

ITS-Davis



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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Save The Date!

ITS-DAVIS HOSTS HYDROGEN AND FUEL CELL VEHICLE PROGRAMS OPEN HOUSE OCTOBER 20

You're invited! Please join ITS-Davis at our Hydrogen and Fuel Cell Vehicle Programs Open House from 10:00 a.m. until 1:00 p.m. Monday, October 20. Chancellor Larry N. Vanderhoef will preside over the formal program from 10:30 a.m. until 11:15 a.m., followed by program talks and vehicle demonstrations.

The Open House will feature six research and demonstration programs, including: our first Federal Transit Agency hydrogen enriched natural gas bus; the completion of Northern California's newest hydrogen refueling station at UC Davis; our Toyota Fuel Cell Hybrid Vehicle and other ongoing FCV research programs; our diesel truck with a fuel cell APU to reduce idling emissions; the ITS-Davis Hydrogen Pathways

research program; and the arrival of the first “Georgetown” fuel cell bus for future UC Davis engineering research and education.

Please RSVP to ITS-Davis events coordinator Marlynne Walker itsconference@ucdavis.edu or call 530/752-4909.

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Research Results

SETTING THE STAGE: ITS-Davis Research Aids California Regulators

The University of California is often called the state's research arm and is designated in the state's education code as “the primary state-supported academic agency for research.” So it is no surprise that state agencies often call on academic experts from the university system to conduct research that supports state policy-making.



David Bunch discusses his CARBITS model after the ARB workshop

ITS-Davis researchers currently are engaged in important qualitative and quantitative research for the California Air Resources Board (ARB) that will aid the agency's staff in developing a groundbreaking regulation to reduce greenhouse gas emissions from passenger vehicles. David Bunch, of the Graduate School of Management, is working with ARB staff on a sophisticated consumer response model. Institute director Dan Sperling and research engineer Andy Burke, along with grad students Ethan Abeles and Belinda Chen, are reviewing the automotive industry's historic response to

regulation, and the general public's response to industry's actions. All five attended a September 18 ARB workshop in Sacramento on the regulation's potential economic impacts.

“Thanks to government intervention that began in the mid 1970s, vehicles are far safer, less polluting, and less energy consuming than they were four decades ago,” Sperling said. “Safety and pollution rules have been especially effective. They have gained widespread support from the public and broad acceptance by industry.”

Reducing greenhouse gas emissions has been more controversial, he noted, because it is perceived as fundamentally more difficult and expensive to accomplish than reducing criteria air pollutants.

Bunch participated in the project to provide technical support for discussion of his UC Davis model, called CARBITS, designed to estimate consumer response to climate change regulatory scenarios involving changes to vehicle price, greenhouse gas emissions, and/or performance. It simulates current and future vehicle purchase decisions of California households, extending out to the year 2020.

“We're trying to develop the most advanced system for simulating future market behavior under many different scenarios,” Bunch explains. The model takes a micro-simulation approach by identifying a huge range of possible inputs that closely mirror real life.

For example, the model “ages” each household (simulates behavior) over a 6-month time interval. One household may have a birth, while another may see kids off to college, Bunch explains. “Our assumption is, in aggregate, that all these little effects add up to have meaning and can help us calculate what the market might do,” he says.

Every six months, the model considers the probability of a household engaging in a vehicle transaction. It calculates the kind of

transaction such as replacing an existing vehicle, or adding a new vehicle to the household, then simulates the transaction. "We're adding these effects, because it's been demonstrated over the years that these really are important determinants of vehicle purchase behavior," Bunch continues.

Many standard models are not as robust and do not take this kind of data into effect, Bunch says.

"But with the major change in the vehicle market that will likely result from these and other emissions regulations, you need a detailed model to capture the likely effect," Bunch adds. "We're giving the ARB a state-of-the-art quantitative analysis that they can feel comfortable using as a foundation for the regulatory structure."

Under AB 1493 (Pavley), ARB must develop a regulation that requires automakers to reduce global warming emissions from non-commercial passenger vehicles to the maximum feasible and cost-effective extent, starting with the 2009 model year.

TRANSPORTATION PUBLICATIONS FROM UC DAVIS: Hot off the Presses

"Modeling of Line-Haul Truck Auxiliary Power Units in ADVISOR 2002" Wallace, John Paul. ITS-Davis. August 2003. UCD-ITS-RR-03-7

"Davis Smart Mobility Modeling Project Scoping and Planning Project," Shaheen, Susan A. and Rachel Finson. ITS-Davis. March 2003. UCD-ITS-RR-03-6.

"Applying Integrated ITS Technologies to Carsharing System Management: A Carlink Case Study," Shaheen, Susan A. and Kamill Wipyewski. ITS-Davis. June 2003. Publication No. UCD-ITS-RR-03-5.

"Fuel Cells for Auxiliary Power in Trucks: Requirements, Benefits, and Marketability," Lutsey, Nicholas. ITS-Davis. July 2003. Publication No. UCD-ITS-RR-03-04.

Publications can be ordered by fax, e-mail or mail. Some are now available online.
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Education Highlights

BACK TO SCHOOL: UC Davis Welcomes New Faculty and Researchers

As classes get underway, ITS-Davis is pleased to welcome two new highly qualified faculty members to the UC campus. Joan Ogden, Ph.D., one of the country's premier researchers in hydrogen energy, is an associate professor in Environmental Science and Policy. She also will serve as an associate energy policy analyst at ITS-Davis, and was recently appointed co-director of ITS-Davis's Hydrogen Pathways research program.



Ogden arrived in August, much to everyone's excitement, including Ph.D. student Brett Williams. "Joan's work is probably the single most important factor that cemented my interest in hydrogen and fuel cells in about 1994," he said.

See the [July e-news](#) for more details.

Joan Ogden

Yueyue Fan, Ph.D., joins the faculty as an assistant professor in Civil and Environmental Engineering. Fan's work spans transportation engineering and transportation policy. Her research focus is on network optimization and civil infrastructure systems management, with an emphasis on applied mathematics. She also has industrial experience in both transportation planning and intelligent transportation systems.



"I was drawn to ITS-Davis by the reputation of the transportation program and the very friendly and encouraging working environment here," she told e-news. "I'm already feeling very welcome here."

Fan, who recently completed her Ph.D. in Civil Engineering at the University of Southern California, will teach a graduate course this winter on optimization and control theory and application in civil infrastructure systems. She received her B.S. and M.S. degrees in Civil Engineering from Dalian University of Technology in China in 1995 and 1998, respectively.

Yueyue Fan

The Institute also welcomes Chris Yang, a post-graduate researcher who received his Ph.D. this year from the Department of Mechanical and Aeronautical Engineering at Princeton. Yang will work with Joan Ogden, organizing and conducting research projects on hydrogen fuels for transportation as part of the Hydrogen Pathways program. He also will provide additional research support in the ongoing design and analysis of fuel cell auxiliary power units.

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New Initiatives

COAL-TO-HYDROGEN: Erickson Wins Grant to Study Feasibility

Assistant Professor Paul Erickson is the principal investigator on a new \$500,000 U.S. DOE-funded project to research the feasibility of producing hydrogen from coal-based methanol using the latest reformation technologies. Erickson, who joined the UC Davis Mechanical and Aeronautical Engineering faculty last fall and is affiliated with ITS-Davis, also will test the resulting product gas, if of sufficient quality, in a Polymer Electrolyte fuel cell stack.

"I plan to compare the coal-derived hydrogen fuel to the hydrogen fuel that is currently being used in fuel cells," Erickson explains, "and demonstrate a complete cycle of fuel to electrical energy as would happen within a fuel cell system."



Previous efforts to demonstrate a coal-to-hydrogen pathway have been less successful. Fuel cells need very clean, high-quality fuel, which typically has not been achievable from high-sulfur coal. Erickson believes his steam reforming and autothermal reforming processes may produce a fuel grade that is acceptable.

"It's important to conduct the research to see if it's feasible," Erickson explains, "because if it is, it allows us to diversify our energy portfolio using domestic fuel. We may not have to drastically change our existing fueling infrastructure."

Paul Erickson in the Hydrogen Production and Utilization Laboratory

In addition to several other reformation research projects, Erickson is examining the potential for biomass fuel to serve as a hydrogen feedstock. He also teaches and uses his liquid methanol fuel cell bus as a research and teaching tool.

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ITS-Davis and Campus Highlights

NEW MEMBERS JOIN BOARD OF ADVISORS

ITS-Davis welcomes three new members to its Board of Advisors. Each brings a unique and valuable perspective that broadens the Institute's capabilities. They are:

- David Burwell, Senior Fellow, Prague Institute for Global Urban Development (former president of the Surface Transportation Policy Project)
- Steven Lockwood, Vice President, Parsons Brinckerhoff
- Mitsuhiro Yamashita, President, Nissan Technical Center North America, Inc.

The board meets in December.

ITS-DAVIS WELCOMES NEW STAFF

During her first week on the job, Marlynne Walker, the Institute's new events and publications coordinator jumped right in to the fire and helped out at the Asilomar Conference. Now she's busy planning the Institute's Open House on October 20. A UC Davis graduate, Walker had been living in Los Angeles and working in teaching and for secondary school STAR programs. She brings excellent project management, editing, budgeting, contract preparation and statistical research skills to ITS-Davis, and we're glad she's here.

Katie Rustad has just joined ITS-Davis as the new assistant to Dan Sperling, Joe Krovoza and Renee Pearl. Katie's formal studies are in anthropology, linguistics and teaching. A recent high school English teacher, she has experience in academic office support at the University of Minnesota. We are delighted to have Katie with us and are already marveling at her talents.

ON THE ROAD AGAIN: UC Davis Attends Challenge Bibendum

UC Davis showed off its four student-built plug-in hybrid vehicles — two SUVs and two sedans that have participated in the FutureTruck and FutureCar programs — as well as its Toyota fuel cell hybrid vehicle at this year's Michelin Challenge Bibendum September 23-25.

The vehicles participated in the Bibendum's fuel efficiency, emissions and performance evaluations, and took part in a road rally from Sonoma, Calif. to San Francisco. "It's the only event in the automotive world that demonstrates green technologies and is open to all manufacturers and researchers," said Andy Frank, professor of Mechanical and Aeronautical Engineering.

During a news conference at the event, Toyota announced that its first left-hand drive fuel cell hybrid vehicles leased for customer evaluation in the U.S. would be delivered to UC Davis and UC Irvine in October. Each campus will receive one car. The new car will join UC Davis's first fuel cell vehicle, a right-hand drive model, and be used in ITS-Davis's evaluation of consumer response to fuel cell vehicles.

Matthew Caldwell, Michael Nicholas and Rusty Heffner with Bibendum

Toyota's Bill Reinert said the university's research would help the automaker plan for the future market. "There's no real way we can understand how fuel cell technology will penetrate the market," he told reporters. Reinert is national manager of the Advanced Technology Group, Toyota Motor Sales, USA.

Approximately 30 representatives from Mechanical and Aeronautical Engineering and ITS-Davis attended the event. They participated in the event's Learning Center, answered questions at the Institute's display, and generally made sure that anyone who would listen got a good earful about the exciting transportation and clean vehicle research and education work occurring on the UC Davis campus.

Student Kenth Pedersen (Transportation Technology and Policy) was ecstatic about the experience. "This is such an exciting field. I talked to so many people, I learned so much, and I even got to test drive several of the cars. I'm grateful for the opportunity that my affiliation with ITS-Davis gives me to participate in events like this," he said.

Rusty Heffner test drives a diesel-fueled BMW

has been held in Europe and the U.S. on alternating schedules.

Michelin launched the Challenge in 1998 to allow the manufacturers' technological research into clean vehicles to be assessed in real operating conditions. The event

FALL SEMINARS: Learn a Lot in an Hour!

ITS-Davis continues its fall seminar series on Thursdays from 12:05 p.m. to 1:00 p.m. in Kemper Hall (previously known as Engineering II), Room 1065. Coffee, tea and cookies will be served.

- **October 9**
Patricia Mokhtarian, Professor, Civil and Environmental Engineering and Chair, Transportation Technology and Policy
Technical Writing Tips and Traps
- **October 16**
Lyn Long, Research Associate, Institute of Transportation Studies, UC Irvine
Taken for a Ride
- **October 23**
Jack Johnston, EMRE Coordinator, ExxonMobil Research and Engineering
Hydrogen for Advanced Vehicle Systems
- **October 30**
Lewison Lem, Transportation Policy Manager, California State Automobile Association
Current Transportation Policy Issues in Local, State, and Federal Government
- **November 6**
Dirk Zumkeller, Professor's Chair on Transportation and Director, Institute of Transportation Studies, Karlsruhe, Germany
Title to be announced
- **November 13**
Mike Nicholas, M.S./Ph.D. Student, Transportation Technology and Policy
Title to be announced
- **November 20**
Yueyue Fan, Asst., Professor, Civil and Environmental Engineering
Title to be announced
- **December 4**
To be announced

LEADERS AND THINKERS: Record Attendance at 2003 Asilomar Conference

More than 200 experts in energy, transportation and the environment attended ITS Davis's Asilomar 2003: The Hydrogen Transition conference over the summer. The ninth biennial conference on transportation and energy attracted the nation's leaders in hydrogen and transportation.

With a focus on the coming hydrogen transition, the goal was not to design or advocate for such a transition, but rather to address key questions about the steps necessary for a transition to occur, and to explore whether such a transition is likely, needed, or even possible.

In addition to tackling the many issues that factor into a hydrogen future, participants examined lessons learned from the past 25 years, and discussed

Student Belinda Chen with Dan Sperling

whether hydrogen is any different from our previous experiences. Sessions also covered hydrogen infrastructure and markets, the business case for a hydrogen transition, policy options and instrument, and the bigger picture—beyond hydrogen to greenhouse gas emissions and reduced oil use.

Detlef Stolten, Research Center Juelich, Germany, Alan Lloyd, chairman, California Air Resources Board, and Achim Dahlen, Ministry of Transportation, Germany enjoy the scholarly, yet jovial atmosphere.

SWITZERLAND CONFERENCE DRAWS UC DAVIS ATTENDEES

UC Davis was well represented at this summer's International Association for Travel

Behavior Research conference in Lucerne, Switzerland. ITS-Davis Associate Director Pat Mokhtarian, Susan Handy (Environmental Science and Policy), and Ryuichi Kitamura (ITS-Davis and Kyoto University), presented papers at the four-day conference.



Ilan Saloman (ITS-Davis and Hebrew University), and UC Davis Ph.D. alumni and former students of Kitamura, Ram Pendyala (University of South Florida) and Konstadinos Goulias (Pennsylvania State University) attended the conference, as well.

Ram Pendyala, Pat Mokhtarian, Ryuichi Kitamura,
Konstadinos Goulias on Switzerland's Mt. Pilatus.

EXTRA! READ ALL ABOUT IT: ITS-Davis and Associated UC Davis Colleagues in the News

Tom Cahill, in numerous national papers, on his research about air toxins resulting from the World Trade Center collapse, the week of September 8-11.

Susan Shaheen, in the *Contra Costa Times*, August 22, in an article on the use of the Segway HT in a rental test program managed by UC PATH's Innovative Mobility Research group.

Dan Sperling, in *TR News*, July-August 2003, in a profile on his leadership in transportation research.

John Tillman, in the *California Aggie* and *Davis Enterprise*, with Toyota FCV during a local technology fair.

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