

ITS-Davis e-news presents information on research, education, and outreach from the UC Davis Institute of Transportation Studies and affiliated campus departments that host transportation-related programs. For previous issues, visit the [e-news archives](#).

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New Initiatives

NextSTEPS: Planning the Transition to More Sustainable Fuels and Vehicles



The Institute's wildly successful [Sustainable Transportation Energy Pathways \(STEPS\) Program](#) wrapped up its first four years, and in January launched a second phase of the industry-government-academia collaboration that produces public-domain research on strategies for future fuels and vehicles.

NextSTEPS is now entering a new creative design phase, says STEPS Director Joan Ogden, a professor of Environmental Science and Policy. "STEPS was about building tools to understand the different fuel pathways. Now we're going to put those tools together to create practical visions that will help lead to a more sustainable transportation future."

The mission of STEPS was to create robust comparisons of different fuel and vehicle pathways and to transfer that knowledge to stakeholders in the decision-making process. STEPS research advanced the state of knowledge about alternative fuels and vehicles, including biofuels, electricity, hydrogen, and fossil fuels, and brought an impartial, rational voice to the debates. STEPS data collection and modeling work "provided an information base grounded in technical and economic reality from which to apply a vision of the future," Ogden says.

“When we started, there weren’t a lot of good apples-to-apples comparisons of fuels,” Ogden recalls. The results made clear that no single fuel or transportation approach will enable us to cut our oil use and greenhouse gases emissions the way we need to, to meet our societal and policy goals. “We need a portfolio approach that includes efficient vehicles, reduced travel demand, electric-drive vehicles and de-carbonized fuels,” says Ogden.

More than 100 attendees at the January STEPS Symposium reviewed results of the program’s first four years and discussed plans for the next phase. Among the planned NextSTEPS projects are development and refinement of the “TIMES” energy-economic model to evaluate greenhouse gas policies, led by ITS-Davis researcher Sonia Yeh; analyzing the volume and kinds of water needed and used for biofuels production, led by Transportation Technology and Policy Ph.D. student Gouri Mishra; and designing renewable energy intensive futures, led by ITS-Davis researcher Mark Delucchi ([see story below](#)).

Like STEPS, NextSTEPS will bring together multiple researchers working in complementary disciplines. They’ll build on the data from STEPS to create scenarios and tools, and analyze policies. They’ll generate visions of the future and develop detailed regional studies beyond California – for parts of the United States, China, and Europe.

STEPS ended as a hugely successful \$8 million collaborative, involving 19 sponsors, 15 faculty, 25 graduate students, and 12 academic programs or departments. NextSTEPS is well on its way to matching the success of the first phase. Initial sponsors include BMW, BP, Caltrans, CARB, Chevron, Nissan, Shell, South Coast Air Quality Management District, and the U.S. Department of Energy.

Research Update

100% Renewables: Pipe Dream or Potential?

Powering the world with energy from wind, water, and sunlight may sound like the stuff of dreams – but it’s feasible, says UC Davis researcher Mark Delucchi. In a two-part paper published in December in *Energy Policy*, Delucchi and Stanford’s Mark Jacobson determine what it would take to power the globe solely with renewables, and what it would cost.



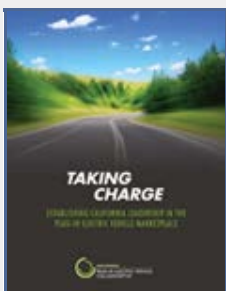
[e-news profiled the duo](#) after a first article on their research appeared last year in [Scientific American](#). Their papers and articles have set off a whirlwind of debate in national and international media circles. Find the researchers’ paper in [Energy Policy](#), and read articles about their work in [Nature Climate Change](#), [National Geographic](#), and [The Hill energy and environment blog](#).

TRB Draws Record UC Davis Attendance

Research from more than 50 UC Davis faculty and students was presented at the annual gathering of the Transportation Research Board in Washington, DC in January. See the complete list of presenters and papers [here](#).

New Reports: PHEV Research Aids Policymakers on Multiple Fronts

The UC Davis Plug-in Hybrid & Electric Vehicle (PH&EV) Research Center, part of ITS-Davis, ended its second year by producing two high-profile research reports containing valuable insight to aid policymakers.



Printed copies of the state’s plug-in electric vehicle plan, “TAKING CHARGE: Establishing California Leadership in the Electric Vehicle Marketplace” are now available. ITS-Davis PH&EV Research Center staff led the research and writing of the plan, which was formally released by the California Plug-in Electric Vehicle Collaborative in December. For print copies contact [Tobias Barr](#) of the PH&EV Research Center. [Download an electronic copy of the plan here.](#)

The second-year report of the PHEV Demonstration and Consumer Education, Outreach, and Market Research Program summarizes the results of the program’s ongoing study of consumer response to plug-in

hybrid vehicles. Among the findings, two are fundamental. First, consumers don't understand the benefits of all-electric driving made possible by some PHEV designs, and this lack of information reduces demand for those designs. Second, anyone who wants to promote PHEVs and their benefits to consumers needs to communicate in language consumers understand. Read more in the latest [ITS-Davis Research Findings](#).

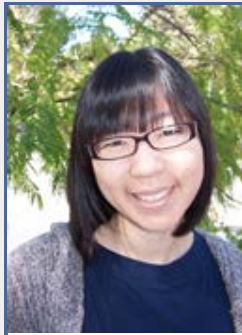
Education Highlights

Fellowships: Supporting Student Education

ITS-Davis is fortunate to be able to offer a number of fellowships to our students for the 2010–11 academic year. The recipients are announced in *e-news* as the awards are given.



Abbas Ghandi



Sahoko Yui

ITS-Davis this year created academic fellowships in the name of each company that supports the Institute's Corporate Affiliate Program at the Patron Level. The first two of these prestigious new fellowships have now been awarded. **Abbas Ghandi**, a Transportation Technology and Policy Ph.D. student who began his UC Davis studies in fall 2007, received the inaugural ITS-Davis Corporate Affiliate Fellowship, the **ExxonMobil Fellowship**. **Anthony Santamaria**, a Mechanical and Aerospace Engineering Ph.D. student working in the Green Transportation Lab under Professor Jae Wan Park, received the **Daimler Fellowship**.

Sahoko Yui, a first-year Transportation Technology and Policy master's student, is this year's **AAA Greenlight Fellow**. This annual fellowship, sponsored by AAA

Northern California, Nevada & Utah, was established at ITS-Davis to attract more minority students to the transportation field, specifically to encourage the study of alternative fuels and other vehicle efficiency technologies.



Susan Pike



Amy Lee

UC Davis students are this year's recipients of all three **Women in Transportation – Sacramento** scholarships. The honors were presented at the annual WTS Awards Banquet in Sacramento in December. **Susan Pike**, a Transportation Technology and Policy master's student working with professors Pat Mokhtarian and Mark Lubell, received the Helene M. Overly Memorial Graduate Scholarship. The Sharon D. Banks undergraduate scholarship went to **Amy Lee**, a senior in Environmental Policy Analysis and Planning who is working with Professor Susan Handy. **Julie Peri**, a senior in Civil Engineering, received the Louise M. Molitoris Leadership Fund award.

ITS-Davis Researchers Cited in *Science Direct* Top 25 Lists

Papers authored by ITS-Davis researchers made two of Elsevier Publications' Science Direct "Top 25 Hottest Articles" lists for the 2009–10 academic year. The papers were published in either *Transport Policy* or *Transportation Research Part D* and are listed below.

[Are batteries ready for plug-in hybrid buyers?](#)

Transport Policy, Volume 17, Issue 3, 1 May 2010, Pages 173-182

Axsen, J.; Kurani, K.S.; Burke, A.

[An analysis of the retail and lifecycle cost of battery-powered electric vehicles](#)

Transportation Research Part D: Transport and Environment, Volume 6, Issue 6, 1 November 2001, Pages 371-404

Delucchi, M.A.; Lipman, T.E.

[A retail and lifecycle cost analysis of hybrid electric vehicles](#)

Transportation Research Part D: Transport and Environment, Volume 11, Issue 2, 1 March 2006, Pages 115-132

Lipman, T.E.; Delucchi, M.A.

[Correlation or causality between the built environment and travel behavior? Evidence from Northern California](#)

Transportation Research Part D: Transport and Environment, Volume 10, Issue 6, 1 November 2005, Pages 427-444

Handy, S.; Cao, X.; Mokhtarian, P.

[Factors associated with proportions and miles of bicycling for transportation and recreation in six small U.S. cities](#)

Transportation Research Part D: Transport and Environment, Volume 15, Issue 2, 1 March 2010, Pages 73-81

Xing, Y.; Handy, S.L.; Mokhtarian, P.L.

Sustainable Transportation Center Update

STC Outstanding Student of the Year

Transportation Technology and Policy Ph.D. student David McCollum is the STC's 2010–11 Outstanding Student of the Year. McCollum was recognized for his achievement at last month's Council of University Transportation Centers banquet at the annual TRB conference in Washington D.C.

For his dissertation research, McCollum is developing a California economic and energy model to analyze the state's greenhouse gas policies and study options for achieving long-term energy and climate objectives. McCollum has received numerous awards and fellowships for his accomplishments at UC Davis, including the best master's thesis award in 2007–2008 for his comprehensive study of the likely effects of expanded use of coal on the nation's rail system, an Eisenhower Fellowship, and a Fulbright research grant, among others.



STC Outstanding Student of the Year David McCollum, left, with ITS-Davis researcher Chris Yang and student Adina Boyce, winner of the Neville A. Parker award, at the CUTC Awards Banquet at TRB

Faculty Research Grants and Student Dissertation Fellowships Awarded

The Sustainable Transportation Center has awarded six faculty research grants and four dissertation fellowships for the 2010–11 academic year.

Faculty Research Grants support the named faculty researcher and at least one graduate student. The 2010–11 faculty recipients are:

YueYue Fan

“Renewable Energy Supply Chain Disruption Management”

YueYue Fan is using a stochastic modeling framework that incorporates various risk measures to develop methods for managing disruptions in renewable energy supply chain systems. Such breakdowns could occur in response to common supply and demand fluctuations (recurrent risks) or facility breakdowns or natural disasters (non-recurrent risks).

Chris Knittel

“Carbon Pricing Policies and Their Effect on Greenhouse Gas and Criteria Emissions”

Chris Knittel is studying the impact of pricing greenhouse gases on both greenhouse gas and criteria pollutant emissions. The goal is to test the belief held by many policy makers that increasing the cost of driving has little effect on consumer behavior and thus emissions. The project will add to our broader understanding of how consumers respond to increases in the cost of driving and how this response affects emissions.

Pat Mokhtarian

“How Permanent are Construction-Induced Adjustments in Commute Behavior? Change Persistence Six Months after the Fix I-5 Project in Sacramento, California”

Temporary events may induce many changes in travel behavior, some of which may lead toward more sustainable commute patterns. But to what extent do those changes persist after the event concludes, and what influences some people to maintain the new behavior indefinitely while others return to their previous pattern as soon as possible? Pat Mokhtarian intends to find out

in this follow-on project. [Find out more here.](#)

Deb Niemeier

“Understanding How Public Perceptions of Road Diets are Formed”

Local projects that facilitate well-planned non-motorized transportation options will be critical for meeting the nation’s greenhouse gas and oil reduction goals – and public acceptance of such projects is critically important. Deb Niemeier will survey residents and businesses in Davis about a proposed “road diet” project in the city. Her research findings will guide policymakers in developing outreach tools for other similar projects nationwide.

Deborah Salon

“Evaluating the Impact of Local Actions on Vehicle Miles Traveled: Case Study in Davis, CA”

Deborah Salon’s project continues a series of before-and-after studies of the effects of three local land-use projects in Davis on vehicle miles traveled in the city. The three changes are the opening of the first “big box” retail store in Davis, the opening of an innovative mixed-use development, and a vehicle lane reduction/bicycle lane addition project on a major arterial road adjacent to downtown. Her experiences on these studies will contribute to the development of methods that communities themselves can use in evaluating the effectiveness of policies to reduce greenhouse gas emissions from driving.

Michael Zhang

“Credit-based Pricing for Multi-user Class Transportation Facilities”

Michael Zhang will develop a novel carrot-and-stick strategy, called Arc-Based Credit (ABC) system, as an alternative to traditional congestion management strategies such as toll roads. The ABC system has the potential to improve road system performance without making any road users worse off, while generating enough revenues to pay for itself.

Dissertation Fellowships support the research of Ph.D. students who have advanced to candidacy and are working on their own original research. The 2010–11 fellowship recipients are:

Yi-Ru Chen

“Modeling Vehicle Interactions in the Ramp Merge Area”

Joeri F. de Wit

“Estimating Demand and Cost Functions for Hybrid-Electric Vehicles in the BLP Random Coefficients Model”

David McCollum

“Modeling Optimal Transition Pathways to a Low Carbon Economy in California: Impacts of Advanced Vehicles and Fuels on the Energy System”

Tai Stillwater

“How Real-time Energy Feedback Influences Driving Behavior and Fuel Economy”

Pat Mokhtarian Featured in UTC Spotlight

Professor Pat Mokhtarian gets the limelight in the February issue of U.S. Department of Transportation’s *Spotlight* newsletter. [“Road Closed: How do Consumers Cope?”](#) summarizes Mokhtarian’s work on commuter response to Sacramento’s “Fix I-5” project. Even though the highway closure during summer 2008 is now just a commuter’s distant memory, Mokhtarian continues to mine the valuable data. Her continuing I-5 research is funded in part by the STC.

Livable Communities: Transportation and the Built Environment

We hear a lot of talk about sustainability, livable cities, and healthy communities these days, but putting that talk into practice is an evolving process that requires research and policy change. The Research and Innovative Technology Administration of the U.S. Department of Transportation last fall hosted a conference that brought together a growing field of researchers and

practitioners to share research results, explore practical challenges, and identify potentially promising directions for future research. The gathering came at a time when land use and livability policy debates are front and center in California, and across the nation.

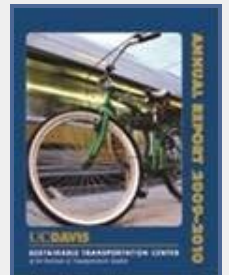


STC Director Susan Handy served on the organizing committee and as such was a central figure in the shaping of the meeting. She also gave a [presentation on the Impact of Community Design on Travel Behavior](#) and served on the closing panel. Handy's presentation discussed the need for better evidence on the impact of the built environment on walking for transport, bicycle commuting, and transit use.

"We know pretty well that community design can increase transit, walking, and bicycling and reduce driving," says Handy. We also know that substantial changes in the built environment may be needed to achieve meaningful changes in traveler behavior. What we need now, she adds, are evaluation studies that provide direct evidence that a change in the built environment leads to a change in travel behavior. We also need more research on demand for livable communities – meaning the degree to which people will choose to live in such places, and on supply of livable communities – meaning development and planning policies that support and facilitate livable communities.

STC 2010 Annual Report

The UC Davis Sustainable Transportation Center 2010 Annual Report wraps up the Center's activities and accomplishments in one neat package. [Download it here.](#)



ITS-Davis Highlights

People: Awards, Accolades, and Activities

Andrew Burke's Contributions to Energy Storage Research Recognized

ITS-Davis Researcher [Andrew Burke](#) has devoted his career to studying electric vehicle technology, and, in recent years, has become known as one of the world's leading researchers in energy storage systems. Burke was recently recognized for his accomplishments with the first Annual Leadership Award in Advancing Energy Storage. The award, presented at the Advanced Energy Storage (AES 2010) Conference, which Burke chaired, acknowledges his contribution to an efficient energy future.

Burke directs the EV Power Systems Laboratory on campus, and performs research and teaches graduate courses on advanced electric driveline technologies. In recent years, he has devoted his attention to the potential for ultracapacitors to be incorporated into electric drivetrains to reduce the peak electrical load on batteries and fuel cells.



Burke has authored over 80 publications on electric and hybrid vehicle technology and applications of batteries and ultracapacitors for electric vehicles. Read a recent summary of Burke's recent ultracapacitor research [here](#).

Nic Lutsey Wins Prestigious TRB Barry McNutt Award

ITS-Davis alumnus and post-doctoral researcher Nic Lutsey received the prestigious Barry McNutt Award at the annual Transportation Research Board conference in Washington. With Lutsey's award, ITS-Davis researchers have now won the honor three out of the last five years. Dan Sperling was the 2008 recipient. Joan Ogden, with then-student Mike Nicholas, received the award in 2007. Lutsey has been instrumental in supporting California Air Resources Board climate and transportation policy development, and, in addition to his research post with ITS-

Davis, is a researcher with the International Council on Clean Transportation.

The award, given annually by the Energy and Alternative Fuels Committees of the TRB, is named for Barry McNutt, who, during his 35 years of transportation and energy policy analysis, made major contributions to national energy and environmental policies for transportation. The award recognizes outstanding contributions to the development of efficient and effective federal policies related to the automotive sector.



Nic Lutsey with Andi Kasarsky and ITS-Davis Director Dan Sperling

CUTC Awards Two, Now at UC Davis

Two UC Davis representatives are among the Council of University Transportation Centers Award winners recognized at the annual CUTC awards banquet at TRB in Washington. Adina Boyce, now a Civil and Environmental Engineering Ph.D. student, won the Parker Award for Outstanding Non-thesis Master's Degree Paper in Science and Technology for work she completed at City College of New York. Gian-Claudia Sciara, a post-doc working with the Urban Land Use and Transportation Center (ULTRANS), received the Wootan Award for Outstanding Ph.D. Dissertation in Policy and Planning.

Inaugural Kitamura Paper Award Given

Two UC Berkeley students, D.J. Gaker and Yanding Zheng, and UC Berkeley assistant professor Joan Walker, are the recipients of the [2010 TRB Kitamura Best Paper Award](#). The award was established by the Transportation Research Board to honor Ryuichi Kitamura, a much-loved and respected UC Davis and Kyoto University professor and internationally heralded transportation scholar, who passed away in 2009. A cash prize supported by contributions to the [Ryuichi Kitamura Fund](#) is given to the winners. Over time, the fund will also help support the expenses of a young scholar in travel behavior research (or a closely-related field) from a university in the East to collaborate with researchers at any UC campus with a transportation program, or vice versa.

UC Davis Ranks at the Top

UC Davis ranked first nationally in "U.S. Institutions: Most Prolific in Environment/Ecology, 2005-2009." The new ranking is from [ScienceWatch \(Thomson Reuters\)](#) and is for the greatest number of papers to the field of environment/ecology over a recent five-year period.

TRB: Fun and Focus

The 90th annual Transportation Research Board meeting wasn't only about serious topics and hard work. In fact, there's always some play, and ITS-Davis is known for contributing to the fun. The ITS-Davis annual reception is now legendary! The reception, held in the historic Churchill Hotel, always draws a wide spectrum of attendees from seasoned transportation and research pros to new students with fresh ideas. The diversity stimulates creative discussion that bubbles forth fueled by the relaxed, casual atmosphere. A good time is had by all.



New Ride: A Plug-in Hybrid for Professor Frank



Professor Andy Frank, widely known as the “Father of the plug-in hybrid electric vehicle,” was one of the first Northern California residents to purchase and receive a Chevy Volt, the first commercially available PHEV. Frank gained worldwide acclaim for his demonstration and groundbreaking student-design contest-winning vehicles that combined efficient gasoline engines with batteries. Local media took notice when Frank picked up his new baby at a local dealer in December.

Campus Synergy: High-Level Gatherings at UC Davis

The [Governors' Global Climate Summit 3](#), held on campus in mid-November, brought together subnational leaders from around the world to address the effects of climate change and build the emerging green economy. The summit, cosponsored by UC Davis and supported by ITS-Davis and other campus research programs, was co-hosted by Governor Arnold Schwarzenegger and other subnational leaders in partnership with the UN Development Programme and UN Environment Programme. As the summit closed, ITS-Davis hosted an up-to-the-minute [briefing on California's vehicle, fuel, and land use policies](#). Following the briefing, the Boards of Advisors of ITS-Davis and the UC Davis Energy Efficiency Center combined for a dinner featuring remarks by CARB chairman Mary Nichols. Both advisory boards held productive meetings the following day.