



e-news



The Institute of Transportation Studies at UC Davis presents *ITS-Davis e-news*, its bimonthly electronic newsletter for affiliates, alumni and friends interested in the ongoing activities at the Institute. *ITS-Davis e-news* reports information directly from ITS-Davis and from UC Davis academic departments affiliated with ITS-Davis that conduct transportation-related research and education. For previous issues, see the [e-news archives](#)

Contents

Issue 4

February 2001

- [New Initiatives](#)
 - [MARKETING CLEAN AND EFFICIENT VEHICLES: Major New Social Marketing Research Agenda](#)
 - [VALIDATING HYDROGEN BUS TECHNOLOGY: ITS-Davis/Unitrans Take Next Step](#)
- [Research Results](#)
 - [THE CRYSTAL BALL: Updating Today's Tools to Model Tomorrow's Growth](#)
 - [FCV MODELING PROGRAM DELIVERS NEW AND UPDATED MODELS](#)
 - [PUBLICATIONS FROM ITS-DAVIS: Hot off the Presses](#)
- [Education Highlights](#)
 - [ITS-DAVIS DOMINATES SAE CONGRESS](#)
 - [STUDENT INTERNSHIPS OFFER HANDS-ON EXPERIENCE](#)
 - [COMING EVENTS AT ITS-DAVIS](#)
- [ITS-Davis and Campus Highlights](#)
 - [NEW GIFTS AND GRANTS](#)
 - [DEB NEIMEIER TO CHAIR CIVIL AND ENVIRONMENTAL ENGINEERING](#)
 - [BEST IN THE COUNTRY! Lipman Dissertation Honored](#)
 - [NSF HONORS ZHANG](#)
 - [SPERLING TO SPEAK AT PACIFIC ENERGY CENTER](#)
 - [EXTRA! READ ALL ABOUT IT: ITS-Davis/UC Davis Quoted in the News](#)
 - [WHAT THEY DRIVE: Sperling's Prius and Burke's EV Plus](#)

| [Top](#) | [New Initiatives](#) | [Research Results](#) | [Education Highlights](#) | [ITS-Davis and Campus Highlights](#) | [e-news archives](#) |

New Initiatives

MARKETING CLEAN AND EFFICIENT VEHICLES: ITS-Davis Launches Major New Social Marketing Research Agenda

ITS-Davis researchers Ken Kurani and Tom Turrentine are launching a major new initiative to bring together stakeholders to move forward on a marketing, education and outreach agenda that can accelerate market penetration of clean, efficient vehicle technologies. ITS-Davis will extend the existing work of green vehicle marketing programs and work in close collaboration with these efforts. This Institute initiative will be the leading national and California state research initiative supporting clean and efficient vehicle marketing. The key stakeholders for this effort will be proponents of clean air, public health, efficient vehicles, and green house gas reduction.



Nissan Hypermini, GM EV-1, Toyota e-com and Honda EV Plus

The first step of the program is a two-day workshop "Marketing Clean and Efficient Vehicles" on March 22-23, 2001 at the campus's Buehler Alumni and Visitors Center.

The workshop will be funded by grants from the Steven and Michele Kirsch Foundation, with additional support by the US Department of Energy. Attendance is by invitation of the researchers and directed toward those with marketing expertise.

The workshop will feature social marketing experts who have implemented successful campaigns in other topical areas to provide a vision of how social marketing can be used to transform behavior and markets. It also will include presentations on existing marketing efforts and proposals targeted at clean and efficient vehicle technologies, as well as breakout sessions on specific issues such as air quality and efficiency. Participants will then outline a plan to initiate and develop an integrated social marketing agenda for clean, efficient vehicle technologies.

ITS-Davis will use the findings of the workshop to begin a green vehicle social marketing research program. The program will examine a range of questions, such as: What do citizen/consumers know about air quality and energy policy? What do we know about consumer opinions of green cars? What is the relationship between selling ideas, behaviors and beliefs, and selling cars?

The workshop and research effort are especially topical now that the California Air Resources Board has voted to uphold its Zero-Emission Vehicle (ZEV) program, and there is growing interest in how the car companies will meet the mandate. CARB has acknowledged "significant challenges" with ZEVs, including "the need to greatly enhance public awareness and education of the attributes and benefits of ZEV technologies..."

"The success of efforts to promote clean air and energy efficiency depend on a concerted effort from government and its supporters to prepare the market," Kurani and Turrentine state. "It is imperative that we do what we can to help the policy makers, industry, and NGOs to envision, develop, and implement a coordinated social marketing effort for clean, efficient vehicle technologies," Kurani and Turrentine continue.

Kurani and Turrentine also see the role of ITS-Davis as conducting both initial research to support the design of a social marketing campaign and the ongoing monitoring of the effectiveness of the campaign.

VALIDATING HYDROGEN BUS TECHNOLOGY: ITS-Davis and the Unitrans Bus System Take the Next Step

ITS-Davis has teamed up with private industry and Unitrans, the student-run bus system serving UC Davis and the city of Davis, to road test a new hydrogen-natural gas hybrid bus. The demonstration is part of a larger ITS-Davis hydrogen bus technology evaluation project that will also establish a hydrogen-fueling infrastructure in Yolo County. Future years of the program anticipate the introduction of fuel cell buses.

ITS-Davis associate researcher Marshall Miller said that if the fuel blend is as clean-burning as predicted, "it will offer a clear way to reduce pollution significantly for already low-emission buses running on natural gas."

Unitrans is among the first transit systems in the nation to test the natural gas-hydrogen hybrid in actual service conditions. Unitrans purchased the hybrid bus, along with nine natural gas buses to replace 1960s era diesel buses on the road in Davis. The university received federal, state, regional and local funds to supplement Unitrans capital reserves to pay for the \$3.5 million project. US Representative Doug Ose and state Assemblywoman Helen Thomson have been instrumental in securing funding for ITS-Davis and Unitrans bus projects.



US Rep. Doug Ose and state Assemblywoman Helen Thomson

Unitrans is believed to be the largest public transit service run by students in the United States. About 175 student employees and 15 career employees run the system, which carries up to 18,000 passengers each weekday (over 2.4 million annually) in 30 buses over 15 routes.



New Unitrans CNG buses, including the one for ITS-Davis Hydrogen-CNG research

For more information see: <http://its.ucdavis.edu/e-news/hydrogen.html>

| [Top](#) | [New Initiatives](#) | [Research Results](#) | [Education Highlights](#) | [ITS-Davis and Campus Highlights](#) | [e-news archives](#) |

Research Results

THE CRYSTAL BALL: Updating Today's Tools to Model Tomorrow's Growth

"Build it, and they will come," said the voice of wisdom about the so-called field of dreams in the movie some years back. The voice of wisdom could easily have been talking about freeway traffic, too. "Widen it, and more cars will come..."

How do today's urban planners project the impacts of freeway growth on traffic and surrounding land use? And how do these decisions impact air quality? ITS-Davis faculty researcher Robert A. Johnston, a professor in the Department of Environmental Science and Policy, and Caroline J. Rodier, who just earned her PhD, have worked independently and in collaboration on several projects to address the complex and intertwined relationships between travel demand modeling, land use, urban planning and air quality.

"We've demonstrated that showing land use effects is very important to properly model travel and emissions," explains Johnston. "If you widen freeways, more people will move farther out, resulting in longer trips, more vehicle miles traveled (VMT) and more emissions." If urban planners do not include land-use changes in their modeling, he adds, they bias the results downward in terms of VMT and emissions.

In her dissertation, Rodier examined the impact of population projections, employment, fuel price, income projections, and other factors on planning models, as well as the phenomenon of induced travel. Induced travel refers to the increase in travel that results from building more roads. If induced travel is not well represented, then the travel and congestion will tend to be underestimated in planning models.

When the models underestimate traffic, congestion, VMT and emissions, cities can get into trouble with their air quality conformity plans, explains Rodier. "There's little room for error in these models," she notes, adding that several regions around the country, including Atlanta, Charlotte, and New Jersey, have recently failed their conformity standards. Sacramento met its test in 1999 – but by a very small margin. Rodier's dissertation examines a number of scenarios that could impact Sacramento's ability to meet federal air quality standards by 2005 or face a cut-off of all federal highway funds.

Rodier is especially interested in the policy implications of all these scenarios and models. "If there's a large probability that the region could go out of conformity, should the public know, and might policy makers want to take more proactive steps to address the issue?" she reasons.

One urban growth model that Johnston developed, called UPlan, was successfully demonstrated in Sacramento and may be expanded to other parts of California. It is also being applied in the Santa Fe-Los Alamos corridor of New Mexico, and in the Salt Lake City region. A simple, rule-based model, UPlan enables planners to project impacts such as runoff, pollution, habitat fragmentation, and local service costs caused by urban development, in a few weeks of effort, because it is easy to implement.

Johnston and Rodier have collaborated on a recent EPA project on the effects of transit, pricing, and transit-oriented development policies. In addition, Johnston has taken the lead on an important international urban model comparison project.

Johnston's and Rodier's work has been funded, in part, by US Dept. of Agriculture, UC Transportation Center, US Environmental Protection Agency, Great Valley Center, Sierra Economic Development District, Cal-Fed, California Energy Commission, and the Mineta Institute at San Jose State University.

FCV MODELING PROGRAM DELIVERS NEW AND UPDATED MODELS

The FCV modeling program delivered its latest set of complete models to program participants in early February, and a not insignificant celebration of the graduate students involved occurred shortly thereafter at a downtown center for liquid refreshment! The models, with full graphical user interfaces, included: 1) major additions to the previously completed Hydrogen and Indirect-Methanol vehicle models, and 2) the release of a new Indirect-Hydrocarbon model.

The program will now conduct groundbreaking evaluations that compare FCV performance attributes based on the three fuels. These evaluations will play an important role in policy development and corporate planning. The full fuel cycle models for each FC engine fuel are unique in the world; no other public institution is completing modeling work in the detail and at the quality level of the ITS-Davis work. Many supporting companies are incorporating these models into their own internally developed models. In some cases they replace internal models.

PUBLICATIONS FROM ITS-DAVIS: Hot off the Presses

- **Commuter-Based Carsharing: Marketing Niche Potential**, Shaheen, Susan A., *Transportation Research Board 80th Annual Meeting, January 7-11, 2001*, pp. 1-10, ITS-Davis Pub #RP-00-18
- **Stochastic Frontier Models of Prism Vertices**, Kitamura, Ryuichi, T. Yamamoto, K. Kishizawa, R.M. Pendyala, *Transportation Research Record 1718, December 2000*, pp. 18-26, ITS-Davis Pub #RP-00-19
- **International Assessment of Electric-Drive Vehicles - Policies, Markets, and Technologies**, Sperling, Daniel, T. Lipman, *KFB (The Swedish Transport and Communications Research Board), August 2000*, pp. 1-46, ITS-Davis Pub #RP-00-20
- **Potential Benefits of Utilizing Fuel Cell Auxiliary Power Units in Lieu of Heavy-Duty Truck Engine Idling**, Brodrick, Christie-Joy, T. Lipman, M. Farshchi, H.A. Dwyer, *Transportation Research Board 80th Annual Meeting, January 7-11, 2001*, pp. 1-19, ITS-Davis Pub #RP-01-01
- **Global Climate Change, Developing Countries and Transport Sector Options in South Africa**, Naude, Clifford, R. Mirrilees, G. Dehlen, J. Pretorius, M Manger, C. Moleho, A. Meyer, D. Sperling, L.S. Redmond, November 2000, pp. 60, ITS-Davis Pub #RR-00-12

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

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One Shields Avenue, Davis, CA 95616-8762

A list of FCV Modeling Program papers is located at
http://fcv.ucdavis.edu/fcvprog/FCVMP_Publications_rev1.html

| [Top](#) | [New Initiatives](#) | [Research Results](#) | [Education Highlights](#) | [ITS-Davis and Campus Highlights](#) | [e-news archives](#) |

Education Highlights

ITS-DAVIS DOMINATES SAE CONGRESS

When the 2001 SAE International Congress convenes in Detroit next month, seven of the 16 peer-reviewed papers accepted for the fuel cell vehicle sessions will be from UC Davis researchers and students. FCV Modeling Program Director Bob Moore notes that's approximately 44 percent of the fuel cell papers presented. Only two of the remaining nine papers are from universities. The others are from major industrial companies engaged in FCV development activities.

In addition, Moore notes that ITS-Davis FCV Center associate director Ram Ramaswamy has been invited to participate in the panel discussion that will close the sessions. "This is a truly dominating presence on the part of our group at THE major annual international conference on automotive research and technology. Outstanding!" Moore says.

STUDENT INTERNSHIPS OFFER HANDS-ON EXPERIENCE

Every year, students take positions with government, industry and advocacy groups to broaden their experience and offer their academic skills to employers. Current interns work at the California Air Resources Board, California Energy Commission, Arthur D. Little, and the California Fuel Cell Partnership.

Brian Abbanat is a graduate student assistant at the California Energy Commission in the light-duty vehicles department. He is pursuing a master's degree in Transportation Technology and Policy.

Since starting his internship last August, he has been working directly on the Advanced Technology and Efficient Vehicle Program, which is considering methods for stimulating consumer market response to highly fuel-efficient gasoline vehicles and alternative fuel vehicles, either through direct incentives or public education and outreach.

Brian's work is supporting his master's thesis; he hopes to conduct a small-scale study of household ownership experience of compressed natural gas vehicles and the effects of government incentives on their CNG vehicle purchase decisions.

"I came into the TTP program with an interest in regional transportation planning, which I still enjoy," he says. Working with the Energy Commission, however, has revealed that transportation in California "is not only about congestion and air quality; but also about energy issues, as well," he notes.

Joshua Cunningham is a graduate student assistant in the Zero-Emission Vehicle Implementation Section at the California Air Resources Board.

Working directly with staff, Joshua is researching the electricity demands from electric vehicles when charging, responding to public inquiries regarding the ZEV mandate, and presenting fuel cell vehicle technical information to staff.

Joshua is pursuing his master's in Transportation Technology and Policy at ITS-Davis. He also works with the Fuel Cell Vehicle Modeling Program, where he enjoys having a chance to apply his engineering skills and pursue his interest in vehicles that are better for the environment.

"Considering my research in advanced vehicles, and my graduate group's semi-emphasis in environmental policy, the internship at CARB is a perfect fit. I plan to complete the internship by the end of March and return to ITS-Davis for one more quarter before graduating in June," he said.

Richard Counts, who is studying for his master's in Transportation Technology and Policy, is staying busy as a program assistant at the California Fuel Cell Partnership, and an energy and transportation researcher and analyst at Arthur D. Little, Inc.

At the CFCP, Richard is assisting the program manager and communications manager with the administration of the program including public relations and outreach. At ADL He is researching and analyzing energy, transportation and environmental issues from the public policy, outreach, technology, and cost-benefit perspective.

Both internships relate directly to his academic studies. "Both of my current positions are providing me with fantastic experience in the field of sustainable development," Counts said.

COMING EVENTS AT ITS-DAVIS

ITS-Davis Seminar Series: March 8

Social Marketing: Transportation Therapy for the 21st Century

Presenter: Ken Kurani, ITS-Davis Research Engineer

Location: Engineering II, Room 1065

Attendance: Free, open to the public

March 22-23

Marketing Clean and Efficient Vehicles

Funded/sponsored by Steven and Michele Kirsch Foundation and US Department of Energy

Organizers: Ken Kurani and Tom Turrentine

Location: Buehler Alumni and Visitors Center, UC Davis

Attendance: By invitation of organizers

May 15-16

Meeting the New CARB ZEV Mandate Requirements: Grid-Connected Hybrids and City EVs

Organizer: Andrew Burke

Location: Buehler Alumni and Visitors Center, UC Davis

Attendance: ITS-Davis Affiliates (free) and others (paid)

This two-day workshop will consider in-depth how the inclusion of grid-connected hybrids and city EVs in the newly revised Zero-Emission Vehicle regulation may affect how the mandate will be met in 2003-2006. In addition, each of the new technology options will be reviewed in terms of vehicle design, utility, cost, and marketing. Registration information will be disseminated in late March.

| [Top](#) | [New Initiatives](#) | [Research Results](#) | [Education Highlights](#) | [ITS-Davis and Campus Highlights](#) | [e-news archives](#) |

ITS-Davis and Campus Highlights

NEW GIFTS AND GRANTS FOR ITS-DAVIS

Private support from foundations, industry, government and others is integral to ITS-Davis' ongoing programs. We are pleased to acknowledge the following grants made since we last thanked our supporters in *ITS-Davis e-news*:

Corporate Affiliate Program

- Toyota Motor Sales and ExxonMobil Corporation -- *Patron Level support of \$40,000/yr*
- Superfarad Svenska, Southern California Edison, and IMRA America, Inc. -- *membership support/renewals of \$15,000/yr or more*

Social Marketing of Clean and Efficient Vehicles

- Steven and Michele Kirsch Foundation -- *\$25,000 to launch the program and support the March 2001 workshop*
- US Department of Energy -- *\$5,000 sponsor the social marketing workshop*

Fuel Cell Vehicle Modeling Program

- XCELLSiS Corporation -- *\$80,000 to become a new member*
- ExxonMobil, Fiat Research Center, Isuzu, Subaru Research Center and one anonymous member -- *\$20,000/yr renewals*

Additional Gifts

- Mr. and Mrs. Richard C. Brown -- *\$1,000 for general program support*
- Detroit Diesel -- *\$80,000 for Selective Catalyst Reduction diesel research*
- Chevron -- *\$9,250 to continue the Chevron Graduate Fellowship*

DEB NEIMEIER TO CHAIR CIVIL AND ENVIRONMENTAL ENGINEERING

Come July, Deb Neimeier will take over as chair of the Civil and Environmental Engineering Department. Chancellor Larry Vanderhoef appointed Neimeier to the position, upon recommendation of the engineering college's dean.

Outgoing Chair Dan Chang, who is affiliated with ITS-Davis air quality studies, is pleased to be returning to his research and usual teaching load and leaving administrative work behind. He has chaired the department since 1998.



Professor Deb Neimeier

BEST IN THE COUNTRY! Lipman Dissertation Honored

The Council of University Transportation Centers recently honored ITS-Davis graduate Timothy Lipman for producing the best PhD dissertation in the country on a transportation policy topic. Lipman accepted the honor at a dinner January 6, during the Transportation Research Board activities in Washington, DC. He, and ITS-Davis Director Dan Sperling attended the awards banquet, which included only one other PhD award category.

Tim's dissertation was titled, "Zero-Emission Vehicle Scenario Cost Analysis Using A Fuzzy Set-Based Framework." He graduated last year with a degree in Ecology and Environmental Policy, having previously received a master's in Transportation Technology and Policy. He is now a post-graduate researcher at UC Berkeley.

NSF HONORS ZHANG

Michael Zhang, assistant professor of civil and environmental engineering, has received a CAREER award from the National Science Foundation for his work with traffic engineering.

Zhang is focused primarily on improving continuum models of vehicular traffic. He notes that the kinematic wave model of traffic flow, in use since the mid-1950s, cannot model complex traffic phenomena, such as stop-start waves, which are important to traffic management and to vehicle-emission modeling. While there have been many attempts to improve current models, Zhang notes they have flaws, such as predicting that cars travel backwards under certain circumstances. He would like to develop and verify improved non-equilibrium models, based on a reliable understanding of actual driving behavior. In addition, he would like to look at the models currently in use to reduce the repercussions of their drawbacks.



Prof. Michael Zhang and his research group

If his work is successful, we will have a better understanding of traffic flow theory while greatly increasing our ability to monitor, model, and control traffic flow. At the same time, we will be able to use existing road models more efficiently, manage traffic better, and reduce traffic-induced air pollution. In other words, we'll be able to get there from here – and cause less pollution through smoother traffic flow, in the process.

SPERLING TO SPEAK AT PACIFIC ENERGY CENTER

If you're in San Francisco the evening of Thursday, May 24, stop by the PG&E Pacific Energy Center to hear ITS-Davis Director Dan Sperling offer his perspective on the future of the automobile. His talk, titled, "Beginning of the end for internal combustion engine cars?" is bound to generate discussions and interest. Refreshments will be served at 6:00 p.m.; the talk begins at 6:30 p.m.

The Pacific Energy Center (<http://www.pge.com/pec>) is located at 851 Howard Street (between 4th and 5th Streets) two blocks south of Market St. and near the Moscone Center and San Francisco Metreon. By car, use the 5th and Mission Street garage. Or better, use transit (www.transitinfo.org; 415/817-1717); exit BART at Powell Street.

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

- Robert Johnston, in *The Sacramento Bee*, on traffic growth and future planning in Sacramento, February 4, 2001
- Susan Shaheen, in *Inc.*, on growth in carsharing in the U.S., February 1, 2001
- Dan Sperling, on NPR's *Living on Earth*, on the California Zero-Emission Vehicle program, week of January 19, 2001
- Michael Zhang, in *San Francisco Chronicle*, on the "pack mentality" of driving on the highway, his car-following theory paper presented at Transportation Research Board, January 8, 2001

Want to read more about ITS-Davis work? A new web site, <http://www.planetsave.com> recently featured several UC Davis news releases on its front page. The site is an environmentally focused charitable giving site.

WHAT THEY DRIVE

Time for a little shameless self-promotion of ITS-Davis encounters with new technology:



Our fearless leader, Dan Sperling, is the proud new owner of a Toyota Prius hybrid-electric vehicle. Dan is pictured here with



Also shown here is ITS-Davis Researcher Andy Burke. As the proud and happy owner of the Honda EV Plus for almost three years now, he is displaying the so-called "EV Smile."

daughter, Rhiannon, after they return from their third ski trip to California's Sierra Nevada mountains with the Prius.

Back to the [e-news archives](#) or the [ITS-Davis home page](#)
