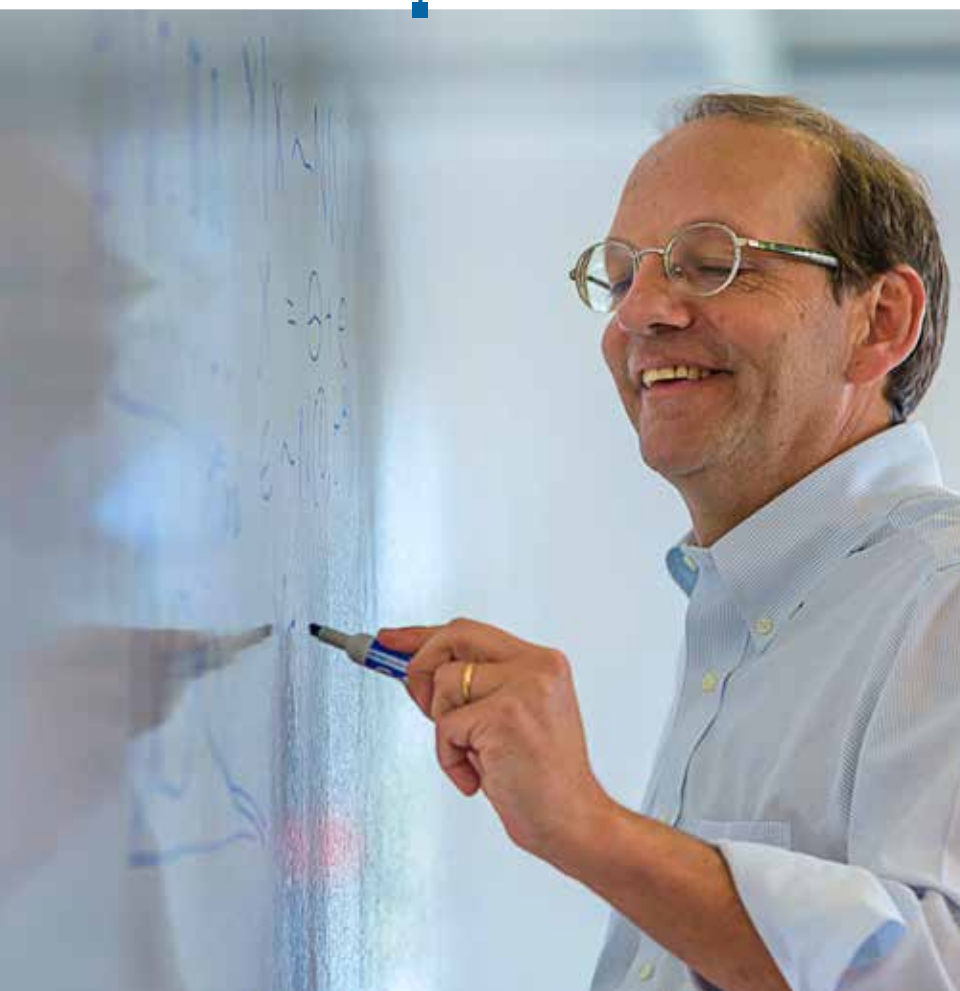
10
Total Active Awards

1
New Active Awards

82%
Expenditures from
Government Awards

18%
Expenditures from
Industry Awards

STATISTICS FACULTY HIGHLIGHTS

Associate professor **Dan Gillen** was appointed to a six-year term as a member of the Biostatistical Methods and Research Design (BMRD) Study Section, a division of the National Institutes of Health's Center for Scientific Review. The BMRD Study Section reviews applications focused on the development and application of statistical methodology for biomedical studies. Gillen's research focuses primarily on the development of statistical methodology for censored survival data and group sequential methods for the design and analysis of clinical trials.

Jessica Utts, professor and chair of the Department of Statistics, was named president-elect of the American Statistical Association (ASA). She will become president for one year starting on Jan. 1, 2016. "I'm excited about the opportunity to serve as president of the ASA," Utts said. "With the increasing demand for statisticians, one of my primary goals will be to educate high school and college students about the diverse and exciting career opportunities in statistics."

Professor **Hernando Ombao** chaired the program at the 2014 Eastern North America (ENAR) conference of the International Biometric Society and served on the Scientific Committee at a workshop at the Newton Institute in Cambridge, U.K. He is co-editor of "Handbook of Statistical Methods for NeuroImaging," which will be published in 2015. With students and collaborators, he is developing novel statistical tools for studying complex dependence between nodes in a network where such dependence may evolve over time.

Hal Stern, statistics professor and dean of the Donald Bren School of Information and Computer Sciences, is part of a UC Irvine team that received a $10 million, five-year Silvio O. Conte Center grant from the National Institute of Mental Health, which is part of the National Institutes of Health, to study how maternal signals and care before and after birth may increase an infant's vulnerability to adolescent cognitive and emotional problems. Stern is directing approaches for creating mathematical cross-species models of fragmented and unpredictable maternal signals, and is exploring the relationship between early development and subsequent vulnerabilities.

STUDENT SPOTLIGHT

Sepehr Akhavan, a statistics Ph.D. student, placed second in the student paper competition at the annual meeting of the Western North America Region (WNAR) of the International Biometric Society. His paper, "A Flexible Joint Longitudinal-Survival Model For Quantifying The Association Between Within-Subject Volatility In Serum Biomarkers and Mortality," proposes a statistical method for tracking albumin, an important biological marker, in patients undergoing dialysis treatment for kidney disease.

AWARDS AND HONORS

DAN GILLEN, *professor*
Clinical Research, Education and Awareness Award, Chao Cancer Center, Irvine, 2013; ICS Dean's Award for Service, University of California, Irvine, 2013

WESLEY O. JOHNSON, *professor*
Elected director, executive board, International Biometrics Society, 2013-2015

HAL STERN, *professor and dean*
Appointed chair of National Academy of Sciences panel on Research Methodologies and Statistical Approaches to Understanding Driver Fatigue Factors in Motor Carrier Safety and Driver Health

JESSICA UTTS, *professor and chair*
Appointed Chief Reader of the Advanced Placement Test in Statistics; appointed to the Executive Committee of the Statistics Section of AAAS (the American Association for the Advancement of Science)

RESEARCH CENTERS
Statistics faculty participate in the following:

Center for Statistical Consulting

Genetic Epidemiology Research Institute (GERI)

Institute for Genomics and Bioinformatics (IGB)

Institute for Mathematical Behavioral Sciences (IMBS)

Center for Machine Learning & Intelligent Systems

Research Units

The Donald Bren School of Information and Computer Sciences hosts three Organized Research Units (ORUs): academic units established by UCI to provide a supportive infrastructure for interdisciplinary research. They typically involve faculty from two or more schools.

INSTITUTE FOR GENOMICS AND BIOINFORMATICS (IGB)

Director: Pierre Baldi

Fostering innovative basic and applied research in genomics and bioinformatics, IGB works with established companies, start-ups, government agencies and standards bodies to develop and transition these technologies to widespread and practical application.

Faculty: 88

NOTABLE PROJECTS:

New target for treating a wide spectrum of cancers: Employing a computational method to capture the various shapes of the p53 protein, which helps repair damaged DNA in cells or triggers cell death if the damage is too great, IGB researchers identified an elusive pocket on the surface of the p53 protein that can be targeted by cancer-fighting drugs. **Principal Investigators:** Richard Lathrop and Peter Kaiser. **Other Investigator:** Scott Rychnovsky.

New crowdsourcing method for verifying scientific data: Researchers developed a pipeline for translating protein phosphorylation status from rat primary lung cells to human primary lung cells after subjecting cells to various stimuli consisting of known drugs and chemicals. Their work placed second out of 13 teams in the 2013 sbv IMPROVER competition. **Principal Investigator:** Pierre Baldi. **Other Investigators:** Peter Sadowski and Michael Zeller.

INSTITUTE FOR SOFTWARE RESEARCH (ISR)

Director: Richard N. Taylor

ISR works toward advancing software and information technology through research partnerships and educating the next generation of software researchers and practitioners in advanced software technologies.

Faculty in ICS: 12

NOTABLE PROJECTS:

Automatic Software Architecture Recovery: A Machine Learning Approach: This project seeks to recover high-level knowledge from software

Richard N. Taylor, ISR director

Magda El Zarki, IVECG co-director

Walt Scacchi, IVECG co-director

artifacts automatically in order to make software components understandable in the absence of documentation. This approach, which uses machine learning techniques, unveils important knowledge and tools related to open source projects and combines them in a plugin for Eclipse that supports automatic recovery of software architecture. **Principal Investigator:** Cristina Videira Lopes.

Game-based informal music learning environments: ISR, in collaboration with the San Francisco Symphony, helped to redesign an online music learning game environment for children, titled SFSKids.org. The website is specifically designed for use on desktops and laptops (to ensure maximum access in homes and classrooms) and features six learning modules that foster youth engagement with orchestral music. **Principal Investigator:** Walt Scacchi.

COAST: dynamic, secure on-demand services: COmputAtional State Transfer (COAST) is an architectural style designed to provide extensive, safe and secure client-directed customization of decentralized services. COAST combines mechanisms from software architecture, cryptography, security and programming languages, granting application architects flexible provisioning of their core services and assets while protecting those services and assets from attack and misuse. **Principal Investigator:** Richard N. Taylor.

INSTITUTE FOR VIRTUAL ENVIRONMENTS AND COMPUTER GAMES (IVECG)

Directors: Magda El Zarki, Walt Scacchi

IVECG brings together researchers for the common goal of understanding and creating technology and applications that transform how we see the world through immersive visualization and virtual tours;

interact and socialize with global communities; communicate and collaborate with colleagues in virtual collaborative space; provide medical care and training to remote corners of the world; and educate all ages and populations using virtual environments.

Faculty: 61

NOTABLE PROJECTS:

African history educational game: An IVECG team is developing an educational game that will introduce students at many levels to the immense diversity of African peoples and their interactions between 1400 and 1700. The game will focus on the immense diversity the lives of Africans — and how the Atlantic slave trade affected their societies. **Principal Investigator:** Magda El Zarki. **Other Investigator:** Patricia Seed.

How people with disabilities understand embodiment as avatars in virtual environments: A team of researchers is exploring how experiences of movement, self-presentation and self-efficacy shape how disabled persons perceive themselves (and are perceived by others) as "disabled" when their avatar bodies are fully "able" in a virtual environment. **Principal Investigators:** Bonnie Nardi and Tom Boellstorff.

Study on games conceived for application and use in complex enterprise settings: An IVECG research team has set out to study the informatics of serious games, particularly games involved with the advancement of scientific knowledge and informal science education; in-home energy management and environmental management; and therapeutic applications of games to improve health. **Principal Investigators**: Walt Scacchi, Jill Berg, Tom Boellstorff, Yunan Chen, André van der Hoek, Alfred Kobsa, Jung-Ah Lee, Gloria Mark and Bonnie Nardi.

IVECG has designed an educational, interactive environment using the Oculus Rift headset.

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Alumni & Friends

Supporter Spotlight

Longtime ICS and UCI supporters **Bob and Barbara Kleist** deepened their commitment to the school this year with the endowment of the Robert A. and

Dean Hal Stern, Barbara Kleist, Bob Kleist and Gillian Hayes

Barbara L. Kleist Chair in Informatics. Gillian Hayes, associate professor of informatics, was named the first holder of the chair. The Regents of the University of California established the endowed chair in April through a generous donation from the Kleists. The chair is intended to recognize and support the research, teaching and service activities of an informatics scholar of distinction focused on health and technology.

Bob Kleist was one of the founders of Printronix in 1974 and served as its CEO and chairman of the board through 2008. Bob received a BSEE degree from Kansas University and an MSEE degree from Stanford University, and holds 17 patents for computer and control systems. Barbara Kleist is a graduate of St. Luke's Hospital School of Nursing (now the St. Luke's College of Health Sciences). During her nursing career, she specialized in nursery care and public health nursing. After she and Bob raised their three girls, she became active as a hospital and community volunteer.

"I'm honored to have the support of such generous philanthropists as the Kleists," said Hayes, who has published extensive work in areas as diverse as autism, asthma, premature infancy and cancer. "This gift, as well as the mentoring that Bob regularly provides, will enable us to engage with the community to produce research that addresses significant societal challenges."

Welcome Alumni!

ICS holds several joint **alumni events** with the Samueli School of Engineering each year. In Spring 2014, ICS went Hollywood (well, Culver City, at any rate) with a fun-filled gathering at the historic Sony Pictures Studios. The festivities included a spectacular offering of food and drink, guided tours of the lot — including the studios where *Jeopardy!* and *Wheel of Fortune* are filmed — and fascinating presentations. Dan Hitomi (UCI Social Sciences, '99), vice president of product for Sony Media and Cloud Services, spoke about the impact of technology on the entertainment industry, while Engineering professor Athina Markopoulou talked about her research into speeding up content delivery to mobile devices. Look for an alumni event in your area soon!

Calling All Mentors

The Donald Bren School of Information and Computer Sciences joined with The Henry Samueli School of Engineering in 2013-2014 to initiate a new **Undergraduate Mentorship Program**. In its first year, the program focused primarily, though not exclusively, on pairing up female ICS and Engineering

Mentor Linda Smart with student Rachel Weiner

students with mentors in a variety of high-tech businesses. The proportion of women in STEM fields (science, technology, engineering and mathematics), both in academia and industry, continues to lag behind that of men. The goal of the program is to increase retention of female students in the majors in these fields and ultimately to enhance recruitment of women into the schools. Mentors and students both expressed great enthusiasm for the program.

ICS Hall of Fame

Oct. 4, 2015 will mark 50 years since UCI's first day of classes. To commemorate the anniversary, the Bren School will be launching the ICS Hall of Fame. We will induct the top alumni from the past 50 years by recognizing those who have made significant contributions in the fields of technology, business, government, education and social causes. Nominations will be accepted from any alumnus — or alumnus' associate, friend or family member. Watch for more information via the school's social media channels, website and electronic communications.

Be a Corporate Partner

The **Corporate Partners Program** of the Donald Bren School of Information and Computer Sciences and the Samueli School of Engineering provides concierge-level service to our corporate counterparts, assisting them with talent acquisition, corporate presence/brand building, strategic partnering, collaborative research and workforce training and education. Our Corporate Partners Program is available at the Corporate Member, Premier Member and Visionary Member levels.

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For information on any of our programs, please contact icsdean@ics.uci.edu.

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