

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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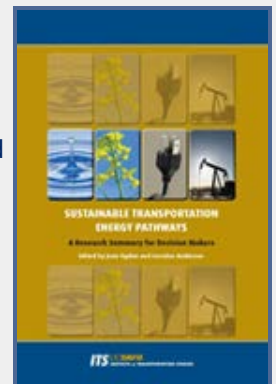
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### Research Update

#### **New Book: *Sustainable Transportation Energy Pathways: A Research Summary for Decision Makers***

"We stand at the beginning of a revolution in transportation and energy. Growing demand, resource constraints, and environmental imperatives will reshape our energy system - changing the way we travel and the vehicles we drive, and challenging the primacy of petroleum and the internal combustion engine. This transformation poses urgent questions today because of the decades needed for developing new fuel and vehicle technologies and changing the energy system. This book compares biofuel, hydrogen, and electricity pathways and options, and examines the policy and technology challenges ahead."

So reads the back cover of *Sustainable Transportation Energy Pathways: A Research Summary for Decision Makers*, a new 334-page book published by ITS-Davis (available [in color](#) and [black and white](#) paperback versions).



The book was written to help inform decision makers in industry and government about the potential costs and benefits of different fuel/vehicle pathways, and to illuminate viable transition strategies toward a sustainable transportation future. It draws heavily on insights gained from the four-year ITS-Davis Sustainable Transportation Energy Pathways (STEPS) research program. STEPS began in 2007 with a goal of performing robust, impartial comparative analyses of fuel/vehicle pathways by drawing on UC Davis and other programs' expertise in engineering, economics, environmental science and consumer behavior. The program's second phase, NextSTEPS, is now underway, with researchers working to create scenarios and tools, analyze policies, and develop detailed regional studies for parts of the U.S., China and Europe.



Joan Ogden with STEPS board member Ben Knight, Honda R&D Americas, Inc.

The book was edited by STEPS director and UC Davis professor Joan Ogden, with technical editor Lorraine Anderson.

## Education Highlights

### ITS-Davis Symposium Celebrates Two Decades of Learning and Research

“What do you think of when you think of ITS-Davis?”

Professor Pat Mokhtarian, associate director of education, posed this question in her opening comments at the Institute of Transportation Studies' 20th Anniversary celebration in late September. In a humorous and heartfelt look back over the past 20 years, Mokhtarian highlighted the Institute's key growth indicators, milestone events, and numerous faculty and student research accomplishments. But in the end, she concluded, the Institute's great achievements are a reflection of its people.



Pat Mokhtarian

“When I think of our students, I think of the mark they're making on our lives, and I hope, the mark we're making on theirs.”

More than 150 people - current students, alumni, faculty, researchers, corporate supporters and friends - came together to celebrate the occasion. The daytime Symposium featured [panel discussions](#) on infrastructure issues, environmental vehicles and next-generation fuels, and land use and travel behavior. The evening festivities included a [gala reception and dinner](#)

Throughout the day, accomplished alumni presented their current research, described how their UC Davis education prepared them for their careers, and explored the compelling transportation issues that are the Institute's focus.

Yu (Marco) Nie, Ph.D. '06, Assistant Professor, Northwestern University, opened the first panel by acknowledging the Institute's unique approach to education. “The fact that we're encouraged to integrate these grand challenges of our time into our individual disciplines is what makes ITS-Davis such an important institute in this country.”

Konstadinos Goulias, Ph.D. '91, one of the Institute's first grads and now a professor at UC Santa Barbara, recalled insight he gained from ITS-Davis Director Dan Sperling. “He told me ‘Have a mission in your life. Tell yourself you're going to make a change, make a difference.’ ”

Oliver Gao, Ph.D. '04, Associate Professor, Cornell University, said he appreciated the freedom and flexibility of the academic program here as well as the tools and opportunities it provides to help students grasp new concepts quickly, and be able to analyze them thoroughly. “It goes hand in hand with the kind of pressure we face in the real world.”



Oliver Gao

Wayne Leighty, M.S. '08 and Ph.D. '10, now a policy and regulatory affairs analyst at Shell Oil Company, said the Institute's interdisciplinary focus prepared him for his current job. He said he uses his economic and business training the most, but also relies on his technical training to keep up with the engineers. He urged current students to take the opportunity to work in teams, practice communications and presentations, and accept internships to hone the skills that will be essential in their careers.

Anthony Eggert, M.S. '01, Deputy Secretary for Energy Policy, California Environmental



Wayne Leighty

Protection Agency, highlighted ITS-Davis's role in informing California's climate change policies that address vehicles, fuels and land use. "The basis of these policies was technical analysis – the work of a lot of people who've been through the Institute."



Anthony Eggert

One of the day's recurring themes was the apparent disconnect between transportation researchers and policymakers. ITS-Davis Researcher Deborah Salon, Ph.D. '06, noted that it is only on rare occasions that information gleaned from university modeling research gets used in decision making. ITS-Davis Director Dan Sperling added that his experience as an appointed California Air Resources Board member has given him new insight into the policy process and sparked an idea that he hopes will soon come to fruition.

"I also have a passion," Sperling said at the close of the Symposium. "I want to do a better job of connecting research with policy." As he spoke, a certain twinkle in his eye told the audience that the man who had a big idea 20 years ago now has another that will keep him going for at least 20 more.

See more photos of the 20th Anniversary Symposium on the [ITS-Davis Facebook page](#).

## Welcome New Students

ITS-Davis welcomes the following students in 2011:

- Eric Cahill
- Wen Deng
- Brigitte Driller
- (Jeffrey) Mason Earles
- Yu Fei
- Xi He
- Shiang-Feng Hung
- Jeff Kessler
- Zhengmao Liu
- Stephanus Louw
- Aliaksandr Malokin
- Garry Negrone
- Kenneth Ning Yu Pie
- Alvaro Rodriguez Valencia
- Sohail Shaikh
- Julia Sohnen
- Yijun Xiao
- Jingyan Wu
- Lin Zhu
- Wei Zou



Returning students and faculty welcomed newcomers with food, fun and conversation at the annual ITS-Davis welcome BBQ.

[See more photos on Facebook](#).

## ITS-Davis Congratulates Recent Grads

Over the past year another impressive group of graduates has moved on. UC Davis awarded degrees in Transportation

Technology and Policy (TTP), Mechanical and Aerospace Engineering (MAE), Civil and Environmental Engineering (CEE) and Geography.

### **September 2010**

Greg Gould, Ph.D., CEE

Adviser: Deb Niemeier

Dissertation: "A Spatially Detailed Locomotive Emission Model and Goods Movement Data Constraints on Public Policy and Planning"

Yongxi (Eric) Huang, Ph.D., CEE

Adviser: Yueyue Fan

Dissertation: "Sustainable Infrastructure System Modeling Under Uncertainties and Dynamics"

Raymond Leung, M.S., CEE

Exam

Rachel Maiss, M.S., TTP

Adviser: Susan Handy

Thesis: "Children's Mental Maps: How Biking Affects City Knowledge"

Gouri Shankar Mishra, M.S., TTP

Adviser: Sonia Yeh

Thesis: "Analysis of Lifecycle Water Requirements of Alternative Energy Pathways: Case Study of Ethanol from Corn Grain and Crop Residue, and Electricity from Geothermal Resources"

Juhong Yuan, M.S., TTP

Adviser: Alissa Kendall

Thesis: "Life Cycle Assessment of Honey Production and Processing in the United States"

### **December 2010**

Yongling Sun, Ph.D., TTP

Adviser: Joan Ogden

Dissertation: "Societal Lifetime Cost Comparison of Hydrogen Fuel Cell Vehicles and Gasoline Vehicles"

David Vernon, Ph.D., MAE

Adviser: Paul Erickson

Dissertation: "Hydrogen Enrichment and Thermochemical Recuperation in Internal Combustion Engines: An Investigation of Dilution and Inlet Temperature Effects in the Autothermal Reforming of Ethanol"

Micah Fuller, M.S., TTP

Adviser: Deb Niemeier

Thesis: "Near-Road Tree Canopy Modeling of Particulate Matter Impaction in Dilute Air Flows"

Andrew Lentz, M.S., TTP

Exam

Oriana Lisker, M.S., ARE

Exam

William Marin, M.S., MAE

Adviser: Paul Erickson

Thesis: "An Experimental Investigation of Hydrogen Fumigation in a Small Direct-Injection Diesel Engine During Part-Load Operation"

## March 2011

David McCollum, Ph.D., TTP

Adviser: Joan Ogden

Dissertation: "Achieving Long-term Energy, Transport and Climate Objectives: Multi-dimensional Scenario Analysis and Modeling Within a Systems Level Framework"

Nathan Parker, Ph.D., TTP

Adviser: Joan Ogden

Dissertation: "Modeling Future Biofuel Supply Chains Using Spatially Explicit Infrastructure Optimization"

Zheng Wan, Ph.D., TTP

Adviser: Dan Sperling

Dissertation: "An Analysis of the Policies and Technical Efficiency of Public Transit Systems in China's Cities"

Alexander (Sandy) Allan, M.S., TTP

Adviser: Joan Ogden

Thesis: "Renewable Transportation Fuel for California's Electric-Drive Vehicles"

Daniel Arellano, M.S., MAE

Exam

Jamie Davies-Shawhyde, M.S., TTP

Adviser: Joan Ogden

Thesis: "Biodiesel Relative Risk: A Qualitative Approach to Determining the Environmental Fate of Animal Fat and Soy Biodiesels through a Direct Experimental Comparison with Ultra Low Sulfur Diesel and Screening Model Simulations"

David Van Herick, M.S., CEE

Exam

## June 2011

Peter Tittman, Ph.D., Geography

Adviser: Deborah Elliott-Fisk

Dissertation: "Aerial Laser Scanning: Applications for Forest Biomass Management"

Catherine Emond, M.S., TTP

Adviser: Susan Handy

Thesis: "How Far is Too Far: Bicycling to High School in Davis, California"

Jason Greenwood, M.S., MAE

Adviser: Paul Erickson

Thesis: "Hydrogen Enrichment for the Extension of the Lean Limit and Enhanced Combustion in an Alcohol-Fueled Spark-Ignition Engine"

Brendan Higgins, M.S., TTP

Adviser: Alissa Kendall

Thesis: "Life-cycle Environmental and Cost Impacts of Using an Algal Turf Scrubber for Wastewater Treatment and Electricity Generation"

David Kashevaroff, M.S., MAE

Adviser: Paul Erickson

Thesis: "Hybrid Mode Autothermal Reforming of Methanol: Initial Investigation of Short Contact Time Methods"

Robert Lim, M.S., CEE



Adviser: Michael Zhang

Thesis: "Development of Freight Generation Model through Linear Regression: An Application to California"

Carlos Reyes, M.S., CEE

Adviser: John Harvey

Thesis: "A Method for Predicting Sound Intensity Noise Levels Using Laboratory Pavement Cores"

## ITS-Davis Highlights

### Asilomar 2011: Best Ever, Say Many

Many attendees of the 13th Asilomar Conference on Transportation and Energy in August considered this the best yet of the series, which is hosted biennially by ITS-Davis under the auspices of the Energy and Alternative Fuels committees of the U.S. Transportation Research Board (of the National Academies). More than 280 people participated, setting a record.

The Asilomar Conference brings together leading transportation, energy and policy thinkers in a casual, open and collegial setting that fosters discussion, debate and creative problem-solving. This year's theme, "Rethinking Energy and Climate Strategies for Transportation," recognized that political progress toward a secure, low-carbon transportation future is slowing, spurring the need and the opportunity to explore new strategies and government approaches.



Attendees line up to comment during a session Q & A.



The barbeque is a social highlight of the conference.

The conference presentations and discussions pointed to an abundance of technologies and fuels competing for market dominance in the drive to improve transportation options for people around the world. But ensuring both mobility *and* sustainability in an increasingly industrialized global society necessitates creative policy making and changes in human behavior. Addressing the human factor – communications, consumer response to technologies, and policies designed to shape human behavior – was a significant focus of this year's gathering. Other key themes included reframing the debate to focus on the co-benefits of climate strategies, and developing a portfolio of policies that deal with vehicles, fuels and land-use while taking into account the human behavior conundrum.

Asilomar is made possible by the generous contributions of many [private companies, foundations and government agencies](#).

Books and other publications from past Asilomar Conferences are [posted here](#).

Find photographs of speakers and attendees at the [ITS-Davis Facebook page](#).

### People: Awards, Accolades, Accomplishments

**Sahoko Yui**, a second year TTP master's student and 2010-2011 American Automobile Association (AAA) Greenlight Initiative Fellow, received a scholarship and was invited to present at the 5th Graduate Climate Conference, which this year was organized by students at MIT's Program in Atmospheres, Oceans and Climate. The conference was held late last month at Woods Hole Oceanographic Institution. Yui was recognized for her work on "New spatially-explicit estimates of soil and biomass carbon stocks for analysis of land use change from biofuel expansion."



### ITS-Davis 20th Anniversary Gala: A Toast to Leadership and Innovation

Nobody had any idea what was in store when UC Davis Chancellor Linda Katehi

and ITS-Davis Director Dan Sperling stepped on the riser at the ITS-Davis 20th Anniversary Gala – until Sperling gently lifted the Salomanazar of champagne from its bed of ice to show the attendees. The anticipation grew as first Sperling, then Katehi, then a string of current and past Institute students and researchers took a turn of the cork. And another turn. And another.

How many Ph.D.'s does it take to open a bottle of champagne? [Watch the video here!](#)

Festive blue and gold balloon bouquets and floral centerpieces adorned the UC Davis Conference Center ballroom, where the celebration continued into the night with a toast to the Institute's accomplishments of the past and plans for the future.



Spyros Tseregounis, faculty coordinator, Office of Corporate Relations; Dan Sperling; Linda Katehi, chancellor, UC Davis; Nicole Woolsey Biggart, director, UC Davis Energy Efficiency Center



ITS-Davis researchers Ken Kurani and Tom Turrentine with Andreas Truckenbrodt, Automotive Fuel Cell Corporation

Katehi told the audience that when she first came to Davis as the new chancellor, she sought out the leaders – “the wise people” – on campus. Sperling, she said, was one of those people.

Keynote speaker Jack Short, the immediate past secretary general of the International Transport Forum, touched on the daytime Symposium's discussions about infrastructure, road pricing and implementing policy. Drawing on the themes of the day, he acknowledged that technology advances and traditional transportation research, modeling and analysis, alone, are not enough to reach sustainability. “Planning in the broad sense – the

transport system of all modes together,” is critical, he said, adding that the study of human behavior in disciplines such as psychology and sociology is one of ITS-Davis's great strengths. “The multidisciplinary approach is a strong trump card that you have.”



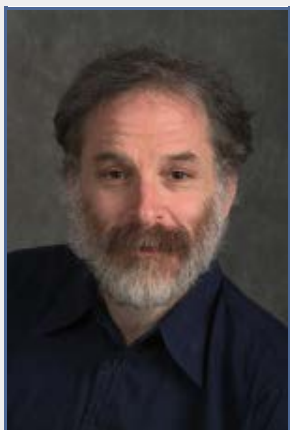
Jack Short, immediate past secretary general, International Transport Forum

True to his Irish heritage, Short closed his speech with a limerick for his friend and colleague Sperling:

A nasty rumor Dan hears  
After all his blood sweat and tears  
They want to put him in clover  
And tell him it's over.  
“No way,” says Dan. “I'm here for 20 more years.”

See more photos of the 20th Anniversary Gala on the [ITS-Davis Facebook page](#).

## Fond Farewell to Lee Schipper



Lee (Leon) J. Schipper, a longtime friend, colleague and internationally acclaimed transportation and energy researcher, died in August of pancreatic cancer. He was 64.

At the time of his death, Schipper, also known as “Mr. Meter,” was a research scientist for the Global Metropolitan Studies Center at UC Berkeley and senior research engineer at the Precourt Institute of Energy Efficiency at Stanford University. He had returned to the Bay Area in 2008 after 13 years away, first in Paris at the International Energy Agency, then with EMBARQ, the World Resources Institute Center for Sustainable Transport, which he helped found. Schipper worked for 20 years at Lawrence Berkeley Lab before leaving in 1995. He received a Ph.D. in astrophysics from UC Berkeley.

[A memorial website](#) describes Schipper as an “...international physicist, researcher, musician and co-founder of EMBARQ [who] inspired and shaped the thinking of a generation of students and

professionals and was widely recognized for enriching policy dialogue with his passion for data and challenging conventional wisdom.”

[The New York Times](#) called him an iconoclast.

Learn more about a scholarship honoring Schipper [here](#).

Schipper was a longtime member of the Steering Committee for the ITS-Davis Asilomar Conference on Transportation and Energy. His death, only days before this year’s 13th Biennial Conference, created a void at the gathering. In addition to missing his quick wit and sharp mind, attendees felt the absence of his [music](#), which he shared every year with his band, The Mitigators. Asilomar attendees lined up at a memorial service to remember Schipper and another Steering Committee member, [Jack Johnston](#), who passed away earlier this summer.

Schipper’s illness spurred [tributes](#) from colleagues around the world, including this memory from ITS-Davis Director Dan Sperling:

“You challenged us all, and because of your passion for data and keeping us honest, plus your zest for life, you were a joy to be with! You inspired me and so many others. We will carry on your life’s work.”

## Sustainable Transportation Center Update

### STC Awards Faculty Research Grants and Dissertation Fellowships

The Sustainable Transportation Center is funding three faculty research grants and three dissertation fellowships for students for the 2011-2012 academic year.

#### **2011-2012 Faculty Research Grants**

**Patricia Mokhtarian**, Civil and Environmental Engineering and Institute of Transportation Studies

“Activities Conducted While Traveling: An Empirical Examination of Their Impact on the Value of Travel Time Savings”

This grant will support the administration, data management and analysis of a survey of California commuters. The study will help researchers better understand the travel choices people make – particularly how the ability to multitask while traveling influences those choices (potentially in favor of public transportation) – which will inform and improve policies and lead to more realistic models and forecasts.

**Cynthia Lin**, Agricultural and Resource Economics, and Environmental Science and Policy

“Optimal Gasoline Taxes and the Elasticity of Demand for Gasoline”

This project seeks to estimate and analyze the elasticity of demand for gasoline and calculate the optimal gasoline tax for various regions of the world, including the United States, China and Latin America. Elasticity of demand is a measure of how responsive consumers are to changes in the price of gasoline. The higher the elasticity in magnitude, the more consumers will decrease gasoline consumption in response to an increase in gasoline price. Understanding the factors that affect the elasticity of demand for gasoline is important for the design of transportation and energy policy.

**Mark Lubell**, Environmental Science and Policy

“Social Networks and Travel Behavior”

This proposal draws on the theory and methods of network science to understand how social networks influence travel behavior, specifically that of UC Davis students. Network science has found that social networks exert a profound influence on individual behavior, yet its application to transportation research is relatively new. This project will improve our understanding of the social factors involved in individual transportation behavior and provide insight into how social networks may be a tool for policies encouraging the use of sustainable transportation choices.

#### **2011-2012 Dissertation Fellowships**

**Hui Li**, Civil and Environmental Engineering

“Improving Outdoor Thermal Environment in Hot Climates Through Cool Pavement Design Strategies”



**Kristin Lovejoy**, Transportation Technology and Policy

“The Landscape of Carlessness in the U.S. and the Factors that Flatten its Topography”

**Alex Karner**, Civil and Environmental Engineering

“Evaluating Public Participation in California’s Climate Change and Transportation Policies: A Mixed Methods Approach”

## Handy Elected to Lead Board of New Transport-Land Use Forum

STC Director Susan Handy has been elected to a six-year term on the board of the new [World Society for Transport and Land Use Research](#). She also has agreed to serve as interim chair until the board selects its officers. One of Handy and Pat Mokhtarian’s former students, Xinyu Cao, now a professor at the University of Minnesota, also has been elected and will serve a three-year term.



The society is intended to promote the understanding and analysis of the interdisciplinary interactions of transport and land use, offer a forum for debate, and provide a mechanism for the dissemination of information. It organized the inaugural World Symposium on Transport and Land Use Research in British Columbia last summer and will organize a second symposium in 2014. Handy served on the symposium’s organizing and international scientific committees, and moderated and presented on its panels. Click the link below to see her presentation:

[Measuring the Impacts of Local Land Use Policies on Vehicle Miles of Travel: The Case of the First Big Box Store in Davis, California](#)

Current Transportation Technology and Policy student Suzie Pike also presented on research conducted with Giovanni Circella and Pat Mokhtarian. Click the link below to see her presentation:

[The Impact of Land Use Characteristics on Commute Behavior Changes Resulting from Temporary Freeway Closures: An Empirical Investigation from Northern California](#)

## Mobile Programming for Transportation Applications: Is There an App for That? Yes, and There’s a Class for That, Too!



Michael Nicholas is never far from his cell phones.

Like many of his contemporaries, ITS-Davis postdoctoral researcher Michael Nicholas loves electronic gadgets. He and his smart phone are rarely separated. When he was a student, Nicholas says, he wanted to take a class in mobile programming. “I wanted to use my mobile phone for research but no one taught mobile programming in our discipline,” he recalls. So, with help from fellow researcher Justin Woodjack, Nicholas decided he’d develop his own course.

Now a researcher at the Plug-in Hybrid & Electric Vehicle Research Center, Nicholas first offered the class last spring and plans to offer it again in Winter Quarter 2012. It includes an overview of general concepts applicable to all mobile platforms, but maps and GPS are the main topics covered. The specific platform choice for final projects is up to the individual student; Android and iOS were the most popular platforms last spring. Students Tai Stillwater and Geoff Morrison developed an app to determine optimal speed for driving to save fuel. Another student created an app to show a map of Davis bicycle facilities, such as air pumps and repair shops.

“Students have a strong personal motivation to take this class,” Nicholas says, adding that it has been a positive experience. “I’ve learned programming, myself. I’ve learned about mapping and GPS capabilities. It’s been great.”

## STC and UCTC Join Forces for New Regional Center

The UC Davis Sustainable Transportation Center has launched a new initiative to enable the center to continue its important research, education and outreach activities in coming years. STC has joined forces with the University of California Transportation Center (UCTC) on a proposal for a regional center that reflects the priorities of both the UC Davis-based STC

and the broader UCTC program.

The proposal responds to a recent U.S. Department of Transportation Research and Innovative Technology Administration (RITA) announcement that it is overhauling its University Transportation Centers program, which funds the Sustainable Transportation Center. As part of the overhaul RITA announced an [open competition for 22 new centers](#).

The proposed new “UCTC 2.0” center builds on the world-renowned transportation programs of the University of California system and decades of successful collaborations among the UC campuses. It would be organized around the themes of environmental sustainability, livability and economic competitiveness. Funding would go towards research, fellowships, education and technology transfer and outreach, with 20 percent of the research budget set aside for intercampus projects. Several California State University campuses would also participate in collaborative research and educational programs.

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