



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 conduct transportation-related research and education. For previous issues, see the [e-news archives](#).

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Research Results



Air pollution lifecycle, as illustrated by Anthony Wexler

AIR QUALITY RESEARCH: "There's No Place Like UC Davis"

Anthony Wexler, Ph.D., an atmospheric scientist at UC Davis, marvels at the breadth of experience among UC Davis faculty studying air pollution. "There are close to 30 — or 50, depending on how you classify their work — on-campus faculty doing air quality research. Having that number of researchers in one place is unheard of," Wexler says.

The university has internationally known experts working on all sides of the air pollution lifecycle, Wexler notes, from researchers studying emissions from vehicles, agricultural dust and other sources, to those studying the atmosphere and its role in air pollution transport, and others studying the receptor impacts, such as human health effects.

The former University of Delaware professor who has been at Davis for a year and a half studies how very small particles, measured in nanometers, or billionths of a meter, contribute to air pollution and affect human health and climate. Wexler's position is housed in three separate departments: Mechanical and Aeronautical Engineering, Civil and Environmental Engineering, and Land, Air and Water Resources.

Wexler has developed new equipment for analyzing single nanoparticles in polluted air. He is participating in an Environmental Protection Agency project to monitor air quality in selected cities including Pittsburgh, Houston, and Fresno, Calif. He also studies how particles of different sizes are carried through the airways into the lungs, and how they can affect human health.

Wexler is one of many faculty members whose research, though not directly involving transportation, has important links to transportation. As an ITS-Davis affiliated faculty member, Wexler's work broadens the scope and capabilities of ITS-Davis.

Another UC Davis researcher, Thomas Cahill, Ph.D., an international authority on the constituents and transport of airborne particles, leads a group of distinguished experts who have just completed a study of the dust and smoke blown through lower Manhattan after the collapse of the World Trade Center.

The group identified unprecedented clouds of very fine particles that should be considered in evaluating rescue workers' and residents' health problems, and recommended specific cleaning methods for contaminated apartments, offices, schools and other indoor spaces.

"No one has ever reported a situation like the one we see in the World Trade Center samples," says Cahill. "The air from Ground Zero was laden with extremely high amounts of very small particles, probably associated with high temperatures in the underground debris pile. Normally, in New York City and in most of the world, situations like this just don't exist."

Cahill, a professor emeritus of physics and atmospheric sciences and a research professor in applied science, heads the UC Davis DELTA Group (for Detection and Evaluation of Long-range Transport of Aerosols), a collaborative association of aerosol scientists at several universities and national laboratories. The DELTA Group has made detailed studies of aerosols from the 1991 Gulf War oil fires, volcanic eruptions, global dust storms, and most recently Asia.

Other air quality faculty and researchers at UC Davis that affiliate closely with ITS-Davis include: Harry Dwyer (Mechanical and Aeronautical Engineering (MAE)), Ian Kennedy (MAE), Michael Kleeman (Civil and Environmental Engineering (CEE)), Doug Eisinger (CEE) and Dan Chang (CEE).



Thomas Cahill at news conference on air quality study of New York's "Ground Zero"

UC DAVIS RESEARCH A PROMINENT COMPONENT OF TRB

UC Davis faculty, researchers and students once again demonstrated their extensive research at the 81st annual meeting of the Transportation Research Board in Washington D.C., January 13-17. The university was well represented on panels, in meetings and in poster sessions, a selection of which are listed below. The Institute of Transportation Studies also held its annual reception on the evening of January 15. Estimates were that close to two hundred friends of ITS-Davis from other campuses, agencies, NGOs and industry stopped by the George H. W. Bush Presidential Suite of the Omni Shoreham Hotel to visit with their acquaintances from UC Davis.

Monday, January 14

Session 103: Congested Traffic Flow: Phenomena and Models ***Kinematic Wave Traffic Flow Model for Mixed Flow***

H. Michael Zhang and Wenlong Jim

Session 130: Shared-Use Vehicle Systems

Susan A. Shaheen, presiding

California's Zero-Emission Vehicle Mandate: Linking Clean Fuel Cars and Shared-Use Vehicle Approaches

Susan A. Shaheen and Dan Sperling; John Wright, UC Berkeley

Taxonomy of Shared-Vehicle Systems

Susan A. Shaheen; Matthew J. Barth, UC Riverside

Session 187: Road Ecology—Science and Solutions, Part 1: Roads, Roadsides, and Wildlife (Part 2, Session 229)

Road Systems

Thomas Turrentine

Session 197: Integrated Land Use – Transportation Modeling Design and Application Issues

Comparison of Highway and Travel Demand Management Measures Using Integrated Land Use and Transportation Model in the Sacramento Region

Caroline J. Rodier and Robert A. Johnston; John E. Abraham and John Douglas Hunt, University of Calgary, Alberta, Canada

Session 208: Transportation Energy, Air Quality, and Fuels

HP-16 Greenhouse Gas Emissions in the Transport Sector, 2000-2020: Case Study for Chile

Thomas Turrentine and Dan Sperling; Raul Enrique O’Ryan, Universidad de Chile

HP-19 Diesel Engines: Problem or Solution?

C.J. Brodrick; Dan Sperling; H.A. Dwyer

HP-21 Multivariate Analysis of Carbon Emissions from Urban Transport

Deborah D. Salon

HP-24 Transport in Delhi India: Environmental Problems and Opportunities

Dan Sperling; Ranjan Kumar Bose, Tata Energy Institute, India

HP-25 Transportation Greenhouse Gas Scenarios for South Africa

Dan Sperling; Mark Delucchi; Jolanda Pretorius Prozzi (UC Davis graduate), Cambridge Systematics, Inc.; Clifford Naude

HP-34 Effect of On-Road Loads on Gaseous Emissions from a Modern Heavy-Duty Diesel Truck

C.J. Brodrick; Emilio Laca; H.A. Dwyer

HP-41 Stochastic Framework for Estimating Unpaved Road Vehicle Miles of Travel for PM10 Mobile Emissions Inventories

Jennifer E. Morey; Debbie A. Niemeier; Thiyaroot Limanond

HP-43 Using Emissions-Optimized Trip Assignment Algorithm to Explore Changes in Vehicle Emissions

Debbie A. Niemeier and Satoshi Sugawara

Tuesday, January 15

Session 330: Transportation Planning and Programming

Postaudit Review: Previous Audits of Project Development on California State Highway System

Debbie A. Niemeier and Harry Hecht

Session 339: Statewide Planning Issues

HP-22 Establishing Peer States for Transportation Performance Comparisons

Patricia G. Hendren and Debbie A. Niemeier

Wednesday, January 16

Session 525: Impact of Information Technologies on Travel Behavior: Research Challenges and Data Needs – Panel Discussion

Patricia L. Mokhtarian

Session 534: Innovations in Transportation Pricing

HP-9 Comparison of High-Occupancy Vehicle, High-Occupancy Toll, and Truck-Only Lanes in Sacramento Region

Caroline J. Rodier and Robert A. Johnston

Session 537: Bikes, Skates and Pedestrians

HP-57 Visitor Bicycle Use in Yosemite Valley

Kenneth S. Kurani and Thomas Turrentine; Sean Albert Co (UC Davis graduate), Santa Cruz County Regional Transportation

Commission

Thursday, January 17

Session 703: Real-Time Traffic Prediction and Modeling for Advanced Traffic Management System

H. Michael Zhang, presiding

Session 718: Ramp Metering

Development of Simulation Laboratory for Evaluating Ramp Metering Algorithms

H. Michael Zhang; Lianyu Chu, UC Irvine; Henry X. Liu, UC Berkeley, Will Recker, UC Irvine

In addition, **Ryuichi Kitamura**, who maintains an ITS-Davis research appointment and serves full time as a Professor of Civil Engineering, Kyoto University, Japan, delivered six papers.

PUBLICATIONS FROM ITS-DAVIS: Hot off the Presses

This Issue's Highlight

Understanding Fuel Cell Vehicles: Handbook for FCV Workshops, Cunningham, Joshua M., S. Ramaswamy and K. Wu, editors, UCD-ITS-RR-01-08

This three-ring binder is packed with details from every presentation given at the ITS-Davis [FCV Workshops](#) last fall and at TRB in Washington in January. The binder provides a comprehensive, carefully organized chronology of the subject matter, as well as a summary of the discussion sessions held during the workshop. The binder was provided to all workshop registrants, and is now available to others for \$50.

Understanding the Demand for Travel: It's Not Purely 'Derived', Mokhtarian, Patricia L., I. Salomon and L. Redmond. Innovation, Vol. 14, No. 4, 2001, pp. 355-380, ITS-Davis-PUB #RP-02-01 (\$5)

Fleet Purchase Behavior: Decision Processes and Implications for New Vehicle Technologies and Fuels, Nesbitt, Kevin and D. Sperling. Transportation Research Part C, September 2001, pp. 297-318, ITS-Davis PUB #RP-01-27 (\$5)

California's Zero Emission Vehicle Mandate—Linking Clean Fuel Cars and Shared-Use Vehicles, Shaheen, Susan A., J. Wright and D. Sperling, Transportation Research Board Paper 02-3587, ITS-Davis PUB #RP-01-26 (\$5)

Compressed Hydrogen Storage for Fuel Cell Vehicles, Gardiner, Monterey R., J. Cunningham and R. Moore, SAE Technical Paper Series, Fuel Cells and Alternative Fuels/Energy Systems (SP-1635), Future Transportation Technology Conference, Costa Mesa, California, August, 2001, ITS-Davis PUB #RP-01-25 (\$5)

System Dynamics and Efficiency of the Fuel Processor for an Indirect Methanol Fuel Cell Vehicle, Ramaswamy, Sitaram, M. Sundaresan, A. Eggert and R. Moore, American Institute of Aeronautics and Astronautics #2000-3048, ITS-Davis PUB #RP-01-24 (\$5)

The Implications of Water and Thermal Management Parameters in the Optimization of an Indirect Methanol Fuel Cell System, Badrinarayanan, Paravastu, A. Eggert and K. Heinz-Hauer, American Institute of Aeronautics and Astronautics #2000-3046, ITS-Davis PUB #RP-01-23 (\$5)

Characteristics of an Indirect-Methanol Fuel Cell System, Eggert, Anthony, D. Friedman, P. Badrinarayanan, S. Ramaswamy, K. Heinz-Hauer, American Institute of Aeronautics and Astronautics, #2000-3040, ITS-Davis PUB #RP-01-22 (\$5)

Hybridization: Cost and Efficiency Comparisons for PEM Fuel Cell Vehicles, Friedman, David, T. Lipman, A. Eggert, S. Ramaswamy and K. Heinz Hauer, Society of Automotive Engineers, Inc. 00FTT-54, ITS-Davis PUB #RP-01-21 (\$5)

A Simulation Model for an Indirect Methanol Fuel Cell Vehicle, Hauer, Karl-Heinz, R. Moore and S. Ramaswamy, Society of Automotive Engineers, SAE FTT 52, ITS-Davis PUB #RP-01-20 (\$5)

Evaluation of UC Davis Long-Range Transportation, Land-Use, and Housing Plans: Examining the Potential for Innovative Mobility Pilot Projects, Finson, Rachel S. and S. Shaheen, October 2001, pp. 12, ITS-Davis PUB #RR-01-10 (\$5)

Carlink II: Research Approach and Early Findings, Shaheen, Susan A. and J. Wright, December 2001, pp.27, ITS-Davis PUB

#RR-01-11 (\$5)

ITS-Davis publications can be ordered by fax, e-mail or mail.

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

E-mail: itspublications@ucdavis.edu

Fax: 530-752-6572

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

A List of Fuel Cell Vehicle Modeling Program Papers is located at http://fcv.ucdavis.edu/fcvprog/FCVMP_Publications_rev1.html

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Education Highlights



2002 FutureTruck Team

UC DAVIS FUTURETRUCK TEAM PREPS FOR ANOTHER WIN

A group of Mechanical, Electrical, and Computer Science Engineering students at UC Davis is hard at work converting a 2002 Ford Explorer sport utility vehicle into a hybrid electric vehicle. The students hope their entry in this year's FutureTruck Competition will replicate the UC Davis team's previous successes. Last year's entry, a Chevrolet Suburban, won first place overall.

The annual competition is designed to give college engineering students hands-on experience in developing advanced vehicle technology. The UC Davis team will be one of 15 schools in the U.S. and Canada competing in the June 11-21 event.

Under the direction of Prof. Andy Frank, the students are building a parallel charge-depletion hybrid drivetrain, which plugs in to recharge the batteries. The team has reduced the size and weight of the primary powertrain, which uses a Saturn 1.9L engine and a 75kW Unique Mobility electric motor to drive the rear wheels through a five-speed manual transmission. A 60kW Enova electric drive system provides 4WD capability and regenerative braking. Nickel-metal hydride batteries from Ovonic will give the Explorer a 60-mile EV range.

This year's truck also integrates a Java-based "telematics" service framework to enable smart communications across entire fleets of vehicles. The vehicle will have a graphical user interface, a voice interface, and a web browser-based remote interface built into its telematics framework. The concept would support additional "valued-added" services, such as video-on-demand or intelligent traffic-aware vehicle navigation.

The FutureTruck Team leaders include: Chief Bangar, Electronics; Chris Carde, Telematics; Jason Parks, Powertrain; Dahlia Garas, Administration and Composites.

FUEL CELL WORKSHOPS A BIG SUCCESS

The last in a series of three ITS-Davis sponsored Fuel Cell Vehicle Workshops targeting regulators, legislative staff, policy makers, environmental NGO staff, industry experts and interested individuals drew a sold-out crowd of more than 100 in Washington, D.C., January 17-18.

The workshop, held in conjunction with the Transportation Research Board's 81st Annual Meeting, received substantial praise from participants, many of whom urged ITS-Davis to take its show on the road to other parts of the country and internationally.



Some attendees asked that ITS-Davis develop targeted workshops including a shorter two-hour version for Congressional staffers and a two-day version for the U.S. EPA.

Full house at ITS-Davis FCV Workshop in Washington

The workshop's objective was to provide background on fuel cell vehicle technology, markets, and policy. It was designed to help attendees critically analyze FCV developments, their proposed impact on the environment, and policy changes needed to responsibly facilitate their introduction into the marketplace.

The workshop evaluation forms offered helpful input on formatting and worthwhile subject matter for consideration at future workshops, as well as many rewarding comments including the following:

"This workshop was very comprehensive. It included very valuable information I didn't expect. I would have liked more technical information on the complete vehicle drive systems that interfaced with the fuel cell."

"Subject matter matched my interests. It didn't delve deeply into any one technical area, but instead gave me a broad picture of the fuel cell market and possible environmental impacts. Speakers were excellent."

The January workshop followed two others in the series. The first was held on campus in the fall; the second was in Sacramento in conjunction with the Electric Transportation Industry Conference in December. The W. Alton Jones Foundation sponsored all three workshops. The Electric Vehicle Association of the Americas co-sponsored the Sacramento workshop and Transportation Research Board co-sponsored the Washington event.

Participants at each workshop received a comprehensive binder containing all the presentations, as well as additional background materials. The binders are available for purchase through the [ITS publications office](#).

ITS-Davis congratulates the fuel cell vehicle researchers who developed the program and comprehensive binder, and who managed the event: Joshua Cunningham, Sitaram "Ram" Ramaswamy, Kitty Wu, Brett Williams and staff members Lori Wright and Renee Pearl.

Special thanks also go to:

- Anthony Eggert, an ITS-Davis graduate who now manages Ford's fuel cell program at the California Fuel Cell Partnership in West Sacramento. Eggert helped coordinate the program, and, as a Ford Motor Co. representative, provided a fuel cell vehicle for demonstration at the Davis and Washington workshops.
- David Friedman, also an ITS-Davis graduate who is now on the staff of the Union of Concerned Scientists. Friedman coordinated NGO participation, assisted with program development and spoke on fuel cell vehicles and public policy.
- Kazuo "Joe" Tomita, Toyota, spoke at the Washington workshop.
- Geoff Ballard, General Hydrogen, founder of Ballard Power Systems, and an ITS-Davis board member, spoke at the Sacramento workshop.

FACULTY AND RESEARCHER ACCOMPLISHMENTS



House Science Committee in session. Rep. Sherwood Boehlert, R-NY, presiding

SPERLING TESTIFIES TO CONGRESS

Early February found ITS-Davis Director Dan Sperling jetting off to Washington to testify before the House Science Committee on the transition from the Partnership for a New Generation of Vehicles (PNGV) to FreedomCAR.

The committee was examining the Bush administration's plans to replace PNGV with FreedomCAR, the fuel cell vehicle research initiative announced in January. PNGV's goal was to produce a prototype, 80 mile-per-gallon family sedan by 2004.

In his testimony, Sperling said that FreedomCAR is an important step in the right direction and an appropriate update of PNGV. "It is a positive statement that the nation is committed to pursuing technology development that is in the long-term interest of society," he said.

But he also raised important questions: Will FreedomCAR result in an effective partnership that embraces automakers, technology suppliers, energy providers, as well as research centers? How will funds be spent, who will receive the funds, and what role will different stakeholders play in those decisions? And, perhaps most importantly, will the FreedomCAR program be used to divert attention from difficult political decisions about vehicle fuel economy, energy security, and greenhouse gas emissions?

Sperling suggested a three-pronged approach for accelerating the development and commercialization of new clean car technologies. A variation of his recommendations made to Congress will be published in an upcoming issue of *Issues in Science and Technology*. The updated recommendations include the following:

Advanced vehicle research, development, and education

- Basic research directed at universities and national labs, especially focused on materials research and key subsystem technologies that will also have application to a wide range of other electric-drive vehicle technologies.
- Leveraged funding of innovative technology companies.
- Funding to universities to begin training the necessary cohort of engineers and scientists. This might merit creation of a second FreedomEDUCATION partnership (building on DOE's small Graduate Automotive Technology Education centers program).

Hydrogen distribution

- Assistance in creating a hydrogen fuel distribution system (with respect to safety rules, initial fuel stations, standardization protocol, pipeline rules, etc.), requiring some R&D funding, but in more of a facilitating role.
- Funding to assist the development and demonstration of key technologies, such as solid hydrogen storage, and demonstration of distributed hydrogen concepts, such as electrolysis and vehicle-to-grid connections. This activity might merit a third FreedomFUEL partnership.

Incentives and regulation

- Incentives and rules that direct automakers and energy suppliers toward cleaner, more efficient vehicles and fuels.
- Incentives to consumers to buy socially beneficial vehicles and fuels.

These three sets of strategies must all be pursued to ensure a successful and timely transition to socially beneficial vehicle and fuel technology. The last set of initiatives is particularly critical in order to accelerate the commercialization and adoption of existing socially beneficial technologies, including hybrid electric vehicle technologies, Sperling said.

CARLINK II WINS AASHTO PRESIDENT'S AWARD

The American Association of State Highway Transportation Officials (AASHTO) recently awarded its President's Transportation Award for Intermodal Transportation to [CarLink II](#), the carsharing and congestion relief research program directed by ITS-Davis and PATH Researcher Susan Shaheen. CarLink II received the award for its exemplary service furthering transportation activities during the AASHTO annual meeting in December in Fort Worth, Texas.

CarLink II is a public/private partnership between ITS-Davis, UC Berkeley's Partners for Advanced Transit and Highways (PATH), Caltrans' New Technology and Research Division, American Honda Motor Co., and Caltrain.

"CarLink II is building on a vision for a cleaner, more efficient and lower-stress transportation future," Shaheen notes. "In this time of unprecedented advances in information and communication technologies, the CarLink project partners are exploring how to effectively apply these innovations to meet growing mobility needs in both a socially and environmentally beneficial manner."

Randell Iwasaki, Acting Director for Caltrans District 4 said the project team is proud to have earned the AASHTO special honor. "This award underscores the importance of developing new strategies to maximize the efficiency of our transportation system by improving mobility and easing traffic congestion," he said.

ITS-Davis and Campus Highlights



Rep. Doug Ose on a recent visit to UC Davis

HYDROGEN BUS PROGRAM RECEIVES CONTINUATION FUNDING: Thank You To Congressmen Ose and Thompson

Thanks to support from Congressmen Doug Ose and Mike Thompson, efforts to test and validate new hydrogen internal combustion engine bus technology in Davis will continue. Congress has appropriated \$900,000 for this continuation project that is road-testing a hydrogen-natural gas (HCNG) bus. ITS-Davis has teamed up with private industry and Unitrans, the student-run bus system serving UC Davis and the city of Davis, to evaluate HCNG buses and hydrogen fueling infrastructure. The ITS-Davis Hydrogen Bus Technology Validation Program will also establish a hydrogen-fueling infrastructure in Yolo County, explains researcher Marshall Miller.

“This program is focusing on the future. The HCNG buses should reduce a critical component of bus emissions (NOX) by over 90 percent, and the hydrogen infrastructure can pave the way for fuel cell buses when they become commercially available,” says Miller, who is directing the project.

The program plans to eventually bring fuel cell buses to the Unitrans fleet. Miller adds that in addition to the near-term clean air benefits of these buses, “HCNG bus projects hold the promise of being a financially feasible way for the U.S. to accelerate the development of hydrogen fueling infrastructure for fuel cell buses.”

Unitrans is among the first transit systems in the nation to test the HCNG bus technology in actual service conditions. Unitrans purchased ten natural gas buses to replace 1960s era diesel buses on the road in Davis. Two natural gas engines from these buses will be modified to run on the hydrogen-natural gas mixture. The university received federal, state, and regional funds to supplement Unitrans capital reserves to pay for the \$2.3 million project.



Dan Sperling and Andy Frank show off current and past vehicle projects to Rep. Mike Thompson



ITS-Davis Board of Advisors, December 2001

ITS-DAVIS BOARD OF ADVISORS CONVENED IN DECEMBER

The Institute’s Board of Advisors held its annual meeting on December 10, 2001. The Board received formal presentations on ITS-Davis’ education and research programs, and provided considerable comment on planning documents that will be used to guide future Institute growth.

Members attending were: Jan Sharpless (chair ITS-Davis board; former chair California ARB; former member California Energy Commission); Geoffrey Ballard (founder Ballard Power Systems; chairman General Hydrogen); Norm Bryan (retired PG&E); Jack Collins (Nissan); Jim DeStefano, (former Sun Microsystems); Tony Finizza (retired ARCO); Wendy James (Better World Group); Larry Johnson (Argonne); Chung Liu (South Coast AQMD); Paul MacCready (AeroVironment); Hani Mahmassani (University of Texas at Austin); Neil Otto, (former Ballard Automotive); Ferdinand Panik (DaimlerChrysler); Eldon Priestley (ExxonMobil); Bob Sawyer, (emeritus, UC Berkeley); Joe Schofer (Northwestern University); and Hiroyuki Watanabe (Toyota).

RODIER JOINS ITS-DAVIS

Caroline J. Rodier, Ph.D., has joined ITS-Davis as a post-graduate researcher. At the Institute Rodier will extend and apply the advanced transportation modeling methods that she developed while pursuing her Ph.D.

As a student researcher, Rodier worked closely with ITS-Davis faculty researcher Robert A. Johnston, a professor in the Department of Environmental Science and Policy, on the impacts of freeway growth on traffic, land use policy and air quality.

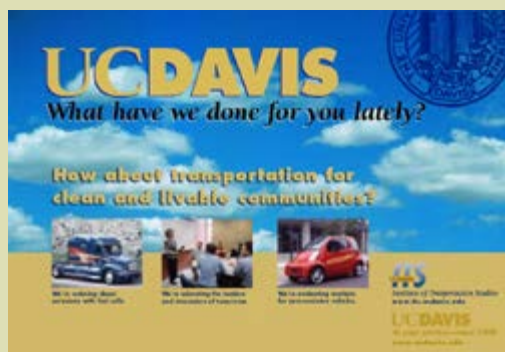
CUNNINGHAM NAMED ASSOCIATE DIRECTOR OF FCVMP

Joshua Cunningham, M.S., a 2001 UC Davis graduate, has stayed on with the ITS-Davis Fuel Cell Vehicle Modeling Program and has recently accepted the position of associate director. As a grad student, Cunningham worked on the simulation of air supply components and their interaction with other components in a fuel cell engine.

Cunningham was an ENO Fellow in 2000. He received his Bachelor's from Michigan State University and worked with General Motors' Delphi Chassis Systems as a product engineer before coming to Davis.



FCVMP Associate Director Joshua Cunningham



UC DAVIS FEATURED ON AIRPORT BILLBOARDS

UC Davis has run a series of adds at the Sacramento International Airport featuring campus programs that make strong contributions to community, government and industry. Current and past themes tout the campus' work in support of veterinary medicine, viticulture and enology, and outreach programs to encourage K-12 students to strive for a college degree. Now the ad series is featuring ITS-Davis' work. The Institute's 5-foot by 4-foot poster rotates to different sites on the secure side of the terminals during 2002. It was last seen in terminal B2, which serves Alaska Airlines and Horizon Air.

EXTRA! READ ALL ABOUT IT: ITS-Davis/UC Davis Faculty and Researchers Quoted in the News

Dan Sperling, on CNN "Inside Politics," 3-14-02, on oxygenates and ethanol in gasoline. Other guests included Sens. Barbara Boxer, (D-California) and Chuck Grassley (R-Iowa).

Dan Sperling, in *Fuel Cell Industry Report*, March, on the need for increased funding for the Graduate Automotive Technology Education (GATE) program.

Geoffrey Ballard, ITS-Davis board member, co-founder of General Hydrogen and former CEO of Ballard Power Systems, in *Fuel Cell Industry Report*, March, in a feature on the ITS-Davis Fuel Cell Vehicle Workshop in Washington.

ITS-Davis research was cited in *The Sacramento Bee*, 3-8-02, in an article about the Sacramento region using old vehicle data to prepare regional transportation plan.

Dan Sperling and Anthony Eggert (ITS-Davis grad) on National Public Radio's "All Things Considered," in a special series on America's dependence on oil, 3-4-02 through 3-7-02. The final story focused on fuel cell cars. To read the series and hear the report (as long as the link lasts) <http://www.npr.org/news/specials/oilseries/fuelcellcars.html>

Dan Sperling, Joshua Cunningham, Anthony Eggert (ITS-Davis grad), and Meena Sundaresan in a lengthy report in *Electric Vehicle Progress*, 2-15-02, on the ITS-Davis Fuel Cell Vehicle Workshop in Washington.

Andy Frank and Dan Sperling, in *California Aggie*, 2-8-02 in an article discussing different approaches to cleaner, fuel efficient cars through hybrids and fuel cells.

Dan Sperling, in a *United Press International* wire story, 2-7-02, about the Congressional hearings on FreedomCAR during which he testified.

Andy Frank, in *San Francisco Chronicle*, 2-4-02, in an article on his efforts to promote the fuel efficiency and emissions benefits of plug-in hybrids to Detroit automakers.

Dan Sperling, in *Fuel Cell Industry Report*, February, in an article from the Electric Transportation Industry Conference, on the need to train technicians and policy makers of tomorrow

Dan Sperling, in *Los Angeles Times*, 1-26-02, in an article on Assembly Bill 1058, California legislation limiting global warming pollutants.

Andy Frank, in a photograph in *The Sacramento Bee*, 1-12-02, in an article on Congressman Mike Thompson's new district, which includes Yolo County and UC Davis. The article featured a photo of the congressman and Dr. Frank in the UC Davis HEV Technology Center.

Pat Mokhtarian, in *The Sacramento Bee*, 12-2-01, in an article about e-commerce and its impact on traffic.

The Institute's FCV Workshop was highlighted along with other ITS-Davis work in news coverage of the Electric Transportation Industry Conference in December, in *The Sacramento Bee*.

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