

ITS UC DAVIS e-news

ITS-Davis e-news is the electronic newsletter of the UC Davis Institute of Transportation Studies. Written for alumni and friends, *ITS-Davis e-news* reports information from ITS-Davis and affiliated campus departments that host transportation-related programs. For previous issues, see the [e-news archives](#).

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ITS Celebrates 15 Years

15 YEARS: "Wow. That Makes Us a Full-Fledged Teenager!"



Pat Mokhtarian and alumnus Kevan Shafizadeh

ITS-Davis Director Dan Sperling's opening statement drew laughs and cheers from the more than 130 faculty, staff, alumni, students and friends gathered on campus the



Special friends deliver an anniversary toast to ITS-Davis

evening of April 29 to celebrate the Institute's 15th anniversary.

The gala dinner capped a day of entertaining alumni talks and thoughtful looks into the future of transportation by leading researchers. Heartfelt speeches, champagne toasts, a rockin' video created by the Institute's own Ernie Hoftzyer, together with great food and wine (but of course) and an unmistakable atmosphere of mutual respect and love created a giddy, familial bond that strengthened throughout the day and

evening.

In an evening speech reflecting on the Institute's growth and success, Sperling recounted its history through its people. "ITS-Davis is filled with many very accomplished researchers and students, some of the most dedicated and creative people I know...I believe that ITS-Davis has thrived because it is filled with people who want to make a difference."

Among those working hardest to make the day and evening a success were ITS-Davis staff Joe Krovoza, Renee Pearl, Stacy Mello and Katie Rustad, who together produced what Sperling called the Institute's classiest event yet.



Vice Chancellor Barry Klein congratulates Dan Sperling and his family

During the day, alumni from the last 15 years talked about their professions and credited the solid foundation that UC Davis provided.

"From my classes and research experience to the high-level information to which I was exposed, it gave me confidence," said John Gard, B.S. '92 Math and M.S. '94 CEE, now an engineer at Fehr & Peers.

The work done here "...is policy-relevant—not just ivory-tower research—but useful in the world. I see students here publishing, doing research, and it's very inspiring. It's the kind of center I want to build some day," said Jennifer Dill, B.S. '87 ESP, who came back to UC Davis to conduct Ph.D. research and is now a professor at Portland State University.

"Not until now, when we look back on those times, do we realize how special they were. None of us has been able to replicate that dynamic of policy and engineering that is so unique to ITS-Davis," said Kevan Shafizadeh, B.S. '96

CEE and M.S. '99 CEE, a professor at CSU Sacramento.

"There are so many people here who care about sustainable transportation and making a difference...and that's something you can't get most other places," said current student Jonathan Hughes, a sentiment that echoed throughout the day and evening.

ITS-Davis has a glorious future, Sperling said, in closing his evening speech. "Unlike most transportation centers, we are not rooted in the past. We are engaged in the key challenges facing this state, this country, and this world."

ITS-Davis is on a steep upward trajectory. He continued. "We are arguably already the world leader in sustainable transportation research, and we're just getting started."

Here's to the next 15 years.

[View the 15th Anniversary Image Gallery](#)

New Initiatives

FIRST OF ITS KIND: UC Davis Hosts Energy Efficiency Center

Long known as a leader in energy, environmental and transportation research, the campus is now home to the [UC Davis Energy Efficiency Center](#), the nation's first center to bring together leaders in academia, industry, and the investment community to advance innovation in energy efficiency—the state's most critical energy resource.

Governor Arnold Schwarzenegger and California's leading energy industry and policy experts mingled with energy researchers and academic leaders on the UC Davis campus in mid-April to celebrate the creation of the UC Davis Energy Efficiency Center through a \$1 million challenge grant from the California Clean Energy Fund (CalCEF).

"The center is the first of its kind in the nation and is destined to be a world leader in energy efficiency innovation," said UC Davis Chancellor Larry Vanderhoef.

The announcement took place in a soon-to-open campus building designed and built to achieve certification under the U.S. Green Building



Andy Hargadon at the podium, with the governor, Assembly Member Alan Nakanishi and Chancellor Larry Vanderhoef on stage.

Council's LEED (Leadership in Energy and Environmental Design) rating system. The governor toured the building before addressing the audience.

"This building is just the beginning," Schwarzenegger said. "This campus will become the academic center of the energy efficiency movement... the Energy Efficiency Center will be a lab for ideas of the future." (View video of the governor's announcement online [here](#))

The UC Davis Energy Efficiency Center will be unique because it focuses specifically on the technology transfer process for energy efficiency solutions and on developing the solutions in a multidisciplinary fashion, activities at which UC Davis excels. It will emphasize three energy use sectors: buildings, transportation, and agriculture and food production.

Initially, ITS-Davis will serve as the physical and administrative home of the Center until new space is identified. ITS-Davis Director Dan Sperling is associate director of the new Center, and Andrew Hargadon, an ITS-Davis affiliate and associate professor at the UC Davis Graduate School of Management (GSM), is the Center's founding director.

"This center will change the way we study energy efficiency, the way we teach it, and the ways in which we work together with the public and private sector to develop real and lasting innovations in energy – to get them out of the lab and into the marketplace faster," said Hargadon.



Campus architect Bill Starr shows the governor and chancellor ceiling tile made of waste wheat straw.

Benjamin Finkelor, a GSM graduate, has been named the Center's program manager. Over the past four years Finkelor has worked in the clean technology sector in the greater Sacramento region, having served as interim executive director for CleanStart, a regional business incubator, and as clean technology analyst for the California Public Employees' Retirement System.

In addition to its close affiliation with ITS-Davis and GSM, the Center will work very closely with the California Biomass Collaborative and the California Lighting Technology Center.

UC Davis won the grant in competition against Stanford University and UC Berkeley. The proposal was spearheaded by Joshua Cunningham, research staff member of ITS-Davis, and Dan Sperling. With leadership by Vice Chancellor of Research Barry Klein, the campus pledged \$1.3 million to match the CalCEF grant in operating and research funds, faculty time, and office and laboratory space. Already, 32 faculty members from 11 departments have

affiliated themselves with the new Center. UC Davis also plans to recruit 12 new faculty members in the energy field during the next several years as part of the Energy for the Future Initiative announced last fall.

In addition to the CalCEF grant and campus matching funds, PG&E Corp. pledged \$500,000 over five years for academic fellowships, recruitment, and an international energy conference. CalCEF is a \$30 million public benefit investment fund formed in 2005 as part of the Pacific Gas & Electric bankruptcy settlement.

► Research Results

BETTER PAVEMENT: UC Research Helps Save Money, Cuts Construction Delays

Every week, John Harvey and his Davis-based research staff from the UC Pavement Research Center (UCPRC) gather in the ITS-Davis conference room for a videoconference staff meeting with the other half of the UCPRC's research and technical staff based in Richmond, Calif. The Center is expanding its presence in Davis while maintaining a lab and the heavy vehicle simulation equipment in the Bay Area.

A sizeable UCPRC project funded by Caltrans' Division of Research and Innovation is supporting the state's implementation of a new approach to designing concrete and asphalt pavements. Called mechanistic-empirical design, the approach uses computer models and lab test results to calculate critical stresses on pavements, factor in climate, traffic and other constraints, and predict likely pavement performance.

"Caltrans is on the cutting edge in implementation of this approach," says Harvey, an associate professor of Civil and Environmental Engineering and director of the UCPRC. "It provides a far more powerful analytical capability to get the most cost-effective pavement design for a given road."



A four-inch diameter concrete core after compression testing. Data from the test will be used for a research project involving mechanistic-empirical pavement calculation methods.

Previous design methods involved a lot of trial and error. “The old way, we spent millions to build it in the field then track it over a long time. The pace of change for updating methods or trying new things was painfully slow.” Roads have typically lasted 20 years or longer, he notes. “So by the time they finally got the results of their study, the people who remembered the original questions were gone.”

Now, with a mechanistic-empirical framework, pavement researchers are starting with basic performance models then testing mechanical properties, such as stiffness, thermal expansion under day-to-night and seasonal temperature changes, and strength in the lab. “We can measure properties of the new structure or material in the lab, plug it into the model and get a first cut answer of whether it makes sense and is better than what we have. If it works in the lab, then we take it to the heavy-vehicle simulator to do a full scale check. Then we go into the field and build a test section.”

Over the past five years two major California road reconstruction projects, on I-710 in Long Beach and I-15 near San Bernardino, have benefited from this new approach; it saved money and helped speed up the construction, thus reducing traffic delay. Caltrans is applying the approach to new longer-life pavement designs, which will save money in the long run. “This method allows us to figure out how to get the longer design life without massively over-designing the road,” says Harvey.

The approach itself is not something the average person will notice – or, perhaps, even care about – Harvey acknowledges. “Nobody notices pavement unless it’s bad.” But he adds that all Californians will benefit by getting better pavement that lasts longer for fewer dollars.

FROM AG TO ENERGY: UC Davis Biomass Research Shapes State Energy Policy



Landfill gas-to-electricity bioreactor

UC Davis researchers affiliated with the Institute of Transportation Studies are providing research that is central to the state’s increased policy focus on bioenergy. Bryan M. Jenkins, a professor in the Department of Biological and Agricultural Engineering, heads the [California Biomass Collaborative](#), which contributed to the new state Bioenergy Plan, a report issued in mid-April that outlines near-term first steps that the state can take to “invigorate the biopower and biofuels sectors.”

The Collaborative is a forum for industry, government, academia and the environmental community to work together to build a roadmap for sustainable energy from biomass. It was formed about three years ago to examine the full spectrum of biomass, including electricity, heat, fuel, and bio-products, such as lubricants, green chemicals, and pharmaceuticals. Jenkins also heads the agriculture and foods committee of the recently created [UC Davis Energy Efficiency Center](#).

In the strictest of definitions, biomass means living material. There are three principal biomass resources currently in California: residues from agriculture and food processing, residues and thinning from forestry and mill operations, and urban residues such as solid waste and wastewater. In the future, greater amounts of biomass may come from dedicated energy crops—trees, grasses, and other crops grown specifically for energy or multiple purposes beyond the more traditional agricultural products.

“Biomass is a chemically diverse material,” Jenkins explains. “We have lots of opportunity to produce many different products from it. Essentially, anything we can produce from petroleum we can produce renewably from biomass—and more. A number of new products are already in production, but research needs to be continued on novel processes and methods.”

Jenkins’ relationship with ITS-Davis has grown in recent years due to an increased interest in biofuels in the transportation sector. Several ITS-Davis students are [exploring ways to extract hydrogen from landfill gas and agricultural resources](#). “It’s a natural association to join the efforts of the Collaborative and ITS-Davis,” he says.

Jenkins is heartened by the sudden level of interest in biomass. “We’ve wanted more sustainable development of the resource in moving toward a more renewable California, but we didn’t expect it all to get moving so quickly.” He credits high gasoline and other fuel prices and international developments, which prompt public concern about energy and in turn spurs policy makers to act.

The Collaborative contributed to the preparation of the state Bioenergy Plan through recommendations provided in a white paper and other documents on biomass issued last year, and by comments provided to a state agency task force charged by the governor with creating a plan for increasing bioenergy use in California. The Collaborative’s roadmap will be the long-term follow-on document that guides the state’s efforts in the field.

TRANSPORTATION PUBLICATIONS FROM UC DAVIS: Hot off the Presses

ITS-Davis has recently updated and catalogued many new research publications. For the latest transportation publications list, visit our [publications page](#).

Publications also may be ordered by fax, e-mail or mail.

<http://www.its.ucdavis.edu/publications/>

e-mail: itspublications@ucdavis.edu

Fax: 530-752-6572

Mail: Publications, Institute of Transportation Studies, UC Davis, One Shields Avenue, Davis, CA 95616-8762

Education Highlights

TESTING FATE: Team Fate Heads to Proving Grounds in June

In a matter of weeks, UC Davis's Team Fate will once again test its engineering and mechanical prowess and creative design capabilities in the second stage of the three-year ChallengeX Competition. The 30-member team, led by Mechanical and Aeronautical Engineering professors Andrew Frank and Paul Erickson, will travel in June to the General Motors Proving Grounds in Mesa, Ariz. with their re-designed competition vehicle.

Team Fate is one of 17 student teams nationwide seeking to re-engineer a Chevy SUV to minimize energy consumption, emissions, and greenhouse gases while maintaining or exceeding the vehicle's utility and performance. The ChallengeX competition succeeds the FutureCar and FutureTruck vehicle design competitions, which Dr. Frank's UC Davis team has won several times over the past decade.

The secret to Team Fate's previous successes has been its plug-in hybrid approach. Once again the UC Davis entry is the competition's only plug-in hybrid vehicle. This year, it's a flexible fuel vehicle capable of running on gasoline or ethanol as well as electricity. The team named the vehicle, "Trinity" to reflect its tri-fuel capability. The vehicle uses a Toyota Prius engine coupled with UC Davis's patented CVT, a high-power liquid-cooled lithium-ion battery, and a 10kW fuel cell to power auxiliary loads.

Bryan Jungers, who is completing his master's in Civil and Environmental Engineering under Professor Deb Niemeier, is this year's Team Fate co-leader along with grad student Terrence Williams of Mechanical and Aeronautical Engineering. Another student, Beth Solik, serves as the team manager. Jungers says one of the biggest challenges has been keeping students engaged on a long-term basis.

"Last year, we focused on modeling, designing and planning. It was tough to get students excited about that. Many prefer the hands-on work."

The point of ChallengeX, he notes, is to mimic a manufacturer's typical three-year vehicle design process. The competition also treats the team like a real-world company, but Jungers points out college students can't be expected to act like a real-world company.

"We have to be accountable to ChallengeX, but our team is all student volunteers, most of them undergrads with competing interests. We have to find fun ways to motivate them and give them tasks that are meaningful. If we push too hard, we lose them."

Now, with the on-road testing part of the competition only a few weeks away, the team is very focused. For the last four months, the work has been all hands-on; students have been fitting new and replacement components into the existing space and finding ways to re-engineer the space to accommodate the drivetrain, motor and other conversion parts.

After the on-road tests in June, the team will refine the vehicle, fix any bugs, work to make it more consumer friendly, and put the finishing touches on the body so it is ready to advance to the third year of competition.



Bryan Jungers with past winning vehicle, Joule

HISTORIC QUALIFYING EXAM: Five for Five

David Ory, a doctoral student in Civil and Environmental Engineering (CEE), made history in February when he passed his qualifying examination and advanced to candidacy for the Ph.D. It was historical not because he passed,



Pat Mokhtarian, Joan Walker, Susan Handy, David Ory, Debbie Niemeier, Yueyue Fan

but because his five-person examination committee consisted entirely of women faculty, all with engineering backgrounds.

“We think this may be the first time – ever – for the Ph.D. oral qualifying exam committee of an engineering student to be all women,” beamed CEE Professor Pat Mokhtarian, Ory’s major professor and one of the committee members.

Susan Handy, associate professor, Environmental Science and Policy, was the qualifying exam chair. Other committee members were CEE’s **Debbie Niemeier**, professor, and **Yueyue Fan**, assistant professor; and **Joan Walker**,

assistant professor, Geography and Environment at Boston University.

OUT IN FORCE: UC Davis Researchers and Students Attend National Hydrogen Conference

Once again, a large group of researchers and students represented the Institute and its many hydrogen research projects at the annual National Hydrogen Association Conference, this year, in Long Beach, Calif.

The highlight for many was when Professor Joan Ogden accepted the prestigious Robert M. Zweig Public Education Award on behalf of ITS-Davis during the conference awards luncheon.

The awards program lauded the Institute for its “Extensive hydrogen program headed by world-known researchers and scientists; publishing of over 50 papers on hydrogen and fuel cell vehicles and presenting over 80 papers at major international conferences; its broad graduate program to train the next generation of engineers, policymakers, and business leaders in hydrogen technology and policy.”

Dr. Robert Zweig was a Riverside, Calif. family physician who saw the effects of air pollution in his patients’ health and devoted 35 years to promoting the use of alternative fuels. Many in the industry remember Zweig as the man who once drank the water from the tailpipe of a hydrogen-powered vehicle. Zweig died in 2002.

In accepting the award, Ogden thanked all who support hydrogen research at UC Davis. “Having known Bob Zweig for a long time, it is a great honor for us to receive his award,” she said.

Hydrogen Pathways Program researchers made seven presentations at NHA. UC Davis represented one quarter of the university and national lab presentations at the conference. [View the presentations here.](#)



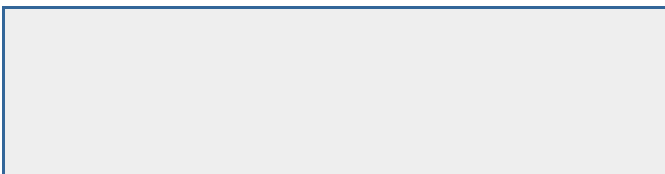
Joan Ogden at the awards ceremony with NHA President Jeff Serfass, left, and Shell Hydrogen’s Phillip Baxley, chairman of the board of NHA.

PARTNERS WANTED: GATE Center Wants You!

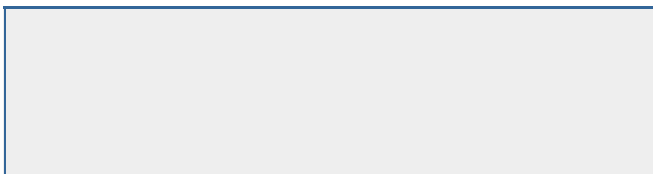
The [UC Davis Fuel Cell, Hydrogen, and Hybrid Vehicle \(FCH2V\) GATE Center of Excellence](#) is entering its second year of research, education, industrial collaboration and outreach on automotive technology. The FCH2V Center is seeking partnerships with industry for student research and education fellowships in well-defined research areas that are compatible with the Center. Contact Program Manager [Are Gjellan](#) for information.

ITS-Davis and Campus Highlights

SEE THE FUTURE: Picnic Day Draws Crowd



Once again the Institute, together with the College of Engineering,





Belinda Chen signs up people to ride in fuel cell cars.

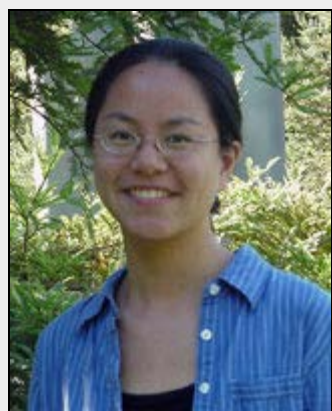
ChallengeX Team, California Air Resources Board and California Fuel Cell Partnership, gave visitors a look into the



Are Gjellan helps a visitor into the UC Davis Toyota FCHV.

future of transportation at Picnic Day, the annual campus open house, which typically draws 50,000 people. More than a thousand visitors stopped by the exhibit to kick a few tires, grab a glimpse under the hoods of both fuel cell and battery electric vehicles on display, and learn about future alternative fuel vehicle options. Over the course of the day, 575 people took rides in the UC Davis Toyota Highlander Fuel Cell Hybrid Vehicle and a Hyundai fuel cell vehicle. All emerged with big smiles.

ITS-DAVIS PEOPLE: New Fellowships Announced

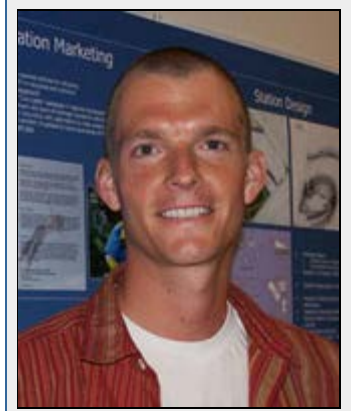


Belinda Chen

Belinda Chen, a Transportation Technology and Policy Ph.D. student, has won a 2006 Dwight D. Eisenhower Fellowship from U.S. DOT's National Highway Institute. The fellowship is awarded to qualified students conducting transportation research, and is intended to "support advanced transportation workforce development," the award letter states.

Chen is studying the environmental and economic impact of motor-vehicle trends on low-income households. She is evaluating how new vehicle sales trends toward larger luxury cars trickle down to the used car market, typically affecting low-income peoples' mobility, purchase decisions, and factors such as their likelihood to hold on to older, more polluting cars longer.

Nic Lutsey, a Transportation Technology and Policy Ph.D. student, has been named a 2006 Eno Fellow, from the Eno Transportation Foundation.



Nic Lutsey

Eno Fellows are invited to participate in the Foundation's Leadership Development Conference, an intensive week-long professional development program held each spring in Washington, D.C.

ITS-DAVIS PEOPLE: Goodbye and Hello



Joan Tolentino

ITS-Davis bids a fond farewell to Graduate Student Coordinator **Joan Tolentino**, who is retiring after more than seven years of service to the Institute. Tolentino managed the Transportation Technology and Policy graduate program almost from its inception. During her tenure, the program enrollment grew from fewer than 10 students to its current 45 students. She played a key role in the administration of the \$2.7 million National Science Foundation IGERT award and has been integral to the growth of ITS-Davis.

"Joan has been an absolute treasure to me, and to ITS-Davis," said Pat Mokhtarian, ITS-Davis associate director of education. "We couldn't have asked for a better person to do this demanding job, and are so fortunate to have held her for so long."

ITS-Davis welcomes **Paisley Rosengren** as the new Graduate Student Coordinator. Rosengren, a UC Davis graduate, earned a bachelor's in



Paisley Rosengren

Psychology. She continued her studies at CSU Sacramento and earned a master's in Counselor Education. She most recently worked as a clinician for Yolo County. We are happy to have someone with Rosengren's skill set join ITS-Davis and think she will be a terrific resource for

our graduate students, faculty and staff.

ITS-DAVIS PEOPLE: Awards and Recognition

Obadiah Bartholomy has received an Appreciation Award from the California Climate Action Registry. Bartholomy has been working at Sacramento Municipal Utility District on its greenhouse gas emissions reduction program, and interacting with the state and the Climate Registry on the state's Climate Action Plan. The California Climate Action Registry is a non-profit public/private partnership that serves as a voluntary greenhouse gas (GHG) registry to protect, encourage, and promote early actions to reduce GHG emissions.

VIEW FROM ABROAD: Pedestrians Rule

Ph.D. Student Chris Congleton, traveling Asia on a year-long self-declared sabbatical to learn about how different societies organize personal travel options, recently submitted this missive on the superiority of the human-powered rickshaw:

"...Kolkata, India is the most horn-happy and congested city I've ever been in, with a sort of frenzied buzzing gridlock; it took two hours to travel 20 km in a taxi there. The most amazing thing is this: in spite of being banned after 1945, there are still hand-pulled rickshaws there, and they are faster than almost any other mode over a distance of several kilometers. Why?

I took a rickshaw across town in Kolkata in order to catch a train, and I was surprised to find that having this man running in front of me was faster than being in a car or a tuk tuk (a cycle rickshaw) and he was much faster than me walking or running with my backpack on. He would magically wave his fingers at oncoming cars and motorcycles, tuk tuks and cycle rickshaws, and they would veer out of his way, impelled by the power of his fingers and his unwavering determination.



Chris Congleton rides in a bicycle rickshaw in Kolkata.

Here is a road user who is one of the most vulnerable on the road, and yet because of pity or fear or his predictably stubborn determination to take right of way (or something else I cannot yet grasp), he can dominate much of the space much of the time. The only road users who clearly overruled his determination were the pedestrians he attempted to overtake; sometimes they would get out of the way and sometimes he would have to wait for them.

Although this mode of transport has been discontinued and is disapproved of in much of the world, my experience with the rickshaw holds a mysterious lesson for advocates of walking and cycling and other non-motorized modes everywhere: a group of consistently behaving vulnerable road users can dominate the larger, heavier, and more injurious motorized contingent. Whether or not it takes the congestion of Kolkata or not remains to be discovered, at least for me..."

EXTRA! READ ALL ABOUT IT! ITS-Davis and UC Davis Researchers in the News

Ken Kurani, May, in *Wired* magazine, on how consumer beliefs and perceptions affect their car-buying behavior.

Andy Frank, April Issue, *Scientific American*, in an article co-authored by Joe Romm on plug-in hybrids.

Anthony Eggert, April 25, in the *Edmonton Journal* (Alberta) and on CTV.CA (Canadian Television) on the challenges faced by alternative fuels despite high gas prices, coverage from the Canadian Energy Research Institute conference.

Joan Ogden and Anthony Eggert, April 22, in *The Sacramento Bee*, on hydrogen and fuel cell vehicles; advance coverage of President Bush's visit to California Fuel Cell Partnership.

Dan Sperling, April 17, on *KCRA.COM*, on President Bush's expected Earth Day (April 22) trip to the California Fuel Cell Partnership to tout fuel cells.

Dan Sperling, April 16, in *The Los Angeles Times*, in a feature examining the future of alternative fuels and alternative vehicle technologies.

Andrew Hargadon, Chancellor Larry Vanderhoef and others, April 12 and 13, in multiple print, broadcast and online news outlets on the announcement of the new UC Davis Energy Efficiency Center.

Andrew Frank, April 2, in the *New York Times*, and March 23, in the *Detroit Free Press*, and a variety of other national and regional media

outlets, on plug-in hybrids.

Dan Sperling, and Andy Frank on *CNN*, March 18 and 19, in a one-hour *CNN Presents* special titled "We Were Warned – Tomorrow's Oil Crisis."

Andrew Burke, March 6, in *Toronto Star*, on potential for ultracapacitors to provide portable power, acknowledging that there is a lot of hype but not a lot of research to back it up.

Dan Sperling, March 5, in *The Fresno Bee*, in a story on biodiesel, noting that the ideal crops, such as soybeans, fare poorly in California's Central Valley.

Andy Frank, February 2, in *The Sacramento Bee*, on plug-in hybrid vehicles, and their potential contribution to environmental and energy needs in conjunction with biofuels and alternative fuels.

Dan Sperling, February 1, on *ABC News Online*, in an article on switchgrass as a feedstock to ethanol, following President Bush's State of the Union address.

Chris Congleton, in *La Presse* (Montreal), January 30, in an article on his research with California PATH on the interactions between pedestrians and motorists.