



e-news



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

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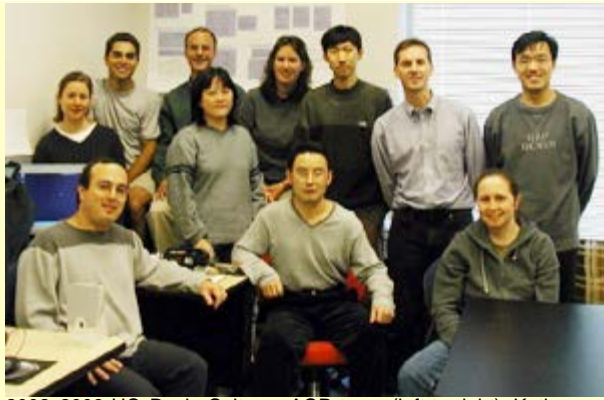
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Research Results

CIVIL ENGINEERING'S PRODUCTIVE PARTNERSHIP YIELDS IMPRESSIVE RESULTS: UC Davis-Caltrans Air Quality Project a National Model

When the California Department of Transportation considers important long-term transportation and air quality policies, it turns frequently to a highly effective team of experts at UC Davis' Department of Civil and Environmental Engineering to provide the critically important technical and analytical foundation for the big decisions. Under the UC Davis-Caltrans Air Quality Project, UC Davis researchers and students work together in a unique partnership with Caltrans to support development of the state's transportation projects while meeting air quality goals.

The AQ Project was formed to address critical problems identified by Caltrans, conduct new emissions and air quality research, develop and enhance modeling and planning analysis tools, analyze and comment on



2002-2003 UC-Davis Caltrans AQP team (left to right): Kathy Nanzetta, Gil Tal, Kevan Shafizadeh, Doug Eisinger, Zhen Dai, Sondra Rosenberg, Oliver Gao, Bai Song, Tom Kear, Mimi Sogutlugil, and Faa Ji.

pending policy issues, and respond to informational requests. Over the last seven years the project has scored countless successes and published more than 30 peer-reviewed reports.

Principal Investigator Deb Niemeier calls it a strategic partnership for tech transfer. “Our project provides a ladder of intellectual resources that can be used to develop new planning tools to transfer technology back to Caltrans.”

The ladder’s rungs are students, who work at all levels under the direction of Niemeier, Project Manager Doug Eisinger, and Project Engineer Tom Kear. “We have Ph.D. students conducting cutting edge research that may derive originally from a Caltrans problem and for which there was a gap in knowledge, master’s students working on applied research, and undergrads working on literature reviews, helping graduate students with experiments and in some cases doing their own research,” says Niemeier. “Students are clearly the heart and soul of the project and many stay in California working for Caltrans and other agencies. They do a great job.”

Two of the AQ Project’s most recent efforts are aimed at research on particulate matter, or PM10.

Predicting Paved Road PM10 Emissions Factors

One project is examining the relationship between land use and PM10 road dust. In places such as California’s Central Valley, rural agricultural areas with dusty roads are rapidly converting to developed parcels. Developed land typically leads to increased vehicular traffic, and traditional models assume that PM concentrations increase with more traffic and vehicle miles traveled. But in the case of dusty agricultural roads, researchers hypothesized—and pilot study findings support the hypothesis—changing land use may actually reduce particle pollution.

Student Researcher Sondra Rosenberg sampled road dust at 11 sites in the Davis area. Among other findings, the pilot study found a large discrepancy between measured values and values predicted by current emissions tools, and a strong relationship to the adjacent land uses. This suggests the need for a more comprehensive evaluation to update current modeling methods.



Sondra Rosenberg collects PM along a road in Davis.

Much is at stake. Billions of dollars in federal transportation funding hinge on a region’s ability to meet air quality standards, and state and local planners depend on the models to predict the effect of increased traffic on local air quality.

The researchers are currently expanding the roadside sampling to 150-200 sites in California’s San Joaquin Valley.

Qualitative PM10 Hotspot Analysis

UC Davis researchers are working with Caltrans and the Federal Highway Administration to develop a PM10 “hotspot” analysis protocol that will be the first in the nation to provide transportation planners a step-by-step guide to complete project level PM10 analyses.

“This work will result in a very important planning tool,” Niemeier notes. “Although the Clean Air Act requires PM10 hotspot analysis, to date there have been no guidelines for conducting these analyses.”

A hotspot is a localized area near a transportation project that might have elevated pollutants linked to the transportation project.

Federal regulations require PM10 hotspot analyses for new projects. The new UCD PM10 Protocol provides a methodology for project analysts to use the latest scientific information to assess potential PM10 hotspots. It will allow Caltrans and local metropolitan planning organizations to conduct the necessary analyses to reach the required "conformity determinations" and obtain the necessary environmental approvals for transportation projects.



Ph.D. student Kathy Nanzetta helped develop the UCD PM10 Protocol.

Niemeier credits Ph.D. student Kathy Nanzetta, and Doug Eisinger and Tom Kear with leading the development of the protocol.

Among the AQ Project team's new projects is more research on transportation toxics. "We know toxics will be one of the most important issues for transportation agencies to deal with in the next five years," Niemeier says. "Caltrans is asking us to take the lead on both assessing and conducting cutting edge research to help the agency set guidance and policy in a sensible way."

The AQ Project is also conducting a study of "way in motion" data and truck travel. Under the leadership of Ph.D. student Oliver Gao, the team is examining five years' worth of data to understand how a variety of travel factors affect air quality. For example, more daytime truck travel means more daytime diesel emissions, which interact with sunlight to raise ground-level ozone levels. Previous models assumed more nighttime truck travel, and may no longer be accurate. "Caltrans is demonstrating its forward-thinking with this project, and we're excited about the opportunity to evaluate data that could lead to very different assumptions for emissions

models in the future," Niemeier says.

Niemeier notes that the UC Davis-Caltrans Air Quality Project is the only national model where a state agency has said: "be our research arm and give us the right tools to sensibly implement policy." The UC Davis researchers are more than happy to oblige.

For more information on the UC Davis-Caltrans Air Quality Project see: <http://aqp.engr.ucdavis.edu/default.htm>

MECHANICAL ENGINEERING'S HYBRID SUV TAKES SECOND PLACE IN FUTURETRUCK COMPETITION



2003 UC Davis FutureTruck Team with "Yosemite."

A Ford Explorer sport utility vehicle rebuilt by UC Davis engineering students to run as a gas-electric "plug-in" hybrid has won second place in the national FutureTruck competition. The UC Davis team also won a prize for Best Dynamic Handling and the Cisco Systems award for telematics. The University of Wisconsin-Madison took first place overall.

"The competition went very well; there were a lot of competitive cars running," said team leader Dahlia Garas, a graduate student in the Department of Mechanical Engineering. The award-winning team is a project of the UC Davis Hybrid Vehicle Center, directed by Prof. Andy Frank.

"Yosemite," the UC Davis entry, is designed to achieve fuel economy of about 30 miles per gallon with the same performance as a standard model Ford Explorer SUV. Batteries and electric motors power the vehicle during low-speed city driving. A small, fuel-efficient gasoline engine powers the vehicle for extended highway driving and keeps the batteries charged. The vehicle also can be plugged into a domestic power outlet overnight to charge the batteries with off-peak electricity.

The UC Davis team won the competition in 2001 with a hybrid Chevrolet Suburban, "Sequoia." Major sponsors of this year's competition are Ford Motor Company and the U.S. Department of Energy.

To learn more about the UC Davis FutureTruck Team, visit: <http://www.team-fate.net/>

A technical paper on this "Yosemite" project written by the UC Davis team and published by SAE is available at: <http://www.team-fate.net/reports/UCD2003TechReport.pdf>

TRANSPORTATION PUBLICATIONS FROM UC DAVIS: Hot off the Presses

"Modeling the Individual Consideration of Travel-Related Strategies." Cao, Xinyu, P. Mokhtarian. ITS-Davis. May 2003. Publication No. UCD-ITS-RR-03-3.

"Enthalpy of Formation of Cubic Yttria-Stabilized Zirconia." Lee, T.A., and A. Navrotsky. Journal of Materials Research. Vol. 18, no. 4. April 2003. Publication No. UCD-ITS-RP-03-8.

"Design and Development of the UC Davis 2003 FutureTruck." Allan, William, and C. Bangar, C. Carde, A. Dalal, A. Garas, J. Holdener, N. Meyr, C. Nitta, A. Frank, Society of Automotive Engineers, Publication No. UCD-ITS-RP-03-9 www.sae.org

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Education Highlights

UC DAVIS WELCOMES H2 EXPERT JOAN OGDEN TO FACULTY

Joan Ogden, one of the country's premier researchers in hydrogen energy, joins the UC Davis faculty this fall after many years at Princeton. Dr. Ogden arrives in August to a new position of Associate Professor in the Department of Environmental Science and Policy. She also will serve as Associate Energy Policy Analyst at ITS-Davis.

"Dr. Ogden's appointment will draw much attention to our campus and will be a large boost to our energy research and education programs," said ITS-Davis Director Dan Sperling.

Ogden, who will be involved with the Institute's new Hydrogen Pathways program, expects to teach both undergraduate and graduate courses in energy policy, policy analysis, and hydrogen energy systems. "I'm looking forward to working with graduate student researchers, as well," she told e-news.

Ogden has been a researcher at Princeton since 1985, first at the Center for Energy and Environmental Studies and later at the Princeton Environmental Institute. Most of her work has involved technical and economic assessments of new energy technologies, primarily in the areas of hydrogen, fuel cells, renewable energy and energy conservation. She is particularly interested in alternative fuels production, the use of hydrogen as an energy carrier and applications of fuel cell technology in transportation and stationary power production.

"My research centers on understanding how a transition might occur from our current transportation system toward one based on use of hydrogen as an energy carrier," Ogden said.

Over the past several years she has assessed fuel cell vehicles and hydrogen refueling infrastructure. She has testified before Congress on these issues and served on a number of high-level panels, including serving as formal leader of the "Integration Team" for the U.S. Department of Energy Hydrogen Roadmap. She received her Ph.D. in Physics from the University of Maryland, College Park.

"I am thrilled to be joining the group at UC Davis. ITS-Davis has had an excellent program in alternative transportation technologies for many years. The chance to work with the strong interdisciplinary team at ITS-Davis was a great attraction for me. Another wonderful feature is the fine group of talented young researchers at UC Davis. There is an obvious camaraderie and intellectual excitement. I welcome the opportunity to help educate the next generation of leaders in my field," Ogden said.



Joan Ogden arrives August 1

WHAT WILL MOVE YOU? UC Davis Hosts 2003 IGERT Student Research Conference

Approximately 85 of the nation's best and brightest students studying transportation came to Davis for the 2003 Student Research Conference, sponsored and hosted by the UC Davis Integrative Graduate Education and Research Traineeship (IGERT) program. About 25 students, including three UC Davis students, presented their research work at this June 26-27 event. The conference was

organized by UC Davis transportation students to address cutting edge issues in transportation technology.

One important goal of the IGERT Student Research Conference was to showcase the research of the top transportation students in the country, with timely dissemination of new results and cross-fertilization among researchers. Another goal was to create a community of these leaders of tomorrow in a setting where they could get to know each other and find out what others in the country are learning and doing.

Among the special presenters in Davis were Caltrans Director Jeff Morales; Tom Gross, a member of the board of the U.S. Department of Energy; John Wallace, former director, Ford Motor Company THINK Technologies Division; and Susan Shaheen, Ph.D., a special assistant to Caltrans, nationwide expert on carsharing and innovative mobility, and UC Davis alumna.

The IGERT program is a National Science Foundation endeavor initiated in 1997. Now comprising approximately 100 university award sites, it continues into its sixth annual competition. UC Davis was among the first 17 awarded these prestigious and highly competitive five-year multi-million dollar grants. In fact, ITS-Davis continues to be the only transportation program in the country to be funded as an IGERT program. This award recognizes that UC Davis's unique multidisciplinary approach to graduate transportation studies is a national model.

Conference CDs containing the papers and presentations are available for purchase for \$10 through ITS Publications.

AWARDS AND RECOGNITION

High Marks for UC-Davis Eisenhower Fellows



UC Davis Eisenhower Fellows: Belinda Chen, Emily Winston, and Deborah Salon.

Once again, ITS-Davis salutes graduate students for their outstanding performance in the prestigious Dwight David Eisenhower Fellowship program administered by the U.S. Department of Transportation. Belinda Chen (Transportation Technology and Policy) ranked third nationally; Deborah Salon (Agricultural and Resource Economics) ranked 20th; and Emily Winston (Transportation Technology and Policy) ranked 30th. The top 10 awardees receive full multi-year awards and the next 15 are provided an all-expense paid trip to the annual meeting of the Transportation Research Board in Washington, DC. Belinda Chen previously earned an EPA STAR fellowship.

Capital Fellows Program Executive Fellowship

Tara Goddard (Civil and Environmental Engineering) has accepted an Executive Fellowship through the Capital Fellows Program, run by the Governor's Office and the Center for California Studies. She will be a fellow for one year in a state agency such as the California Air Resources Board, Cal-EPA, or Office of Planning and Research. Goddard will return to UC Davis in Fall 2004 to finish her Master's.

This summer, Goddard is interning at the National Association of Regional Councils (NARC), which offers technical assistance, educational services and public policy support to local government officials in over 500 agencies around the country. As NARC's Transportation and Air Quality Research Associate she has a full plate of summer activities including



Left to Right: Fran Mainella, director of the National Park Service; Tom Cristoffel, NARC member; Peggy Tadej, NARC special projects director; ITS-Davis's Tara Goddard; and Interior Secretary Gale Norton.

the following:

- Developing guidelines for regional councils from NARC's sixth transportation and air quality workshop
- Researching and writing articles on air quality trends and intelligent transportation systems (ITS) for the quarterly newsletter
- Reviewing an EPA grant application for the Environmental Education Grants Program
- Summarizing Congressional and NGO meetings for weekly membership email

Goddard also participated in NARC's annual conference in Pittsburgh in June, where the accompanying photo was taken.

National Park Scholars Fellowship

Congratulations to Thomas Barron, who won the National Park Scholars Fellowship (through the ENO Transportation Foundation), and will be using it to spend a year working in Yellowstone Park and Puerto Rico (after interning at the Toyota Technical Center in Ann Arbor this summer). Barron is a first-year Transportation Technology and Policy student who has been working with Prof. Susan Handy.

2003 GRADUATES OFF TO MAKE THEIR MARK

ITS-Davis congratulates the following students who graduated this winter/spring:

Patricia Hendren, Ph.D., Transportation Technology and Policy

Advisor: Debbie Niemeier

Dissertation: "Evaluating the Link Between Resource Allocation Decisions and Transportation Performance Measures: Seventeen Years of Spending on Our Roads"

Yu Nie, Ph.D., Civil Engineering

Advisor: Michael Zhang

Dissertation: "Development of Advanced Estimation Methods for Inferring Dynamic Origin-Destination Trip Tables on General Congested Urban Transportation Networks"

Kitty Wu, M.S., Transportation Technology and Policy

Advisor: Dan Sperling

Exam

AHHH SUMMER: Time for a break

ITS-Davis students are enjoying a break this summer from the rigors of the academic schedule. On June 5 the Institute hosted its annual end-of-the year picnic.

BIG BANG! Students Advance to Finals

The good news is: The team of Transportation Technology and Policy students that formed Solid Oxide Systems, LLC, made it to the final round of the UC Davis Graduate School of Management's Big Bang Business Plan Competition in May.

The bad news is: They had to withdraw.

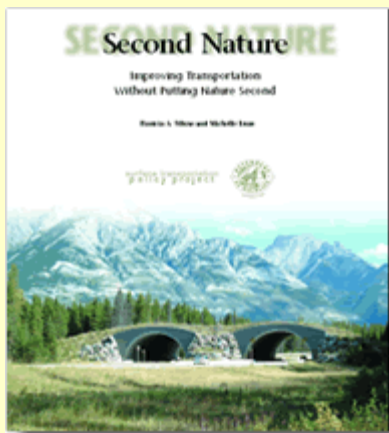
But the good news is: They withdrew because they exceeded the \$500,000 private equity funding limit and were no longer eligible to compete. Student researchers Kenth B. Pedersen, Jonathan Weinert and Matt Caldwell noted that they were sad to have to bow out. But, noted Peterson in an e-mail message to colleagues, "If we must [withdraw] because of too much success, this we can live with."

The students' plan focused on the business opportunities of the Microfuel system, a novel high-efficiency, high-temperature steam electrolyzer technology developed by Lawrence Livermore National Laboratory (LLNL), and commercialized by Solid Oxide Systems. The technology is being licensed from LLNL by the start-up company, Solid Oxide Systems. The ITS-Davis team served as advisors to the company.



Ethan Abeles shows off his barbequing skills at the summer picnic.

ALUMNI ACCOMPLISHMENTS: Published Reports Gain National Attention



UC Davis Alum, Michelle (Garland) Ernst (1996) now working with the Surface Transportation Policy Project (STPP), has co-authored a report on transportation and biodiversity. "Second Nature: Improving Transportation Without Putting Nature Second" outlines the impacts of surface transportation infrastructure on America's wildlife and provides win-win solutions that retain and respect both our mobility and conservation objectives.

Co-published with Defenders of Wildlife, the full report is available online at

<http://www.transact.org/report.asp?id=206>

<http://www.defenders.org/habitat/highways/secondnature.html>

As the Union of Concerned Scientists' clean vehicles program senior engineer, former UC Davis grad student David Friedman is frequently quoted in the national media. His report, "A New Road: The Technology and Potential of Hybrid Vehicles," examines how hybrid vehicles can play a significant role in addressing several of the major problems faced by the United States and the world today: climate change, air pollution, and oil dependence.

Read more about it and download the full report at http://www.ucsusa.org/clean_vehicles/advanced_vehicles/page.cfm?pageID=1082



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ITS-Davis and Campus Highlights

DEVELOPMENT UPDATE: Private Philanthropy tops \$1.5 million for 2002-2003

For fiscal year 2002-2003, ITS-Davis received \$1.5 million in private gifts. We would like to give special thanks to all of the companies, foundations and individuals for their generous contributions to the Institute.

Corporations: American Honda Motor Co./Honda R&D Americas, Aramco Services Company, BP America, Centro Ricerche Fiat, ChevronTexaco/Chevron Products Company, ConocoPhillips, DaimlerChrysler, ExxonMobil, Freightliner LLC, Hyundai Motor Company, General Hydrogen, Nissan Technical Center North America, Shell Hydrogen (US), Skeleton Technologies, Subaru Technical Research Center, Taylor Made Environmental, Toyota Motor Sales, Volkswagen, Volvo Group, Webasto Thermosystems, and Xantrex Technology.

Foundations: Energy Foundation, William and Flora Hewlett Foundation, and McWick Technology Foundation.

Individuals (special gifts): Jake Peters (narrow vehicle research) and Neil Otto (fuel cell stacks). Also note the *Friends of ITS-Davis* individual gifts below.

Friends of ITS-Davis Off and Running

Following the initial solicitation in May, alumni Co-Chairs Joshua Cunningham and Trish Hendren recently asked alumni for their input on how to keep alumni connected to ITS-Davis and each other. Gifts to *Friends of ITS-Davis* have already totaled \$11,000. ITS-Davis would like to give special thanks to the inaugural *Friends of ITS-Davis* donors.

Donors: Geoffrey and Shelagh Ballard, Norm and Catherine Bryan, Anthony Eggert, Robert Epstein, Patricia Hendren, Joseph and Janet Krovoza, Paul and Judith MacCready, Neil and Peggy Otto, Christopher and Renee Pearl, John and Julia Schutz, Dan Sperling and Patricia Davis, Satoshi and Mutsumi Sugawara, and Conrad Wagner.

The 2003 Match: A very generous match from General Hydrogen has helped jumpstart the Friends program. The company will match all gifts of \$1,000 on a one-for-one basis, up to 20 such gifts. This match has spurred the first

five \$1,000 gifts to the Friends fund from the Ballards, Ottos, Bryans, MacCreadys and Dan Sperling and Patricia Davis. ITS-Davis gives special thanks to General Hydrogen for this visionary leadership gift.

To find out how you can contribute to *Friends of ITS-Davis*, please contact Associate Director of Development Renee Pearl (530/754-6514 or rmpearl@ucdavis.edu).

ITS-Davis Welcomes New Associate Director of Development

In June, the Institute expanded its fundraising and program development resources by announcing the promotion of Renee Pearl to the newly created position of Associate Director of Development.

Pearl will support Development Director Joe Krovoza in his expanding role of managing the Institute's expanding array of external relationships—working on Congressional requests, federal solicitations, and California initiatives, as well as the many private fundraising efforts. "This is quite exciting for ITS-Davis," said Krovoza. "It will allow the Institute to pursue new fundraising opportunities."

Pearl will assume her own portfolio of development projects, focusing on the *Friends of ITS-Davis* program, foundations and Corporate Affiliate Program support and benefits delivery. "Over the next year, I hope to build the Friends program and look forward to raising funds for the Institute's many outstanding projects," she said.

Pearl joined the Institute's staff in October 2001, and quickly established herself as an invaluable assistant to Krovoza and Institute Director Dan Sperling. "Renee has distinguished herself by helping to establish the *Friends of ITS-Davis* program, handling many aspects of corporate gift stewardship, supporting our Board of Advisors, and pursuing professional development in the field of fundraising," Krovoza added. "We're very lucky to have her on our team."

Pearl is pleased to be working with Krovoza and her Institute colleagues. "I am thankful to have the opportunity to work with a great group of people towards a common goal of cleaner transportation," she said.



ITS-Davis Associate Director of Development Renee Pearl.

ITS-DAVIS WINS WTN FINALIST AWARD

ITS-Davis was selected as a finalist in the World Technology Network's (WTN) 2003 World Technology Award in the corporate energy category. ITS-Davis Director Dan Sperling attended the awards ceremony recently in San Francisco.

The annual awards are presented by the WTN in association with NASDAQ, Accenture, Microsoft, Genencor International, Dupont Textiles and Interiors, and TIME, Technology Review, Science, and Business 2.0 magazines. Selection as a finalist also means that ITS-Davis has been elected as a Corporate Member of the World Technology Network.

The World Technology Awards honor individuals and corporations from 20 technology-related sectors. A panel of current WTN members recognizes the winners as innovators who are doing work of the greatest likely long-term significance. Award categories range from biotechnology, space and energy to ethics, design and entertainment.

Headquartered in London, the World Technology Network was created to "encourage serendipity" and "happy accidents" among those individuals and companies deemed by their peers to be the most innovative in the technology world.

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

Pat Mokhtarian, in the Washington Post, June 26, in a feature on commute distance and time, and driver preferred commute length.

Anthony Wexler, in the San Francisco Chronicle, June 13, in an article on new research from Cal-Tech showing that widespread use of hydrogen could indirectly deplete the ozone layer.

Susan Shaheen, on National Public Radio's "Marketplace," May 16 and 19 in a feature on carsharing.

Dan Sperling and former ITS-Davis grad student David Friedman, now with Union of Concerned Scientists, in Los Angeles Times,



May 12, in a story on the future market and environmental consequences of biodiesel.

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