interface

California Institute for Telecommunications and Information Technology

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innovate
integrate
ignite

University of California, Irvine

interface-2-face

The Importance of Interface

Interface – the ability to interact – with diverse audiences is integral to Calit2's mission to forge successful research collaborations. That's why we have given the name *Interface* to our new quarterly magazine. We hope the pages of this magazine will inform, enlighten and build new relationships with all our academic, business and community partners. We also hope *Interface* will encourage all of you to interact with us.

In traditional academia, professors are cloistered within academic disciplines and interactions are limited to those in the same discipline. Interactions with students are confined to classrooms and perhaps a few precious office hours each week. Interactions with colleagues are often limited to published papers in journals that may take months to appear, or through long-distance travel to academic conferences.

And not so long ago, interacting with industry was viewed with suspicion. The president of a great American public university once admonished his engineering faculty not to get too close to industry lest they become contaminated!

Calit2 is working to change these constraints. We intend to build as many interfaces as possible: between faculty and students; between professors in all disciplines on campus; and between our researchers and our many community partners, including industry, government and the public at large.

We hope you enjoy *Interface*. We will continue to strive towards the ideal of constant interface with you, our reader.

Albert Yee
Director

Interface
Fall 2005

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The California Institute for Telecommunications and Information Technology (Calit2) is a two-campus multidisciplinary research institute. By integrating UC Irvine and UC San Diego research expertise with industry experience, Calit2 seeks innovative information technology approaches that will benefit society and ignite economic development. The institute is conducting research in areas as diverse as the environment, transportation, emergency management, health care, global economics, education and entertainment.

Calit2 emphasizes the importance of collaboration. That's the foundation upon which both the institute and the building itself were built. The four-story, 120,000-square-foot building, which opened earlier this year at UCI, includes state-of-the-art labs and two floors of open space. Space is assigned by project, not department, which encourages new ideas and relationships, and is easily configurable, lending itself to new partnerships.

At UCI, 167 faculty members are actively engaged in Calit2 activities. Some reside in the building, conducting research and working with students, while others maintain home department locations but collaborate on institute projects with peers from various disciplines. The affiliated researchers utilize funding, and administrative and student support opportunities – all value-added services that Calit2 brings to the campus and its partners.

An important component of Calit2's unique research approach is its close ties with industry. This partnership accelerates development of new information and technologies that benefit the public and the economy. It facilitates creative strategies to improve technology transfer, speeding downstream commercialization of research discoveries. More than 50 companies – large and small, public and privately held – have become partners.

Welcome to Calit2@UCI, where we innovate, integrate and ignite ideas in information technology.

innovate integrate ignite

Teammates

A Game Plan for Success

Paul Folino – former three-sport jock – took to heart the pep talks preached by a succession of high school and college coaches. The Emulex Corp. CEO has now parlayed those lessons into a slam dunk in the business community.

by Anna Lynn Spitzer

When Folino joined Emulex as president and CEO in 1993, the struggling manufacturer of storage networking devices was losing money, forcing him to institute drastic layoffs. Today, Emulex employs 550 people, leads the world in its core markets and has nearly $600 million in the bank.

"I learned in sports that you can't always win," says Folino. "But you've got to pick up, dust off, learn from your loss and focus on the next game. Turn the loss into a victory."

While Folino has experienced business failures, Emulex is definitely in the winner's circle. The stock was named Orange County's number one performer for the 1990s, and the American Electronics Association named Emulex Outstanding Public Company of 2002. Folino himself was selected Ernst and Young's Orange County Technology Entrepreneur of the Year in 1999, and Orange County Director of the Year for high-growth technology in 2000. The company generated record revenue of $108.2 million in the fourth quarter of fiscal year 2005, a 25 percent increase over the same period last year.

"I learned in sports that you can't always win... learn from your loss and focus immediately on the next game."

Funding Future Technology Leaders

Emulex is an original Calit2 corporate partner and one of its biggest supporters. A large portion of the company's $2.5 million gift funds dozens of undergraduate and graduate students in a range of IT-related disciplines.

For example, the Calit2 graduate fellowship program recruits talented students from around the world to UCI and the institute. Emulex's gift also supports post-doctoral fellows and, beginning this year, the Calit2 Summer Undergraduate Research Fellowship in Information Technology (SURF-IT), which exposes undergraduates to the rigors of research (see pages 4-5).

Folino believes the investment is mutually beneficial. "Emulex has gained exposure to quality students – a number of interns come to work at the company – and we get the opportunity to weigh in on some of the research taking place," he says.

That exposure is useful as Emulex looks to diversify its business.

The Bottom Line is Research

Just a few years ago, 98 percent of the company's revenue came from its line of host bus adapters. In 2003, it acquired Vixel, a manufacturer of embedded

Paul Folino, president and CEO, Emulex Corp.

Photo: Paul Kennedy

http://www.emulex.com/

"Calit2 is really an opportunity - right in our own back yard - to jumpstart pure research again."

storage switches, which has added handsomely to its bottom line. Folino says Emulex is poised to investigate new technologies and protocols that will continue to expand its markets.

"Most successful companies find their leadership in key markets, but continue to grow and diversify into complementary areas," he says.

He is particularly attracted to the research fostered by Calit2. "Back in the early 70s and 80s, pure research in technology flourished throughout the United States. Those *(continued page 4)*

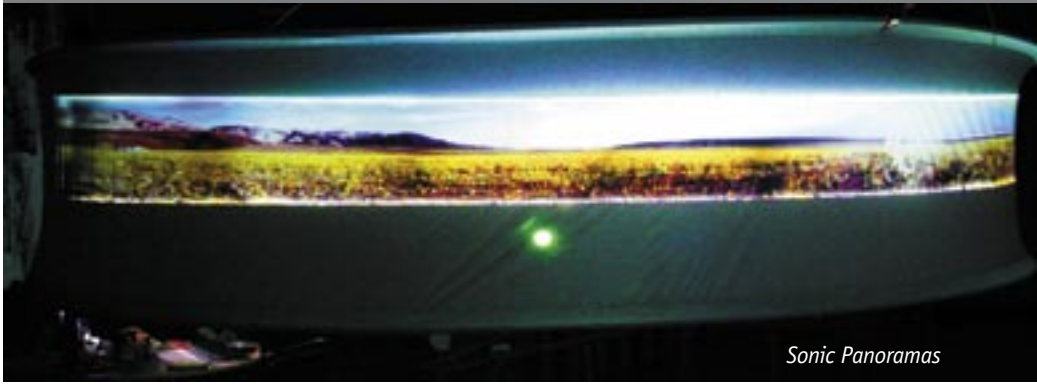
Making Scenery Sing

Eric Kabisch is a linguist of sorts. He's also a musician.

The Calit2-Emulex graduate fellow in the Arts, Computation, Engineering (ACE) program translates the beauty of landscapes into navigable interactive music experiences in his Sonic Panoramas installation. Kabisch built the original system in Calit2's media arts lab for an ACE exhibition last June. He then reconfigured it for its August debut at Long Beach, Calif.'s SoundWalk2005, an annual one-night aural-visual experience that incorporates indoor and outdoor spaces.

Sonic Panoramas is an interactive system in which the user creates unique music from natural and urban landscapes. The installation balances art and technology; datasets abstracted from the landscape images pass through algorithms which convert them to sound.

"I'm interested in the way that the world is increasingly described by data and information, as opposed to people's real physical experience," Kabisch says.



Sonic Panoramas

labs have diminished over the years, so Calit2 is really an opportunity – right in our own back yard – to jumpstart that type of research again," Folino muses.

"Emulex has gained exposure to quality students... and we get the opportunity to weigh in on some of the research taking place."

Emulex helps fund Calit2 research on IT development in Asia and its impact on the United States' high-tech industries and policies.

The company also has funded an atomic force microscope, capable of imaging nano-meter-sized particles, in the Calit2 materials characterization lab.

Making Philanthropy a Hobby

Folino's philanthropy extends well beyond Calit2. He enjoys giving back to the community, pointing out that "Orange County is a great place to live, raise a family and grow a high-tech business." Until August, Folino was board chairman of the Orange County Performing Arts Center, spearheading a $200 million expansion effort. He is also a past president of the South Coast Repertory Theatre, which underwent a $50 million facelift and building addition under his leadership. Other recipients of Folino's largesse are the M.I.N.D. Institute, Cal State Fullerton, Chapman University and UCI's Merage School of Business.

"My non-profits are my hobby. They're challenging, complicated and difficult, but they're very rewarding when you get them across the finish line."

True to his athletic experience, Folino believes that failure ultimately contributes to success. "One of my biggest disappointments was realizing I wasn't going to be the point guard for the L.A. Lakers," he laughs. "But it forced me to stay in school and get a good education. I've had failures in my career, too; most successful people have. You learn not only from your successes, but from your bumps along the way. I'm very blessed that I've had a combination of both."

Research Goes Abroad

Amanda Williams, a Calit2 graduate researcher, will take her work in ubiquitous computing to Bangkok, Thailand next year, thanks to a National Science Foundation Graduate Research Fellowship.

The second-year doctoral student in information and computer science is one of 1,020 graduate students nationwide to receive the prestigious fellowship.

Williams plans to spend approximately six months in Bangkok in 2006 investigating the city's technology infrastructure and its citizens' personal computing habits. "Bangkok is a huge city with burgeoning technology that is very different in character from U.S. cities," she explains.

Amanda Williams

Take 14 undergraduate students from different disciplines, pair each with a faculty mentor and throw them into an intense 10-week summer research program. What emerges?

Fourteen eager students with heads full of ideas and discoveries, and a shared passion for research. This was the outcome of the inaugural SURF-IT program funded by Emulex Corp.

"If you involve undergraduate students in research, they get excited and it gives them a better foundation for making decisions about their own education," explains Stu Ross, SURF-IT research coordinator.

The collaboration between Calit2 and UROP (Undergraduate Research Opportunities Program) was the brainchild of Director Albert Yee.

"I had the idea for a long time," says Yee. "I believed from the beginning that Calit2 was going to be the new paradigm for educating not only graduate students, but also undergrads." Yee thinks that immersing undergraduate students in a unique, multidisciplinary environment provides them with the edge they need to succeed in the job market.

That sentiment is echoed by Said Shokair, UROP director, whose own excitement about the program was

http://www.urop.uci.edu/

SURF'S UP at Calit2

by Jonathan Cheung

palpable. "I'm thrilled with SURF-IT's success; it's a unique multidisciplinary opportunity for students to pursue their passions," he says. "I love the collaborative aspect and look forward to many more successful years."

them insight into a range of topics that intertwined with their own research. The program culminated with a reception and poster session.

The SURF-IT students were enthusiastic about the opportunities the

2005 SURF-IT Fellows

During the summer, the students, who were selected from a field of 40 applicants, gained first-hand research experience by working closely with faculty mentors in high-tech facilities. Their projects ranged from fingerprint data analysis to stimulating empathy through computer games to growing nanowires. Students met for biweekly lunch seminars designed to give

program provided. "I didn't think I'd ever be doing this as an undergrad," exclaims Michael Brown, a fourth-year Earth systems science major. "The experience I've gained has been awesome."

Yee hopes to continue to inspire even more young minds.

"As long as we have funding, we will continue to have SURF-IT," Yee states. "I'm really happy about this year's participation and I hope to get even more people involved next year."

Madelyn Luttgen worked in the lab of Professor Noo Li Jeon developing a new microfluidic device to use in studying the effect of various chemicals.

Schooling Students in Science

Constructing a battery is a lofty exercise for grade school kids. But if those kids are under the tutelage of the Carbon MEMS (Micro-Electro-Mechanical Systems) group, it's a snap.

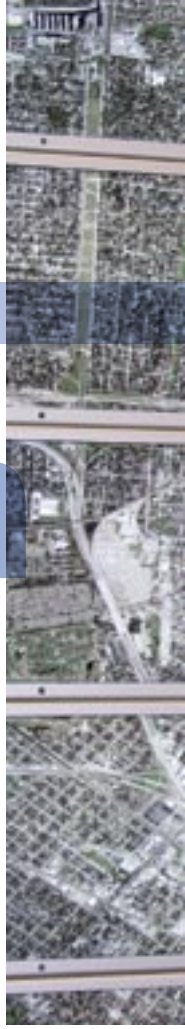
The C-MEMS research team, which works in the Calit2 Building, visited UCI's Extended Day Care program during the summer to share scientific building blocks with the kids.

The group demonstrated energy by transferring water between beakers. They explained resistance and capacitance. And they made batteries by inserting pennies and screws into limes, then wiring the apparatus to an LED light.

"It was a very fulfilling activity," said mechanical and aeronautical engineering graduate student Francesc Galobardes Jornet. "The children had a good time playing and learning, and they understood what we were teaching them. Some of them showed an amazing background in scientific terminology."

Francesc Galobardes Jornet gives a science lesson.

Eye on the Storm



While Hurricane Katrina wreaked death and destruction across the Gulf Coast, it inadvertently accomplished something constructive: it provided crucial data for emergency response research taking place at Calit2.

"HIPerWall is a perfect test bed for processing information into a visual format that adds value and saves lives."

by Anna Lynn Spitzer

Researchers Falko Kuester and Stephen Jenks, assistant professors of electrical engineering and computer science, used the catastrophe to expand the capabilities of their Highly Interactive Parallelized Display Wall, the world's highest-resolution grid-based display for visualizing and manipulating massive data sets.

HIPerWall, a 50-panel, 23 x 9-ft. wall that provides a resolution of 200 million pixels, brings to life terabyte-sized data sets, including biomedical images, climate datasets and geological data.

The Big Picture

After Katrina hit, Jenks and Kuester used HIPerWall to display satellite and aerial images of pre-and post-hurricane New Orleans, advancing research that one day will allow emergency first-responders to react to crises more quickly.

Using TerraServer, a U.S. Geological Survey Web portal, Jenks downloaded nearly 100 pre- and post-Katrina satellite and aerial images of New Orleans.

Then the real work began.

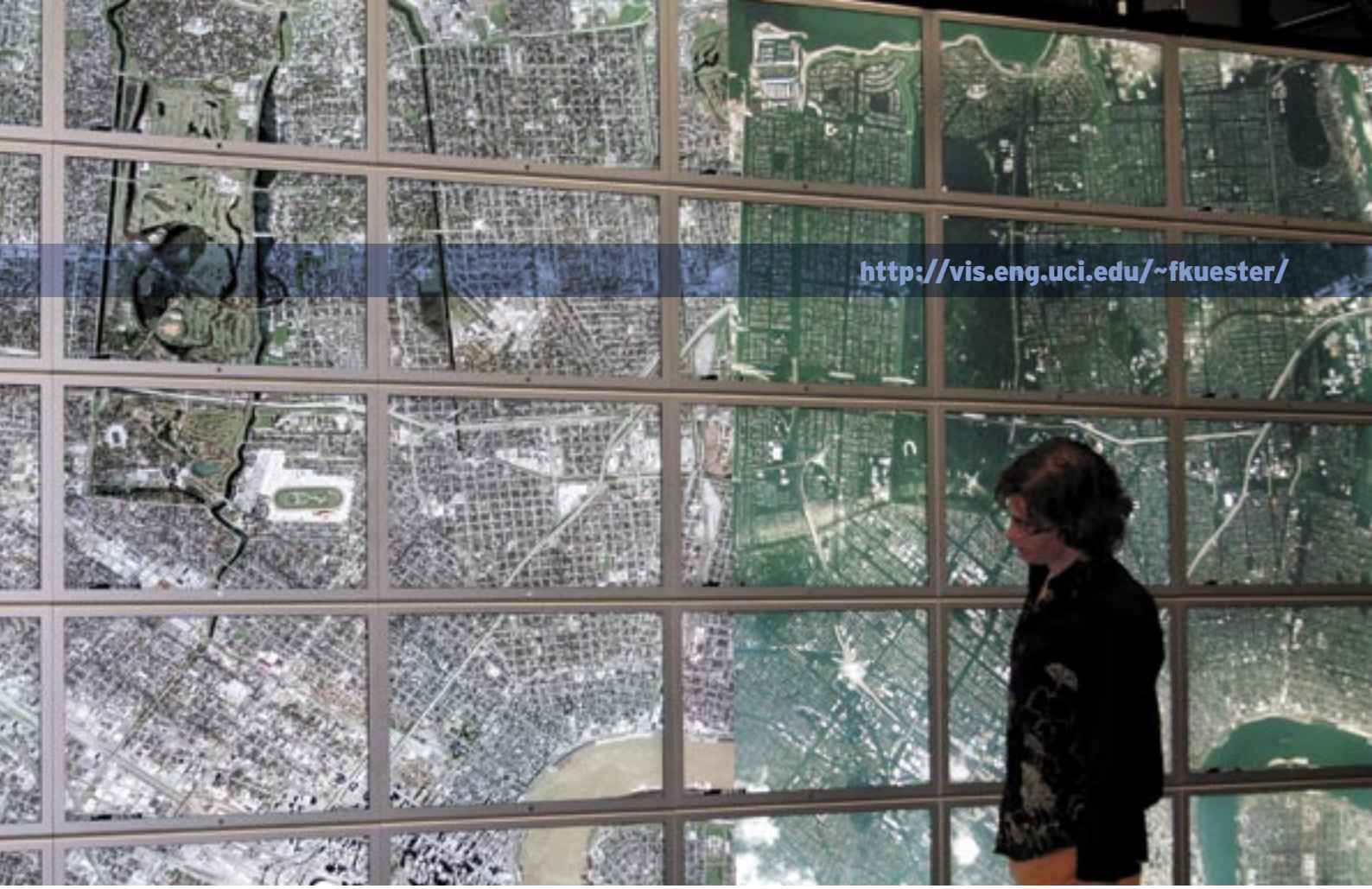
After the download, Jenks geo-referenced the images – aligning landmarks in "before" photos to the same landmarks in the "after" photos – then stitched them together into a panorama.

The work was time-consuming and computation-intensive, exposing the need for more sophisticated image manipulation techniques. Jenks used a self-authored computer program to tile the individual images into one continuous view.

When displayed simultaneously on HIPerWall, the before and after images correlate almost perfectly and reveal incredible detail. HIPerWall's resolution is nearly twice that of the world's next-highest resolution display wall; it has 100 times the resolution of state-of-the-art high-definition television.

In the post-Katrina images, viewers can clearly see debris fields, the depth of the storm surge and houses that once lined residential streets lying twisted in the middle of the road.

Photo: Leonard Ortiz, OC Register



The system's networked cluster provides unmatched data handling and distributed visualization capabilities. Controlled by a cluster of 25 networked visualization servers with interconnected high-end graphics cards, HIPerWall allows researchers to see concurrently the broad view and the fine details of the data.

Time is of the Essence

How do these images benefit emergency management? Kuester says the ability to communicate large amounts of data in easily recognized formats is crucial to speedy recovery and relief efforts. "We are taking information that was acquired before and after a particular event, and providing it to decision-makers at the highest possible level of detail. That way, they can work with it and react in the most efficient ways.

"When you see before and after images, you get the 'big picture,'" Kuester adds. "You can easily identify which areas were impacted the worst."

Kuester says the research team still has a long way to go. The goal is to develop different ways to process available information, ultimately speeding the process.

"You have approximately a week's notice before a hurricane hits, so you have time to prepare, evacuate and execute a response plan. It's a little harder with tsunamis and earthquakes," he explains. "It becomes much more important to get to that data quickly, disseminate it and give responders the opportunity to react."

A Universal Standard

The challenges are numerous. While some of the necessary data is readily available on the Web, other images require varying procedures to obtain access. In addition, photos of affected areas are often taken from different positions, at different times of day or with different cameras or satellites. "Our job is to correlate them as closely as possible," says Kuester.

Because HIPerWall itself could be disabled by a natural disaster, an additional challenge is to determine visualization and processing techniques that could be used in other locations. "Our objective," says Kuester "is to propose techniques that are not limited to HIPerWall and provide a powerful, universal approach to managing data.

"We're focusing on the science of imaging and leaving the decisions about how to use those images to the first-responders. HIPerWall is a perfect test bed for processing information into a visual format that adds value and saves lives."

Other members of the HIPerWAll team are Calit2-Emulex postdoctoral researchers Kai-Uwe Doerr and Christopher Knox, doctoral candidate Sung-Jin Kim, and Frank Wessel, UCI Network and Academic Computing Services.

HIPerWall located in Calit2 Center of Gravity: The HIPerWall team includes, from left, Stephen Jenks, Falko Kuester and Christopher Knox.

FUNDING NOTES

by Stuart Ross

Privacy, Identity and Technology

Paul Dourish, Calit2 associate director and associate professor of informatics, received nearly $750,000 from the National Science Foundation to investigate the ways in which new and emerging information technologies are transforming the practices of privacy and identity in contemporary Western society. Two relatively new technologies – blogging and mobile wireless communication – will be the focus of the investigation, because they have created new concerns and blurred some traditional boundaries. This will be a three-year ethnographic study of young technology users in Southern California.

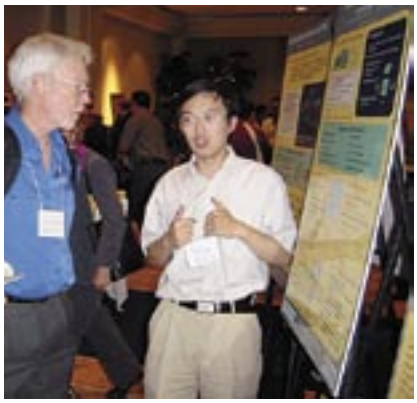
New Equipment is no Small Feat

Albert Yee, Calit2 Irvine director, secured funding of $380,000 from the National Science Foundation for the purchase of a "nanoimprinter" – an embossing machine capable of imprinting polymer materials in patterns at the nano scale – down to several billionths of a meter. Eight other researchers, including scholars from UC San Diego and Johns Hopkins University, joined Yee in preparing the proposal.

Using polymer materials at such small dimensions, embossing can be viewed as a form of construction; the researchers will build nano-sized beams, boxes and other structures to conduct several new kinds of studies. The nanoimprinter will be installed in the Calit2 clean room and operational in early 2006.

Desperately Seeking Trust

The National Science Foundation awarded $261,000 to Calit2's **Sharad Mehrotra**, professor of computer science-systems, to sponsor a three-day workshop in September on computer security. The Cyber Trust workshop examined topics such as biometric identification systems, the accuracy



Cyber Trust poster session drew more than 100 exhibitors.

of electronic voting, denial-of-service attacks, image tampering and detection of anomalies in Internet routing. This was the third annual gathering of Cyber Trust researchers with more than 250 participants in attendance.

Using Less Power

In the design of portable or remotely sited electronic devices, power consumption is an important factor, especially as demands for performance keep increasing. Researchers are constantly seeking ways to improve battery power supply and to reduce the demand from the circuitry. UCI's **Nikil Dutt** and **Fadi Kurdahi** have been awarded initial funding for the design of software that can evaluate the power consumption of whole sets of circuits on a chip, faster and more accurately than before. The funding, eventually to reach $245,000, comes from the Semiconductor Research Corp., a nonprofit organization funded by several electronics and computer manufacturers.

Taking Note of Firsthand Accounts

With a $100,000 supplement to their NSF-funded "ResCUE" project focused on the use of IT in emergency management, **Sharad Mehrotra** and his team of researchers will spend a year designing software that can gather information from Internet sources, such as Web logs (blogs) and electronic journals. The phenomenal growth of blogs and electronic journals presents previously untapped sources of information about disasters. These sources often are generated in near-real time and, especially in the case of blogs, often are generated by affected participants rather than by journalists or official observers. The researchers will study the reliability of such sources and will also index, classify and extract knowledge from text sources. The project will ultimately determine if using such sources is valuable in improving decision-makers' situational awareness.

Designers Game to Save the World

Under the academic leadership of **Robert Nideffer**, associate professor of art, and **Celia Pearce**, new media

Allegra Fuller Snyder (right), daughter of legendary futurist Buckminster Fuller, attended Spaceship Earth gaming workshop.

arts research manager, Calit2 worked with the Buckminster Fuller Institute to design a massively multi-player online game that will educate people about the environmental choices that confront the planet. With funding of $14,000, Calit2 hosted a design workshop in May for scientists, academics, educators and game designers to generate ideas for the game, tentatively called "Spaceship Earth." The inspiration for the game came from the design principles developed by Buckminster Fuller and implemented in his World Game; the game will draw also on the style of the various familiar "Sim" games. Players will take on roles such as business managers, government officials or ordinary citizens and work together to design a sustainable future for humans on the planet.

This list comprises the recent awards administered by Calit2. The institute is particularly interested in helping faculty secure grants for interdisciplinary research. If you have ideas for interdisciplinary research projects with an IT component, contact stuross@uci.edu.

Expert's Guide

The Evolution of Search Engines

This column, which will appear in each issue of Interface, will feature an expert or panel of experts exploring a particular subject of interest to our readers. This month's experts are Colby Riggs, Diane Bisom and Margaret Tapper from the UCI Libraries.

What was the first search engine associated with the Internet?

Wide Area Information Server, pronounced "ways," supported document retrieval from databases via full-text search across networks such as the Internet. This client/server software system provided sophisticated indexing of huge quantities of information and files based on all words in each file, and provided scoring and "relevance feedback" of documents. It also allowed for subsequent searches to find more "like" items than the previous search result and thus further refine the search process. WAIS was invented by Brewster Kahle and released by Thinking Machines Corp. in 1991.

What are the major differences among today's search engines?

Internet search engines help users find Web pages on a given subject on the Internet. Web browser users search for information by using keywords, phrases and Boolean logic. Different search engines have different ways of categorizing and indexing information. They vary according to database size and content, searching capabilities, and how they rank results. Search engines are accessed by typing in the URL of that engine or using a browser's compilation of search engines in its Internet search function.

A metasearch search engine queries other search engines and then combines all the results. As a result, the user is not using just one search engine, but a combination of many search engines at once, to optimize Web searching.

Search Engines

Google: www.google.com – One of the largest databases with superior relevance ranking, comprehensive coverage and caching feature. It also searches human-compiled information from the Open Directory.

Yahoo! Search: www.yahoo.com – With its own search technology, Yahoo is now on par with Google in size, relevance ranking and features.

Teoma: www.teoma.com – A crawler-based search engine that has a smaller index of the Web than its rival crawler-competitors Google and Yahoo, but with some unique features that aid searchers. It sometimes finds rare items, and provides high-relevancy search results. Advanced search includes useful features, such as refine.

Metasearch Engines and Search Engine Collections

Fazzle: www.fazzle.com – Presents a flexible and customizable interface to a wide variety of information sources. Defaults to a more focused, yet complete, set of Web search engines than other tools, allowing for higher relevance while drawing on many sources.

Vivisimo: www.vivisimo.com – An efficient and easy-to-use metasearch tool. It searches a collection of first-rate resources and presents the results pages organized by categories.

Clusty: www.clusty.com – An easy-to-use variation on the Vivisimo metasearch engine, it presents both standard Web search results and Vivisimo's dynamic clusters that automatically categorize results. Makes good use of clustering technology to help users refine their topics.

Ixquick: www.ixquick.com – A very good compilation metasearch tool that ranks results based on the number of "top 10" rankings a site receives from the various search engines.

ProFusion: www.profusion.com – Provides a thorough choice of search sites and metasearch subsets. Retrieves results from several major search engines as well as "invisible Web" resources.

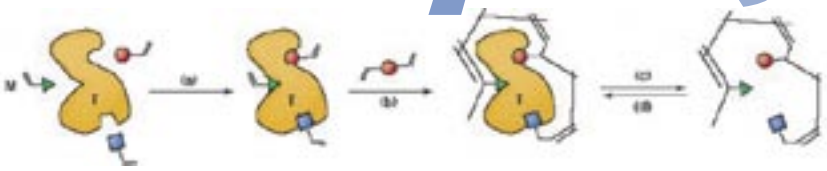
Grokker: www.groxis.com – Displays organized search results into related groupings, providing a visual map that appears as circles within circles.

What are specialty search engines?

Specialty search engines, also called topical search engines, "vertical" search engines or "vortals," are used to find more than just Web pages and sites. They allow the user to search for information relating to specific topics. Although there are many topic-specific Web sites, these sites offer specialty search engines for the topics they cover. Examples include: Educator's Reference Desk (educational information); SearchEdu (college & university sites); and WebMD (health information).

Tiny but Tough

Synthetic Antibodies Detect Foreign Molecules



by Jonathan Cheung

Red Tide, experienced first-hand this summer by Southern California beachgoers, is a neurotoxin-producing algae that is potentially fatal to humans when ingested. The condition requires that seafood be shipped to the Midwest where it undergoes a complicated extraction protocol to ensure safe consumption. Red Tide costs the U.S. an estimated $40 million to $100 million a year, according to *ScienCentral News*.

"If we could make a relatively inexpensive material that recognizes one of these toxins, we could develop a diagnostic to determine the toxicity level present in foods," suggests Kenneth Shea, professor of chemistry.

Shea and Abraham Lee, professor of biomedical engineering, are working to develop such materials. The UCI pair, one of four winners of the Calit2 Nicholas Foundation Award for Cross-Disciplinary Research, is using their funds to develop a method of synthesizing plastic monoclonal antibodies that perform the same function as natural antibodies: recognition of foreign molecules.

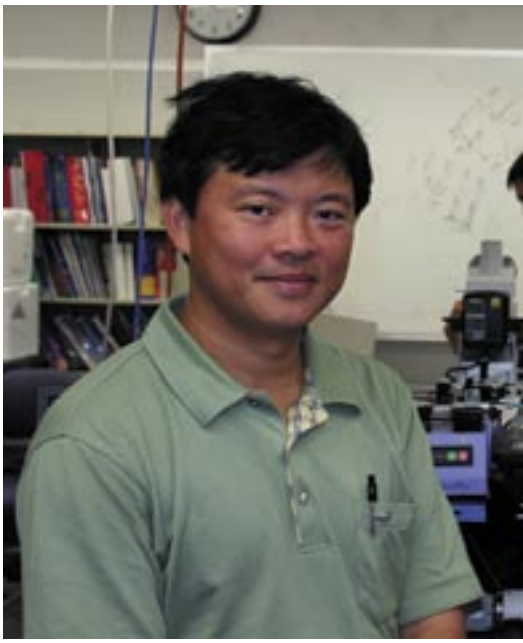
"... we anticipate many new research directions based on this technology as other scientists join in."

In addition to determining toxin levels in seafood, there are plenty of applications for monoclonal antibodies including chemical sensors, biomedical diagnostics and compound purification. "The army is interested in sensors that are capable of detecting the presence of chemical warfare agents," says Shea. "This requires recognizing the threatening molecule rapidly and efficiently using synthetic, robust materials instead of proteins or antibodies which are rather sensitive."

Man-made Resilience

The goal is to develop antibodies and proteins out of synthetic polymers vigorous enough to function in organic solvents, at various temperatures and in an assortment of extreme environments – unlike natural antibodies, which are comfortable only in water with a neutral pH.

"We want to make materials – that we can produce in large quantities



in a relatively straightforward way – that you can put on a hot plate and heat to 100 degrees without changing their functions," explains Shea.

He has already developed a method for creating polyclonal antibodies, those that will recognize a wide range of molecules. Creating pure monoclonal antibodies that will recognize only one specific molecule is more difficult. One approach is to reduce the synthetic antibodies to the size of a large protein and then employ affinity chromatography, a technique used to separate proteins. By covering the surface of a column with the desired binding molecule and running a mixture of antibodies down the column, the antibodies with a high attraction for the specific molecule attach to the column while the rest flow through. The high-affinity antibodies can then be released by a change in the pH and collected.

A Complete Manufacturing Platform

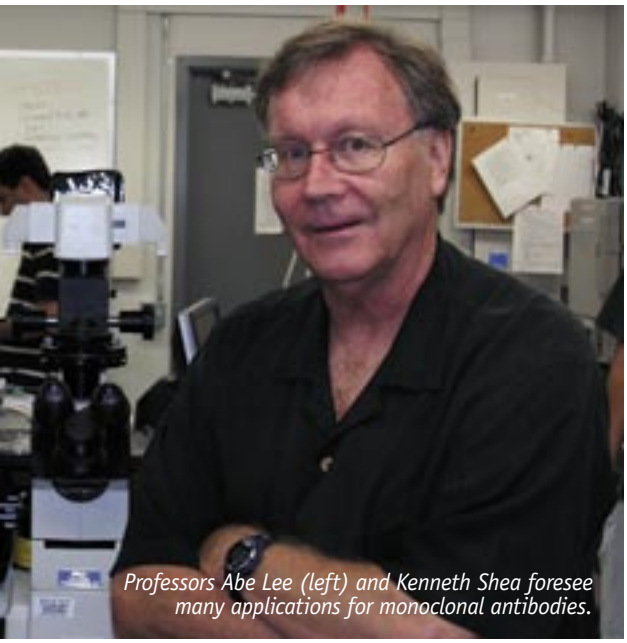
It is not a simple task, however, to mass-produce uniform sub-micron-size particles and put them through a separation technique. Enter Lee and his research on microfluidic devices. "The device allows you to control the formation of small particles that are more mimicking of a true antibody," says Lee.

Using nanojet droplet synthesis, a microfluidic device can produce streams of perfectly uniform, sub-micron-size droplets, each containing a catalyst, a template molecule and monomers that will polymerize into the antibody. The droplets will flow down a microchannel where a UV light source will induce the polymerization reaction, turning the droplets into solid particles. The particles will then move through a series of switchbacks with walls coated with the target-binding molecule, stopping the particles with a high affinity. With this process, microfluidic devices will act as complete manufacturing platforms, simplifying the creation of synthetic monoclonal antibodies.

New Field Emerges

According to Shea and Lee, their cross-discipline collaboration looks to be long-term. "This is a major effort and this award has allowed us to begin all of the necessary steps in this complicated process," Shea says. The process includes obtaining preliminary findings that lend credibility to their hypothesis in order to obtain funding from organizations such as the National Institutes of Health. "The Nicholas Foundation has provided the seed money," remarks Shea, a sum of $80,000 that has allowed them to begin proving that it is possible to make uniform, sub-micron size particles.

The researchers see promise and possibility in the project. "We're pretty excited to be opening up a new field," states Lee. "Once we have our first successes, we anticipate many new research directions based on this technology as other scientists join in."



Professors Abe Lee (left) and Kenneth Shea foresee many applications for monoclonal antibodies.

Nicholas Award Advances Collaborative Research

This is the first in a series of articles featuring research projects that were named winners of the first Nicholas Foundation Award for Cross-Disciplinary Research. The $300,000 gift promotes new collaborations among faculty members on high-risk, high-yield pilot research relevant to Calit2's mission. The first Nicholas Foundation award was announced last April; four winning projects were selected to share the prize from a field of 24 proposals. The winning projects encompass a wide range of multidisciplinary research, including a computational platform used in environmental education, an in-home integrated computing/communication system for treating people with spinal cord injuries, silicon-based current-injection lasers for integrated optoelectronic circuits and synthesized nano-sized "monoclonal" plastic antibodies.

The Nicholas Foundation, founded in 1998 by Dr. Henry T. Nicholas III, co-founder and retired co-chairman and CEO of Broadcom Corp., is committed to enhancing the quality of life by providing grants to nonprofit organizations, primarily in education, performing arts, humanities and science. Other Nicholas Foundation philanthropic activities in Orange County include gifts to UCI engineering, St. Margaret's Episcopal School, the South Coast Repertory, the Orange County Performing Arts Center and the UCI crew program.

http://www.calit2.net/newsroom/release.php?id=457

Tenants Celebrate Community

More than 200 Calit2 Building residents – researchers, post-docs, staff and students – got together early this summer to celebrate their joint occupancy. The group socialized in the building courtyard over a barbecue with all the fixings, enjoyed a jazz trio, won door prizes and at the "Welcome-to-the-Building" bash.

Girls Galore Explore

Sixty teenage girls, wearing matching red t-shirts and carrying logo-emblazoned tote bags, visited UCI and Calit2 during Eureka! Day last July. The guests were affiliated with Girls Inc., a national nonprofit youth organization that provides educational outreach to girls from underserved areas. After touring other parts of the campus, the visitors explored several Calit2 labs, participated in hands-on demonstrations and listened to faculty describe their research in an effort to excite them about education.

Innovation Series Debuts Genetic Medical Imaging

Imaging genetics, an innovative field that integrates medical images with individual genetic information, provides a unique opportunity for doctors to personalize medicine. Calit2, in partnership with OCTANe@UCI, featured this revolutionary approach to science at its inaugural "Innovation Series" event in August. "Genetic Medical Imaging – Converging Technologies Personalize Medicine & Treatment" was attended by nearly 100 people from the campus and the business community. The evening began with dinner in the Calit2 Atrium, continued with presentations by UCI faculty and concluded with a demonstration of HIPerWall, the multi-tiled, high-resolution display wall that visualizes medical and many other types of images (see pages 6-7).

Working on Transportation, Intelligently

Commuter gridlock is an all-too-familiar scene for California drivers.Calit2 researchers in Irvine and San Diego have been working on systems that utilize information technology to greatly improve traffic flow, and in August, they gathered at Calit2@UCI to share their results and look toward the future. Participants in the two-day Intelligent Transportation Systems and Telematics Workshop focused on three types of systems: vehicle-to-vehicle; vehicle-to-infrastructure; and automotive software and systems engineering. The groups have since compiled their results into "white papers" to present to funding agencies in an effort to turn their theories and applications into reality.

Advisory Board Meets

The Calit2 Advisory Board convened at the Irvine Calit2 Building in July to review the current state of the two-campus institute and discuss opportunities for solidifying its future. This year, UC Provost M.R.C. Greenwood attended the board's annual meeting to share her vision for the California Institutes for Science and Innovation, and the role they can play for driving competitiveness and innovation in California. Board members took a coffee break with the SURF-IT fellows (see page 4) to learn about their involvement in Calit2 research projects and to view several demonstrations. The students were equally excited to share their experiences with the highly-respected group that includes Vint Cerf, widely known as the father of the Internet.

UCI, Korean Connection Made

UC Irvine and the National Center for Nanomaterials Technology at Pohang University of Science and Technology, in South Korea, formally signed a memorandum of understanding in a ceremony Friday, Oct. 14, in the Calit2 Building. Calit2 Irvine Director Albert Yee, and Bill Parker, vice chancellor for research and dean of graduate studies, represented UCI at the ceremony, which was also attended by Sukhee Kang, mayor pro tem, city of Irvine. The MOU calls for shared training of researchers and technicians, and joint research that will benefit both institutions. The one-year agreement can be renewed with approval from both parties.

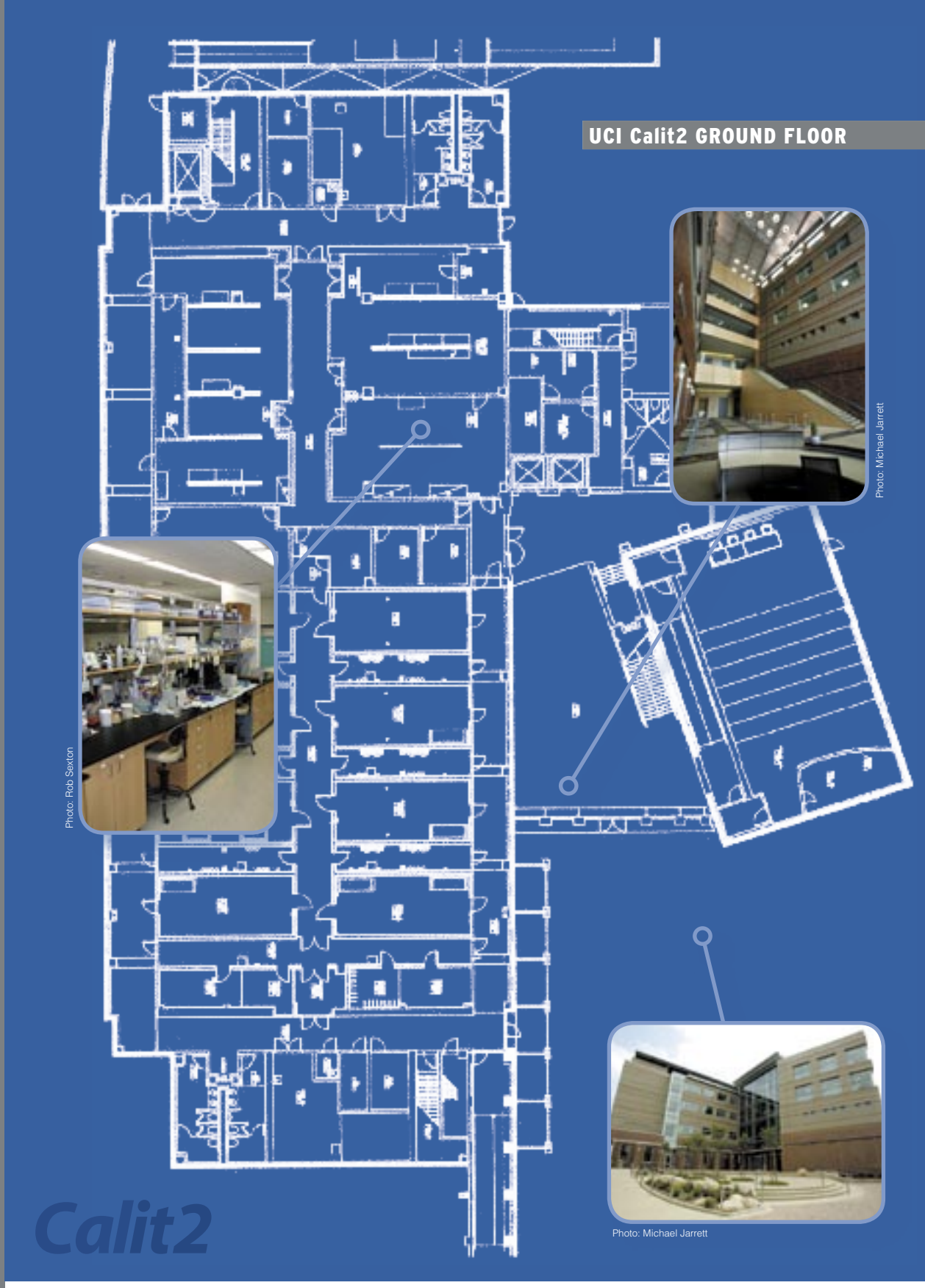
Calit2 and OC Business Groups Get Acquainted

The EcoRaft project set sail into the heart of the business community last August, as representatives from Calit2 joined those from several other UCI departments at a South Orange County Regional Chambers of Commerce event. The reception, held at Ketel One Vodka in Aliso Viejo, introduced local business people to the wealth of resources available at the university. The Calit2 contingent shared the institute's ongoing research – including EcoRaft, an interactive simulation that illustrates methods for preserving the environment – with visitors. EcoRaft was demonstrated by Calit2-affiliated graduate students Sara Goetz, Simon Yau and Eric Baumer.

Usage Note:

The noun *interface* has been around since the 1880s, meaning "a surface forming a common boundary, as between bodies or regions." But the word did not really take off until the 1960s, when it began to be used in the computer industry to designate the point of interaction between a computer and another system, such as a printer. The word was applied to other interactions as well as between departments in an organization, for example, or between fields of study. Shortly thereafter *interface* developed a use as a verb, designating the interaction between people, various communities or the private and public sector. But its niche still lies in the computer world, where the use of *interface* thrives.

Source: The American Heritage Dictionary of the English Language, Fourth Edition



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