



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](#).

Contents

Issue 14

May 2003

- [New Initiatives](#)
 - [DRIVING FORWARD ON ROAD ECOLOGY: Campus Experts Launch Collaborative Initiatives](#)
 - [A MECCA FOR HYDROGEN AND FUEL CELL DEVELOPMENT](#)
- [Research Results](#)
 - [HYPERMINI DEMONSTRATION ENDS: Surprising Results of Market Research](#)
 - [TRANSPORTATION PUBLICATIONS FROM UC DAVIS: Hot off the Presses](#)
- [Education Highlights](#)
 - [AWARDS AND RECOGNITION: Chang Receives Endowed Professorship](#)
 - [AWARDS AND RECOGNITION: Weinert Wins Eno Fellowship](#)
 - [NEW GRADUATE FELLOWSHIP: CH2M HILL Establishes Transportation Technology Award](#)
- [ITS-Davis and Campus Highlights](#)
 - [RAIN FAILS TO DAMPEN PICNIC DAY ENTHUSIASM](#)
 - [CITY OF DAVIS HONORS UNITRANS](#)
 - [ITS-DAVIS WINS LOCAL PR AWARDS](#)
 - [EXTRA! READ ALL ABOUT IT: ITS-Davis and Associated UC Davis Colleagues in the News](#)

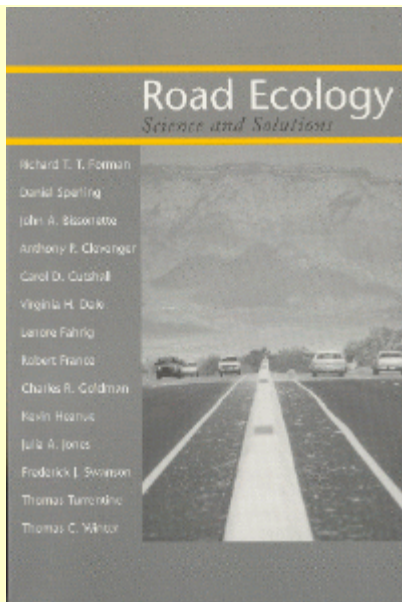
New Initiatives

DRIVING FORWARD ON ECOLOGY: Campus Experts Launch Collaborative Initiatives

ITS-Davis is teaming with another research center at UC Davis, the John Muir Institute of the Environment, to launch an initiative that supports sustainable transportation around the globe. Spurred in part by *Road Ecology: Science and Solutions*, the book co-authored by ITS-Davis Director Dan Sperling and published last fall by Island Press, the group held its first gathering in May.

The workshop was designed to get campus researchers to collaborate on related problems in road ecology, and to bring together campus experts with scientists and policy makers in government and nongovernmental organizations, explains Professor Catherine Toft, associate director of the John Muir Institute. "We hope to generate initiatives in this area to provide solutions that allow environmentally and socially friendly transportation systems."

In a sign that the road ecology movement is gaining serious attention, participants at the first workshop represented a broad cross-section of campus departments and interests, as well as



Road Ecology: Science and Solutions

many government and nonprofit organizations. Presentations, equally diverse, included overviews on road ecology, perspectives on design of human communities and sustainable transportation systems, and effects on wildlife and natural ecosystems. Attendees also heard the perspectives of agencies, in particular California Department of Transportation, on developing environmentally and socially friendly transportation systems and how the university can contribute to this task.

Highlights of the workshop included speeches and presentations by Caltrans Director Jeff Morales, Tony Clevenger of Parks Canada, and UC Davis Provost Virginia Hinshaw. Morales emphasized that the transportation community and policy makers look to the university for several vital contributions, in particular rigorous and objective scholarship and technical and social innovations.

“Jeff Morales underscored an important point that we all need to take to heart,” said ITS-Davis Director Dan Sperling. “He said, to provide sustainable transportation, we need to take a multidisciplinary and collaborative approach. We need to ensure that the boundaries between different disciplines and different organizations do not impede the flow of information between us. Whether we’re an academic entity, government or NGO, we need to be able to solve multiple problems simultaneously,” Sperling said.

Provost Hinshaw articulated the same themes. She reaffirmed her commitment to the environmental disciplines on campus and her support for academics’ need to work seamlessly across institutional boundaries, both on and off campus.

The group agreed upon a set of goals and began discussions on how to accomplish them. The first step in the process is the formation of a virtual center administered collaboratively by the John Muir Institute and ITS-Davis. The center will provide funding and logistical support for a suite of activities planned for the next academic year and beyond. It will support formal and informal working and advisory groups and launch a series of workshops in the upcoming academic year.

A MECCA FOR HYDROGEN AND FUEL CELL DEVELOPMENT

With the official launch of the [Hydrogen Pathways Initiative](#), the recent arrival of the first of three [Toyota fuel cell hybrid vehicles](#) for market research and community outreach, and the recent arrival of a [liquid-fueled fuel cell bus](#) for research and education purposes, ITS-Davis’s fuel cell and hydrogen program is expanding in new and complementary directions.

These new initiatives fall under the auspices of the ITS-Davis Fuel Cell Vehicle Center. They follow on the foundation laid by the Fuel Cell Vehicle Modeling Program, and complement continuing fuel cell and hydrogen research at UC Davis. Existing projects include research on fuel cell auxiliary power units for heavy-duty trucks, a hydrogen/CNG bus technology validation program, and a hydrogen-fueling infrastructure study.

H2 Pathways

Transportation and the Hydrogen Economy: Pathways and Strategies (H2 Pathways) is a new four-year effort to address the transition to a hydrogen economy. As explained by Associate Research Director Anthony Eggert, it serves as an umbrella research program under which ongoing projects can expand and new research efforts can be launched.

“We see our role as developing future engineers, scientists, business and policy leaders,” Eggert says. “They need in-depth knowledge of hydrogen as a transportation fuel, and this program, which will support a range of research and outreach initiatives, will offer a much-needed interdisciplinary perspective.”

At the H2 Pathways workshop in March, participants provided research ideas that will be used to help refine the structure, goals and overall direction of the research program, which is comprised of five concurrent tracks:

- Track 1 - Scenarios, Pathways and Energy Systems Modeling will provide the overarching framework for the program.
- Track 2 - Design and Evaluation of Near-Term Demonstration and Pilot Projects will focus on the initial deployment of vehicles and fuel stations.
- Track 3 - Fuel Cell and Hydrogen Market Analyses and Forecasts will explore a variety of markets and focus on consumers, including market demand and response to various infrastructure strategies.
- Track 4 - Design and Analysis of Hydrogen Fuel Station and Distribution Infrastructure will focus on technology, cost and operational issues of hydrogen infrastructure.
- Track 5 - Environmental, Energy and Cost Analyses will analyze the air pollutant and greenhouse gas (GHG) emissions, lifecycle costs, and energy use of hydrogen pathways, and compare them with other transportation energies and technologies.

With ITS-Davis in the lead, strong research centers with complementary capabilities will be invited to participate as partners. Funding is provided by private industry, government agencies, and foundations. Initial industry sponsors are:

- BP America, Inc.
- ConocoPhillips
- ExxonMobil Research and Engineering
- Honda R&D Americas
- Nissan Technical Center, North America
- Shell Hydrogen US
- Toyota Motor Sales USA, Inc.

To learn more about the H2 Pathways program, including participation details, visit the web at: <http://its.ucdavis.edu/hydrogen>. The new H2 Pathways website includes in-depth program details, a page for future H2 Pathways publications, and information on upcoming program events.

Fuel Cell Hybrid Vehicle Arrives

ITS-Davis and Toyota are partnering to help build northern California's fuel cell vehicle community. ITS-Davis's goals for 2005 include the following:

- Bring 10 to 15 vehicles to Davis for campus and city demonstration
- Develop at least three hydrogen fueling stations
- Help design and implement California's hydrogen infrastructure



Sen. Barbara Boxer checks out the Toyota FCHV.



ITS-Davis's Toyota fuel cell car begins the "Rally Thru the Valley."

The Institute is making progress toward the first goal with the recent arrival of the first of three Toyota fuel cell hybrid vehicles. The car is already in high demand for public appearances. In mid-May, the vehicle participated in the California Fuel Cell Partnership's Rally Thru the Valley, a three-day road rally from Sacramento to Los Angeles to showcase fuel cell vehicle technology. In April, the vehicle was featured at events for U.S. Sen. Barbara Boxer in Davis, San Francisco Mayor Willie Brown in San Francisco, and Davis/North Coast U.S. Representative Mike Thompson in Woodland.

ITS-Davis welcomes John Tillman, program manager, who is responsible for developing and managing the vehicles' testing and demonstration program, and ensuring that they get out to a broad and growing audience throughout northern California.

First Liquid-Fueled Fuel Cell Bus Arrives

An important research and education tool to be used by Assistant Professor Paul Erickson has also arrived on campus. It is a 30-foot fuel cell transit bus — the first liquid-fueled fuel cell bus ever constructed. Built by H Power and Georgetown University in 1994, this is the first of the three famous proof-of-concept fuel cell buses built at Georgetown and funded by the U.S. Dept. of Transportation, U.S. Dept. of Energy, and the South Coast Air Quality Management District.

Erickson, who joined the Dept. of Mechanical and Aeronautical Engineering faculty last fall, was able to transfer the bus to UC Davis from the Federal Transit Administration. The bus was previously located at the University of Florida where Erickson had been conducting systems testing since 1998. “We were trying to quantify the benefits of fuel cells and fuel cell systems and learn more about systems integration in an operational vehicle,” he explains.

Now that it’s here in Davis, Erickson says he expects to use the bus to examine systems degradation and durability issues. “It’s unique in that it’s the first bus of its kind ever built, so it’s old. It will give us an opportunity to examine lifetime issues such as catalyst degradation and durability.” He also plans to use the bus as a teaching and training tool in his class, Advanced Energy Conversion (MAE 218).

This bus is powered by a phosphoric acid fuel cell, which differs from the proton exchange membrane (PEM) fuel cell technology being tested in many fuel cell vehicles today. Although larger in size than current PEM technology, the phosphoric acid fuel cell has a higher operating temperature and is more tolerant of reformed hydrogen fuel. The onboard reformer uses a methanol-water pre-mix feedstock to make hydrogen.

“This reformation of a liquid fuel allows a practical way around the energy density problem of hydrogen, which typically requires fuel cell vehicles to have very large hydrogen fuel tanks or a limited driving range,” Erickson explains. Much of Erickson’s research has focused on reformation and hydrogen production technology.

The bus will reside in the main engineering complex outside Bainer Hall.



The first liquid-fueled fuel cell bus ever constructed arrives on campus. Shown are Dr. Erickson, third from left, and his students.

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

Research Results

HYPERMINI DEMONSTRATION ENDS: Surprising Results of Market Research



Researcher Chris Congleton collects students' reactions to the

After a year of driving 15 Nissan Hypermini city electric vehicles (city EVs) around Davis, ITS-Davis researchers involved in this demonstration and market assessment have collected and are now sorting through the data. In a recent report to Nissan, they presented intriguing initial findings.

“The goal of this project was to test driver response to the vehicles and gauge citizen response to and awareness of the vehicles in their community,” says Ken Kurani, the lead ITS-Davis researcher on the project.

Researchers set out to test two hypotheses: 1) that the market for such vehicles could be cultivated by social marketing to increase consumer involvement in and understanding of policy making and technology development; and 2) that a few vehicles in a small town can make a big impression, and that the travel of people in small towns may be better adapted to a limited range non-freeway vehicle such as the Hypermini.

Hypermini.

Researchers placed three vehicles in UC Davis departments for daily fleet and department use, and rotated the others between the 12 project employees. The employees drove the vehicles to high-profile public events and used them for daily errands around town — all with the goal of collecting people's impressions of EVs in general, and of small city EVs in particular.

"In general, people are aware that something is going on with electric vehicles, but they don't have enough information to really consider themselves to be knowledgeable," says Kurani.

Researcher Chris Congleton observes that many people asked about other electric vehicles such as neighborhood EVs and hybrids when they saw the Hypermini.

In addition, researchers tested driver and community responses to attributes such as comfort, economy, safety, styling, and driving range. In general, responses follow a pattern shaped by information and experience. First impressions are largely favorable, though some people are immediately put off by the vehicle's small size. Favorable impressions often turn negative as people start to ask questions about driving range, recharging time, and top speed. However, as drivers gained experience with the vehicle their response to many of these attributes again became positive.

"You can't simply place a fundamentally new product in front of someone, and expect him or her to provide a realistic response to it," said ITS-Davis researcher Tom Turrentine. "Providing context to evaluate new technology is one of the cornerstones of our approach to market research."

Other findings included:

- People saw Hyperminis as practical for running errands around town—but almost always for someone else.
- The vehicles did not fit some peoples' image of a small, sporty, two-seat car. Their preconceptions of such vehicles involve images of speed, leisure, and the open road — not running errands around town.
- If relegated to running errands, its capacity to haul things, such as building or yard supplies, was limited.
- Speed is important. Most respondents indicated that additional range was desirable, but the car must have a higher top speed than 60 mph to be acceptable for travel to other cities.

The findings seem to contradict the small-town hypothesis; they indicate that there is no evidence that small towns and cities are proportionally better markets than large cities. In fact, several graduating student researchers suggested that a large city, such as San Francisco, would make a better market. They saw the small size of the vehicle as one of the greatest potential assets in a larger urban center — primarily because of parking.

Although the on-road portion of the program officially ended in December, when the vehicles were returned to Nissan, researchers are continuing their assessment. "We continue to use the idea of the city EV to engage people in a conversation about how their day-to-day travel choices affect their town and the world at large," says Kurani. "Even if they can't quite see themselves in this vehicle, many people like the idea of it. The question that remains is, how to turn that idea into reality." The final report and a series of research publications will be forthcoming this fall.

TRANSPORTATION PUBLICATIONS FROM UC DAVIS: Hot off the Presses

"U.S. Shared-Use Vehicle Survey Findings: Opportunities and Obstacles for Carsharing & Station Car Growth." Shaheen, S., Meyn, M., Wipiewski, K., Transportation Research Board, January 2003. pp. 18. Publication No. UCD-ITS-RP-03-3.

"Fuel Cell Commercialization Perspectives - Market Concepts, Competing Technologies and Cost Challenges for Automotive and Stationary Applications." Lipman, T., and Sperling, D., in Handbook of Fuel Cells - Fundamentals, Technology and Applications. Publication No. UCD-ITS-RP-03-4.

"Enhancing Hydrogen Production for Fuel Cell Vehicles by Superposition of Acoustic Fields on the Reformer: A Preliminary Study." Erickson, P. A., Vernon, R., SAE 2003 World Congress & Exhibition, March 2003, Detroit, MI, SAE# RP-2003-01-0806. Publication No. UCD-ITS-RP-03-5.

"PM10 Conformity Determinations: The Equivalent Emissions Method." Kear, T. P. and Niemeier, D. A. Transportation Research v.8D, No. 2. Publication No. UCD-ITS-RP-03-6.

"Bridging the Last Mile: A Study of the Behavioral, Institutional, and Economic Potential of the Segway Human Transporter." Shaheen, S., Finson, R., Transportation Research Board, January 2003. pp. 13. Publication No. UCD-ITS-RP-03-7.

“Hybrid Electric Vehicle Design: Retail and Lifecycle Cost Analysis.” Lipman, T.E., Delucchi, M. Prepared for the Energy Foundation. April 2003. Publication No. UCD-ITS-RR-03-1.

*Publications can be ordered by fax, e-mail or mail. Some are now available online.
ITS-Davis is in the process of getting all research reports in downloadable pdf format online.*

Ordering information: <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

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

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

Education Highlights

AWARDS AND RECOGNITION: Chang Receives Endowed Professorship

Dan Chang, Professor of Civil and Environmental Engineering, has received the Ray B. Krone Professorship, one of three endowed faculty positions announced in early April. Chang is widely known for his research on the effects of air pollution on human health and waste treatment.

“It is an honor to receive this recognition, especially during the difficult economic times facing the university,” Chang told ITS-Davis e-news. “I intend to put this funding to good use to bring outstanding researchers in the field of sediment transport to the campus to give the Ray B. Krone Commemorative Lectures, and to offer a class on sediment transport for our students next year.”

The Ray B. Krone Professorship honors the late professor, who was known for his work in sediment transport and harbor design. Prof. Krone founded the UC Davis environmental engineering program. Funded with donations from Krone’s colleagues, friends and family, the professorship supports teaching, research and outreach.

“The faculty who hold these endowed chairs and professorships are among our most accomplished, creative and committed university citizens,” Provost Virginia Hinshaw told the campus newspaper for faculty and staff, Dateline, when the honor was announced.



Dan Chang

AWARDS AND RECOGNITION: Weinert Wins Eno Fellowship



Jonathan Weinert

Jonathan Weinert, a first-year Master’s student working toward a Ph.D. in Transportation Technology and Policy, was one of 20 students nationwide awarded an Eno Transportation Foundation Fellowship to attend the 2003 Leadership Development Conference in Washington, D.C. in May. Weinert has also been recognized as the 2002-2003 ChevronTexaco Fellow at ITS-Davis.

The conference is designed to provide students a real-world look at the formation and implementation of transportation policy.

“I’m excited to go and learn firsthand from our nation’s top policy makers about how transportation policy works (and doesn’t work). It’ll be fun share this experience with other transportation students around the country since they each bring a different perspective to the table,” Weinert said before his trip.

Weinert is researching the economics of developing hydrogen-refueling infrastructure, or, as he puts it, “What’s the cheapest way to put hydrogen filling stations on every corner?”

NEW GRADUATE FELLOWSHIP: CH2M HILL Establishes Transportation Technology Award



The international engineering, construction, and operations firm of CH2M HILL has established a new transportation fellowship at ITS-Davis. Each year, one outstanding UC Davis student studying transportation technology will be named the CH2M HILL Fellow. The company will provide \$8,350 to fund this honor on a yearly basis. ITS-Davis will administer the fellowship and the first recipient will be named soon for the

2003-2004 academic year.

UC Davis alumnus and Sacramento CH2M HILL civil engineer Hans Strandgaard, who was pivotal in establishing the fellowship, is pleased with his company's decision to develop this tie to ITS-Davis. "The company wanted to fund a new fellowship to promote the field of transportation technology, and we wanted a partner with many and diverse ties to industry. ITS-Davis was a natural," said Strandgaard.

ITS-Davis Director Dan Sperling and Associate Director Pat Mokhtarian are delighted with CH2M HILL's decision. Mokhtarian, who heads the Institute's graduate education and admissions effort says fellowship support is enormously valuable. "It helps us attract the very best students, and it can truly be life changing for students weighing options and fields when they consider graduate studies. Government funding for fellowships is shrinking at worst, and uncertain and highly competitive at best, so industry and foundation support is more crucial than ever," Mokhtarian explains.

The CH2M HILL fellowship is the second privately funded graduate fellowship at ITS-Davis. Chevron established the first in 1990.

ITS-Davis e-news looks forward to announcing the first recipient of the CH2M HILL Fellowship later this year.

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

ITS-Davis and Campus Highlights

RAIN FAILS TO DAMPEN PICNIC DAY ENTHUSIASM

Give a hand to ITS-Davis students and staff who, together with activists from the local electric vehicle community, braved pouring rain to display vehicles and answer questions about hydrogen, fuel cells, battery electrics and hybrids at the campus's annual Picnic Day spring open house in April.

The enthusiastic group participated in the Picnic Day parade through campus and downtown Davis, then huddled under canopies with a display of the campus's new Toyota fuel cell vehicle, as well as a variety of electric cars owned by local Davisites. Our hardy volunteers offered brochures and a wealth of information for the equally hardy hundreds who stopped by to learn more about the future of vehicular transportation.



Rain dampens the Picnic Day parade.

The campus Hybrid Electric Vehicle Center, featuring the student-built and competition-winning plug-in hybrid vehicles, took a dryer display route: The HEV Center opened the exterior doors of its engineering work bays in Bainer Hall. The indoor setting enticed visitors to learn about the Center's work led by Prof. Andy Frank of the Dept. of Mechanical and Aeronautical Engineering.

CITY OF DAVIS HONORS UNITRANS

The City of Davis has awarded Unitrans, the community bus service operated by the Associated Students of UC Davis, its 2003 Environmental Recognition Award in the Non-Profit category. The city recognized the bus service's innovations such as using natural gas and hydrogen fuel to reduce emissions.

Unitrans was nominated by Larry Greene of the Yolo-Solano Air Quality Management District; Terry Bassett of the Yolo County Transportation District;



Unitrans operates nine compressed natural gas buses and one CNG-hydrogen bus.

and ITS-Davis's Dan Sperling and Joe Krovoza. In nominating Unitrans, the four wrote that it is "easily one of the cleanest bus fleets in the state and provides a model for others, for which we can all be proud."

ITS-Davis bids a fond farewell to Unitrans General Manager Jim McElroy, who, after 23 years with the ASUCD bus service in Davis, has accepted a position with the Los Angeles MTA.

ITS-DAVIS WINS LOCAL PR AWARDS

ITS-Davis has won two Silver "Cappie" awards from the Sacramento Public Relations Association. The Institute was recognized for its 2002 Biennial Report and for a feature article on CarLink II published last year in the League of California Cities' magazine, *Western City*.

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

Dan Sperling, in *Los Angeles Times*, May 13, in a business section column on the future of hydrogen and fuel cell transportation.

Dan Sperling, on KALW 91.7, San Francisco, May 12, in a panel on alternative fuel vehicles.

Andy Frank spoke at the Commonwealth Club May 8 as part of a panel on Greening the Automobile Industry. Commonwealth Club presentations are usually taped for airing at a later date on public radio.

CJ Brodrick, on Voice of America and VOANews.com, April 24, on her heavy-duty truck fuel cell APU research.

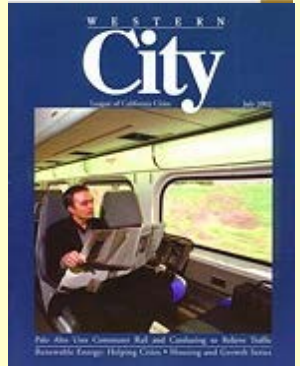
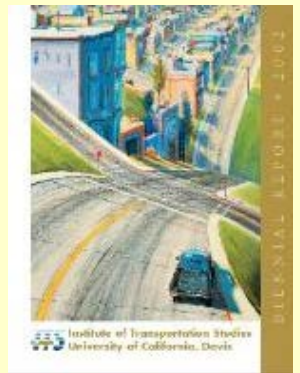
John Tillman, with the Toyota FCHV, on Tech TV, April 23, in a segment on the future of hydrogen-powered cars.

Tom Turrentine, on Tech TV, April 9, on the re-emergence of diesel in the U.S. transportation market.

Dan Chang, in *UC Davis Dateline*, April 4, on his endowed professorship.

Ken Kurani and Dan Sperling, in *Comstock's Business* magazine, April 2003, on UC Davis and the Institute's role in clean, alternative fuel vehicle research and development in the Capital region.

Ken Kurani, Tom Turrentine and the Toyota FCHV demonstration program, in *UC Davis Magazine*, Spring 2003.



2002 Cappie Award-winning entries from ITS-Davis.