



ANNUAL REPORT 2009-2010

UCDAVIS

SUSTAINABLE TRANSPORTATION CENTER
of the Institute of Transportation Studies

ACCOMPLISHMENTS

ACCOMPLISHMENTS

- 6** faculty research grants
- 6** student program fellowships
- 5** summer undergraduate research fellowships
- 5** student travel awards
- 5** student dissertation fellowships
- 4** research webinars for transportation professionals
- 4** graduate-level courses
- 3** conference and event sponsorships
- 3** seminar speakers; 2 STC distinguished speakers
- 2** faculty seed grants
- 2** feature updates in electronic newsletter
- 1** Outstanding Student of the Year award
- 1** visiting practitioner
- 1** Campus Travel Assessment



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DIRECTOR'S STATEMENT



In 2009, the U.S. Department of Transportation joined with the Environmental Protection Agency and the Department of Housing and Urban Development to establish the Partnership for Sustainable Communities. This unprecedented partnership is investing

in programs that support six livability principles, including an expansion of transportation choices “to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions and promote public health.” These principles represent a significant shift in perspective for transportation policy, one that has created new needs for research on topics not traditionally addressed and drawing on a wider range of disciplines than in the past. The Sustainable Transportation Center has been working to meet these challenges since its inception.

Now starting its fifth year, the STC supports research through faculty research grants, dissertation fellowships, seed grants, and other programs. All of this research aims to support evidence-based policy decisions. As in the past, this year’s faculty research grants supported a diverse set of topics, including the short-term and long-term effects of a temporary highway closure on travel choices, formation of attitudes toward bicycling, monitoring of wildlife movements across highways, and optimal tolling schemes for morning commutes. A seed grant helped launch a project to identify and quantify the impacts of rubberized warm-mix asphalt compared to hot-mix asphalts. A dissertation fellowship helped a Ph.D. student compare the societal costs of alternative fuel vehicles throughout their lifecycle.

Outreach was a key focus this year, and the STC led the coordination of a new series of monthly webinars with the four other University Transportation Centers (UTCs) in California. Each featured three researchers presenting key results and policy implications from their UTC-funded projects. As the principal partner for the California UTCs, California Department of Transportation (Caltrans) provided both organizational support and the primary audience for the webinars,

though transportation professionals throughout the state and beyond participated. In conjunction with the webinars, STC researchers have been preparing “research briefs” to more effectively share their results with professionals, policymakers, and the public.

Many partnerships contribute to the success of the STC. With core support from the STC, the Urban Land Use and Transportation Center (ULTRANS) continues to build statewide capacity in forecasting models and to deepen understanding of the effect of land use policies on vehicle travel. The STC’s External Advisory Council—a distinguished group of individuals from public agencies, private firms, non-profits, and academia—provides indispensable guidance. Caltrans continues to generously support our efforts through matching funds and input on the selection of research projects. These partnerships provide crucial links between the STC’s research and the practitioners and policymakers whose work can benefit from it.

Education is central to the mission of the STC in meeting the needs of new policy directives and attracting top students to transportation programs. This year, the STC supported five graduate students with dissertation fellowships and six others with program fellowships. For our summer undergraduate research fellowships, we chose five students from a variety of backgrounds and offered new activities to entice them toward careers in transportation. The STC also enriches the education of our students through ad hoc courses, seminar speakers, and travel to conferences. The interdisciplinary approach that these activities foster is the future of the transportation field.

As we enter our fifth year, we are again optimistic and enthusiastic about our projects, programs, and partnerships. We eagerly await the new federal transportation bill, which will set the future direction of the UCT program, of which the STC is a part. In the meantime, we continue to produce policy-relevant research and well-trained graduates that will support the emerging new transportation paradigm.

Susan L. Handy

MANAGEMENT STRUCTURE • EXECUTIVE COMMITTEE • EXTERNAL ADVISORY COUNCIL

MANAGEMENT STRUCTURE

The UC Davis Sustainable Transportation Center is managed by a director with assistance from an executive committee, the educational director, an external advisory council, UC Davis transportation faculty, and STC staff.

Susan Handy, Ph.D., a professor in the Department of Environmental Science and Policy at UC Davis, is director. Handy oversees all STC activities and programs, and represents the STC at external meetings and events.

The executive committee provides input to the director on STC activities and approves the annual budget, funding decisions, and operating policies. Current executive committee members are Patricia Mokhtarian, Ph.D., a professor of Civil and Environmental Engineering, and Daniel Sperling, Ph.D., a professor of Environmental Science and Policy and Civil and Environmental Engineering and director of the UC Davis Institute of Transportation Studies (ITS-Davis). Mokhtarian also serves as STC educational director, and in this role awards STC program fellowships.

UC Davis faculty affiliated with ITS-Davis review STC faculty research grants and dissertation fellowships, select the outstanding student awards winners, and assist with other activities, as needed. Of approximately 60 faculty from at least 13 academic departments who are affiliated with ITS-Davis, a core of 29 focus primarily on transportation in their research.

The STC staff is housed within ITS-Davis. As the center coordinator, Morgan Kanninen maintains the STC website, coordinates competitive grant and fellowship programs, organizes workshops, symposia, and other outreach activities for the STC, and serves as the primary administrative contact with government agencies. Christina Adamson, the financial coordinator, is responsible for completing required financial reports. Mary Madison joined the STC staff in September to assist with the annual report, project reports, research briefs, and other products. ITS-Davis financial, administrative, and program staff provide support as needed.

EXECUTIVE COMMITTEE

Susan Handy, Ph.D.

STC Director

Department of Environmental Science and Policy

Patricia Mokhtarian, Ph.D.

STC Educational Director

Department of Civil and Environmental Engineering

Daniel Sperling, Ph.D.

Director, Institute of Transportation Studies

Department of Environmental Science and Policy

Department of Civil and Environmental Engineering

EXTERNAL ADVISORY COUNCIL

The STC benefits from the perspective of an external advisory council composed of distinguished leaders whose expertise closely matches the center's focus. The council, which meets annually to review the STC's activities, provides important external guidance on all aspects of the STC program.

Council members represent local and state governments, private industry, and academia. Individual members have expertise in urban and open space planning, sustainable development, public policy, environmental analysis, and engineering. The STC is grateful for each member's significant contribution of time and expertise.



Executive Committee member Daniel Sperling and External Advisory Council member Hani Mahmassani continue discussions over lunch at the annual council meeting.

MANAGEMENT & OVERSIGHT

EXTERNAL ADVISORY COUNCIL



The STC's External Advisory Council and Executive Committee: (L-R) Patricia Mokhtarian, Sharon Scherzinger, Hani Mahmassani, Mitch Sears, Daniel Sperling, Kevan Shafizadeh, Deborah Wong, Eileen Tutt, Susan Handy, Tom Stallard, Jeff Morales, Genevieve Giuliano.

Jennifer Dill, Ph.D.

*Associate Professor, Nohad A. Toulon School of Urban Studies and Planning
Director, Oregon Transportation Research and Education Consortium
Portland State University*

Genevieve Giuliano, Ph.D.

*Professor, School of Policy, Planning and Development
Director, METTRANS Transportation Center
University of Southern California*

Larry Greene

*Air Pollution Control Officer/Executive Director
Sacramento Metropolitan Air Quality Management District*

Lynne Hosley

*Environmental Program Manager
CH2M HILL*

Hani S. Mahmassani, Ph.D.

*W. A. Patterson Distinguished Chair in Transportation
Director, Transportation Center
Northwestern University*

Jeff Morales

*Senior Vice President
Parsons Brinckerhoff, Inc.*

Jay Norvell

*Chief, Division of Environmental Analysis
California Department of Transportation*

Sharon Scherzinger

*Chief, Division of Transportation Planning
California Department of Transportation*

Mitch Sears

*Sustainability Program Manager
City of Davis*

Kevan Shafizadeh, Ph.D.

*Associate Professor, Department of Civil Engineering
California State University, Sacramento*

Tom Stallard

*President, Legislative Intent Service, Inc.
Chair, Clean Air Partnership*

Eileen Tutt

*Executive Director
California Electric Transportation Coalition*

Deborah Wong

*Transportation and Environmental Policy Specialist
AAA Northern California, Nevada & Utah*

YEAR FOUR: PROGRAM OVERVIEW

The Sustainable Transportation Center supported a wide variety of activities in research, education, and technology transfer during its fourth year. Given the center’s interdisciplinary focus, it is not uncommon for a single project to bridge these different activities, with education or outreach components incorporated into research projects, research into educational activities, and so on.

Research funded through STC grants and fellowships

directly supports national transportation research priorities as articulated in the National Highway R&T Partnership’s *Highway Research and Technology: The Need for Greater Investment* and the U.S. Department of Transportation Strategic Plan 2003–2008, particularly in the areas of environment, mobility, planning, and infrastructure. Throughout this report, projects that directly support these national transportation research priorities are identified with a symbol that corresponds with the priority identified in Table 1

PROGRAM OVERVIEW

TABLE 1: SUMMARY OF TRANSPORTATION RESEARCH NEEDS

| Priority | Highway Research and Technology-Groups and Themes | U.S. DOT Strategic Plan-Objectives and Outcomes |
|--|---|--|
| Environment  | Planning and Environment <ul style="list-style-type: none"> • Human health • Ecology and natural systems • Distributional aspects • Planning and performance measures • Land use • Emerging technologies | Environmental Stewardship <ul style="list-style-type: none"> • Reduced pollution and other adverse environmental effects of transportation and transportation facilities • Streamlined environmental review of transportation infrastructure projects |
| Mobility  | Operations and Mobility <ul style="list-style-type: none"> • Customers, customer expectations, and customer needs • Maximizing efficiency and minimizing congestion • Information needs and requirements • Environmental issues • Intermodal interfaces and efficiencies | Mobility <ul style="list-style-type: none"> • Improved infrastructure in all modes • Reduced congestion in all modes • Increased reliability throughout the system • Increased access for all Americans |
| Planning  | Policy Analysis, Planning, and Systems Monitoring <ul style="list-style-type: none"> • Improving understanding of the interactions between transportation and society • Advancing multimodal transportation planning • Enhancing data-driven decision-making tools • Improving monitoring of evolving trends | |
| Infrastructure  | Infrastructure Renewal <ul style="list-style-type: none"> • Decision support tools • Promotion and delivery of innovation | |

Sources: *Highway Research and Technology: The Need for Greater Investment*, National Highway R&T Partnership; *U.S. Department of Transportation Strategic Plan 2003–2008*

DISSERTATION FELLOWSHIPS

The STC directly supported education with funding for dissertation fellowships, program fellowships, undergraduate fellowships, the Outstanding Student of the Year Award, and graduate-level courses.

DISSERTATION FELLOWSHIPS

The STC awarded five dissertation fellowships. These fellowships support the research of Ph.D. students who have advanced to candidacy and are working on their own original research. They provide more freedom to Ph.D. students to choose dissertation topics independent of the work of their dissertation chairs. Recipients are selected based on reviews from researchers outside of UC Davis. Fellowships were awarded to students in Transportation Technology and Policy (TTP) and Agricultural and Resource Economics (ARE).



Yongling Sun, TTP

Societal Lifetime Cost Comparison of Alternative Fuel Vehicles Adviser: *Joan Ogden*

Concerns about energy insecurity, environmental protection and vulnerability of the U.S. economy to oil price shocks have drawn an increased interest in developing alternatives. Among the various fuel/propulsion options available, the hydrogen fuel cell vehicle (HFCV) stands out because it offers zero tailpipe emissions, a variety of hydrogen fuel pathways and the potential for good performance. However, high fuel cell system costs and initial large investments for hydrogen infrastructure are serious barriers to the commercialization of such advanced vehicles. This research explores HFCVs from a social welfare standpoint, and employs a learning curve model for fuel cell system cost estimates to determine the cumulative incremental expenditures needed to make HFCV technology competitive with conventional gasoline vehicles. The research is based on the Advanced Vehicle Lifetime Cost and Energy-Use Model and the Lifecycle Emissions Model developed by ITS-Davis researcher Mark Delucchi. This effort evaluates alternative options, and uses the societal lifetime cost (SLC) as a crucial indicator to compare various scenarios. SLC includes not only consumer lifetime costs, but also externality costs over full fuel cycle and vehicle lifetime. The results can help inform the general public about the externalities from our current petroleum-based transportation system, and inform policymakers about the cumulative investments needed to achieve the successful deployment of hydrogen and HFCVs from a societal lifetime cost perspective. The externalities comparison will illustrate how an energy transition from petroleum to hydrogen can make contributions to sustainable transportation in terms of reductions in oil consumption, air pollution and greenhouse gas emissions.



Zheng Wan, TTP

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

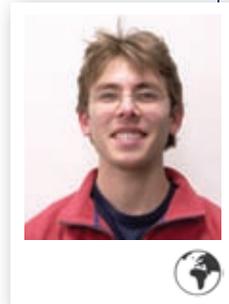
Adviser: *Daniel Sperling*

The urban population of China is expected to increase from 440 million in 2000 to 630 million in 2010. Most transportation studies in China have focused on how this massive increase in urban population will affect first-tier cities such as Shanghai and Beijing, but the challenges and impacts are arguably far greater for second-tier cities. This research compares investments and management in public transit systems in first-tier and second-tier cities, and uses those findings and insights to develop recommendations for policymakers and transit operators. The analysis uses an adapted multi-stream decision-making model as a framework to consider policies. The research also utilizes two advanced quantitative models, stochastic frontier analysis and data envelopment analysis, to study the efficiency of transit systems. This study is the first known study of the policymaking process for public transportation in Chinese cities. It explores how policy participants, including international non-governmental organizations, might influence local transport policies and investments. The resulting recommendations will address changes in operations, investments, management, and regulations to improve public transport efficiency in China's second-tier cities. The recommendations are cast in the context of the varying political and economic structures between first- and second-tier cities, and thus tailored to the circumstances of different regions.

DISSERTATION FELLOWSHIPS

Tai Stillwater, TTP**How Real-Time Energy Feedback Influences Driving Behavior and Fuel Economy**Adviser: *Kenneth Kurani*

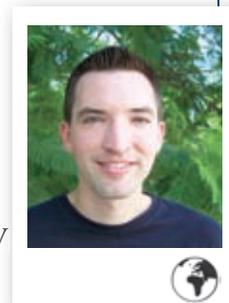
Drivers in the United States burn over 113 billion gallons of fuel each year; 34 billion of these could be saved through improved driving behavior. This study investigates the impact of real-time energy feedback on vehicle energy use, with a focus on the mechanism of driver behavior change. Previous studies have found that improved driving behavior can reduce energy consumption by up to 30%. However, these studies did not systematically investigate why some individuals change their behavior when others do not, or what information is most effective in creating positive behavior changes. To fill that knowledge gap, this study evaluates why and how (not simply how much) drivers respond to real-time energy feedback in real-world driving. To investigate these questions, three identical vehicles have been equipped with data loggers and customized real-time energy feedback interfaces. Participating households drive a vehicle with no feedback for two weeks, and then with real-time energy feedback for two additional weeks. This study tests the hypothesis that when exposed to real-time energy feedback, individuals will make improved driving choices and increase their fuel economy. The resulting analysis takes an important step towards determining the factors that make individuals responsive to real-time energy feedback, and whether or not current theories of behavior change can support the design of more effective feedback methods.

**David McCollum, TTP****Modeling Optimal Transition Pathways to a Low Carbon Economy in California:****Impacts of Advanced Vehicles and Fuels on the Energy System** Adviser: *Joan Ogden*

The impact of energy production and consumption on the global climate has been well documented, and scientific studies now suggest that globally, annual greenhouse gas (GHG) emissions must be cut significantly by 2050 in order to avoid the most destructive impacts of climate change. Toward this goal, California has adopted a broad spectrum of carbon emissions reduction policies. Yet, a transparent, flexible, and accessible analysis tool to help analyze this suite of policies, and thus inform decision-making, does not yet exist. This project evaluates how the California energy system could potentially evolve over the long term by developing a bottom-up, technologically-rich energy-economic model that covers all sectors of the California energy economy, including primary energy resource extraction, imports, electricity production, fuel conversion (e.g., refineries; biofuel and hydrogen plants), and the residential, commercial, industrial, transportation, and agricultural end-use sectors. The model is used to analyze various scenarios for making deep cuts in California GHG emissions. The results of this dissertation project will provide insights on how policies and economic drivers can affect future decisions on investments in advanced energy technologies and resource utilization.

**Joeri de Wit, ARE****Estimating Demand and Cost Functions for Hybrid-Electric Vehicles in the BLP Random Coefficients Model** Adviser: *C.-Y. Cynthia Lin*

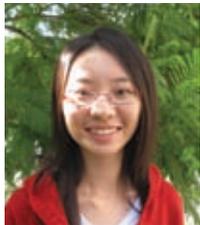
Hybrid-electric vehicles (HEVs) are recognized as part of the solution to reduce carbon emissions and imported oil dependency in the United States. Federal subsidies for the purchase of HEVs starting in 2006 contributed to their prevalence on U.S. roads. Subsidy programs are costly and need to be carefully executed in order to maximize their effectiveness, but little is known about HEV consumption behavior and producer incentives. This project estimates demand and cost functions for HEVs using a structural economic model pioneered by Berry, Levinsohn, and Pakes. Using this model, the study estimates demand and cost functions using a dataset of characteristics (including prices) and monthly sales for each car and light-truck model, both non-HEV and HEV, sold in the United States over the past decade. The results will help policymakers understand what leads people to buy HEVs, how best to promote HEV ownership, and how to define realistic expectations for the growth of this market.



PROGRAM FELLOWSHIPS

PROGRAM FELLOWSHIPS

Program fellowships, used primarily to recruit incoming graduate students, were awarded in Civil and Environmental Engineering (CEE) and Transportation Technology and Policy (TTP). All fellowship students, even those fully supported, are required to conduct research under the direction of a member of the faculty or research staff. Six program fellowships were awarded in 2009–2010.

**Pu Chen, TTP****CA-TIMES Model for Energy Dynamics** Adviser: *Sonia Yeh*

The TIMES (The Integrated MARKAL EFOM System) model is a technology-rich (or bottom-up) model that estimates energy dynamics over a long-term, multi-period time horizon within a reference energy system. The TIMES model aims to supply energy services at a minimum loss of surplus by reaching a supply-demand equilibrium with endogenous energy service demands with perfect foresight. To help build the industrial module of the CA-TIMES model, Pu Chen previously finished developing the base year energy system calibration of the California industrial sector. This past summer, she continued by drafting a Combined Heat and Power Summary report of his findings. She concluded a technology analysis of the industrial sector, including base year fuel type, energy consumption, efficiency, cost, hurdle rate, and future projections to the year 2050. She also drafted introductions to and comparisons of the CA-TIMES industrial module with the National Energy Modeling System.

**Kevin Fang, TTP****Air Quality Issues in Compact Development vs. Conventional Sprawl** Adviser: *Ajith Kaduwela*

“New urbanism,” “smart growth,” and other more-compact styles of land development have been pushed as alternatives to suburban sprawl, in part to potentially reduce greenhouse gas emissions. However, knowledge of how well compact land development performs compared to suburban sprawl in terms of air pollutants is limited. Compact development typically means greater density of transportation facilities and land use activities. This density could lead to relatively higher pollutant concentrations, as well as greater exposure to pollutants. For example, less densely developed suburban areas with greater vegetation should be cooler than more densely developed areas. This past summer, Kevin Fang explored a number of air quality parameters comparing compact development to suburban sprawl. His research looked at 1) exposure to criteria air pollutants; 2) generated emission levels; 3) geography and meteorology of development locations in terms of air quality; and 4) ambient temperature. His research helps to consider the bigger-picture trade-offs when weighing suburban versus more compact development.

**Jia Li, CEE****Dynamics of Traffic Jams: Empirical Evidence** Adviser: *Michael Zhang*

Traffic jams are of critical concern in modern transportation management. However, varying data sources, scenarios, and assumptions create confusion about the causes of and interrelationships among factors involved in traffic problems. To achieve a deeper understanding of this contentious topic, this study examines traffic jams from a system perspective, focusing particularly on two aspects: reliable data and traffic characteristics that are consistent regardless of scale. It is a challenge to obtain reliable estimates of traffic states from heterogeneous data sources, especially when the uncertainty of each single-source dataset is significant. To address this challenge, it is essential to develop optimal data assimilation schemes. Second, this effort considers whether certain characteristics of traffic jams are statistically scale-invariant (i.e., inherent to flow at a system level). Previous studies, which mostly investigate the local spatial-temporal patterns of traffic jams, do not address this question. The research in this project extends the scope of current empirical research on traffic jams and paves the way for further theoretical investigations.

PROGRAM FELLOWSHIPS

David Van Herrick, CEE**Fix I-5 Survey** Adviser: *Patricia Mokhtarian*

This project is an effort to understand the short-term and long-term effects on travel choices of the temporary closing of Interstate 5 for reconstruction through Sacramento in 2008. David Van Herrick conducted a comprehensive literature review and synthesis relating to four topics: planned network disruptions such as the “Fix I-5” network reconstruction project, unplanned network disruptions such as natural disasters, traffic demand management strategies, and habit persistence and voluntary behavior change. The literature review identified results that may be applicable to the Fix I-5 context, and examined similarities and differences between those results and ones found from a survey during the temporary closing. Such an analysis could then strengthen or mitigate confidence in the prospect of generalizing the survey results. Van Herrick also worked on a programming algorithm to match previously unmatched survey results.

**Brendan Higgins, TTP****Biofuels from Algae Research** Adviser: *Daniel Sperling*

Biofuels have been proposed as one of several methods for meeting California’s Low Carbon Fuel Standard. Producing biofuels from algae offers a number of benefits over producing them from terrestrial plants, including high productivity; the potential for high lipid and starch production; and the ability to grow in saline and wastewaters. There are significant technical challenges with growing algae, however, such as limited knowledge about algal synthesis of biofuel precursors, contamination of algal cultures, dewatering, and high capital costs. This project uses a multi-phase strategy to investigate algae’s potential as a biofuel feedstock. A literature review phase identifies the most promising algal fuel pathways. Conceptual process models then help estimate yields and costs for the pathways, and life-cycle assessment methods help analyze the environmental impacts. Finally, a supply chain model will be developed to show likely production sites in California as well as system-wide costs. The resulting model can assist in testing different biofuel scenarios in order to determine how algae can contribute to economic and environmental goals.

**Justin Woodjack, TTP****Electric Vehicle Charging Stations Infrastructure Requirements—A Consumer Survey**Adviser: *Tom Turrentine*

Concern about greenhouse gas emissions led California to enact policies to reduce such emissions from the transportation sector, with a large portion of those reductions attained through the use of electric vehicles (EVs). To promote the use of EVs, California has emphasized the construction of public charging stations, yet there is little research on consumer recharging behavior or charging station location preferences. This project develops an online survey tool to understand consumers’ need for electric charging stations. The survey tool includes an interactive Google map to allow participants to create and explore their activity space, critical destinations, and desired charging station locations. The survey will be administered in the San Diego region with the help of San Diego Gas & Electric (SDG&E). The project includes discussions with key decision makers (San Diego Association of Governments, Ecotality, and SDG&E) about their methodologies for planning and implementing charging infrastructure in order to inform analysis of driver survey results.



EDUCATION

SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS

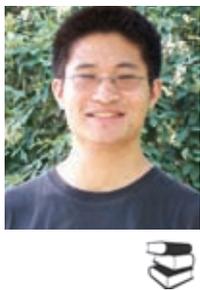
SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS

Undergraduate research fellowships are awarded to outstanding UC Davis students with upper-class standing. The recipients work full time during the summer on a research project directed by a member of the faculty or research staff. Five undergraduate students received fellowships for summer 2010 research projects.

A Meet-n-Greet event was held for fellowship recipients to meet one another, the faculty mentors, and STC staff, and discuss their interests and upcoming projects. Based on feedback from the fellows about the information and events that would be most educational, the STC arranged a field trip and put on a capstone event. The fellows visited the labs of the Urban Land Use and Transportation Center (ULTRANS) to learn about the center's work on regional and state-wide travel demand forecasting tools. At the end of the summer, STC hosted the first-ever Undergraduate-to-Graduate Symposium for the campus. This event convened the fellows to present their research and answer questions, thereby reflecting on their experiences and practicing their presentation skills. The STC invited undergraduates from all over the UC Davis campus to attend to learn about transportation research. Three STC-funded graduate students also presented their research to all attending, and told their own stories of how they each came to be doing transportation research.



STC Summer Undergraduate Research Fellow Sam Halstead presents his research findings to an audience of other UC Davis undergraduates interested in transportation studies, STC director Susan Handy, and STC-funded graduate students.



Daryl Chan, Environmental Policy Analysis & Planning

Advisers: *Mike McCoy and Giovanni Circella*

This summer, Daryl Chan interned with the Urban Land Use and Transportation Center (ULTRANS) under the guidance of post-doctoral researcher Giovanni Circella and ULTRANS director Mike McCoy. ULTRANS is in the midst of developing a statewide model for forecasting traffic for the California Department of Transportation. The model consists of two related components: one for land development patterns, and one for the flow of vehicle traffic. Chan organized the airline data that would be used in calibrating the model, totaled the number of people traveling, and found the travel time and average costs between all California airports.

He also reviewed the literature on what factors affect public transit use and supply, concentrating mainly on price elasticity, land use, and international comparisons.



Brigitte Driller, Environmental Policy Analysis & Planning

Adviser: *Stephen Wheeler*

This summer Brigitte Driller worked for Professor Stephen Wheeler on identifying and evaluating urban form types found in Paris, Beijing, Amsterdam, Moscow, Cairo, and Bangkok. Along with STC undergraduate Luka Ukrainczyk, Driller studied Google Earth aerials and identified landscape types. Then she evaluated these landscape types in terms of transportation efficiency by calculating connectivity indicators. She then researched transportation in each region and postulated connections between transportation behavior and landscape type. Driller also used Geographic Information Systems software to calculate the average temperature near each type of urban form around Sacramento. The results were consistent with the concept of the heat island effect: landscapes with more paved area had higher average temperatures.

EDUCATION

SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS

Sam Halstead, Environmental Policy Analysis & PlanningAdviser: *Susan Handy*

Sam Halstead worked on three projects under the direction of STC director Susan Handy this summer. His first project reported on methods to evaluate “road diets”—the redesign of streets to reduce the number of lanes for auto traffic while improving the space given to transit, bicyclists, and pedestrians. His work will be used in a before-and-after evaluation of a road diet in the city of Davis scheduled for 2012. Halstead’s second project analyzed open-ended questions in the 2008–2009 UC Davis Campus Travel Survey and reported on key themes in a memo to Transportation and Parking Services for UC Davis. For his third project, Halstead completed a research paper on “excess” driving and the question of why Americans drive as much as they do, which included a literature review and statistical analysis of data from the 2008–2009 UC Davis Campus Travel Survey.

**Amy Lee, Environmental Policy Analysis & Planning**Adviser: *Susan Handy*

Amy Lee worked with Sarah Underwood, a graduate student in the Department of Public Health, on a project led by STC director Susan Handy on the formation of attitudes toward bicycling. Lee helped with a survey and in-depth interviews with over 50 residents of Davis, producing a wealth of data and information. Lee created a database for the results and analyzed correlations in the data. She will continue working with Sarah and other graduate student researchers during the academic year on qualitative analysis of interview transcripts with respect to travel behavior, preferences, bicycling comfort, and identity as a bicyclist. Lee noted that it was valuable to participate in a research project from its start and to gain first-hand experience of the planning, paperwork, and logistics that happen before data is ever collected or analyzed.

**Luka Ukrainczyk, Civil Engineering**Adviser: *Stephen Wheeler*

This summer, Luka Ukrainczyk set out to examine the types of urban forms found in large metropolitan regions around the world under the direction of Professor Stephen Wheeler. Along with Brigitte Driller, another STC undergraduate fellow, Ukrainczyk used a number of online resources, including Google Earth, to visually survey a number of international cities. They identified the landscape types present in each city and documented qualitative and visual characteristics of the landscape types. Their results showed that single-use, automobile-dependent development, particularly in the form of suburban tracts and high-rise superblocks, was a common in the second half of the twentieth century. The prevalence of this landscape type strained the transportation networks of these cities, while cities with more fine-grained, multi-use development supported a higher number of transport options and were less car-dependent.



TEACHING/COURSES

TEACHING/COURSES

The STC supports the development of new courses to complement the existing transportation curricula at UC Davis and provides support for special activities within existing courses that enrich the learning experience. In 2009–2010 the STC funded instructors for one core course for the Transportation Technology and Policy program and for two ad hoc transportation courses, and provided funding for a field trip for one established course and a guest lecturer for another established course.

TTP 210, Introduction to Transportation Technology

Nathan Parker (Winter '10)

This course explored the fundamental science and engineering concepts at the heart of the modern automobile. Nine students investigated the use of petroleum-based fuels in the internal combustion engine as a springboard to study more advanced technologies to reduce environmental impacts and energy use from automobiles. This study of the automobile offered an understanding of its basic workings, energy conversion from a fuel to vehicle propulsion, pollution control mechanisms, and factors that contribute to fuel economy. The class examined advanced vehicle technologies, such as plug-in hybrid vehicles, biofuels, and fuel cells, for their potential to reduce vehicle emissions and energy use. This course is a core requirement for the TTP program, made possible by funding from the STC.

TTP 289-007, Improving Community and Landscape Connectivity

Fraser Shilling (Fall '09)

Central to landscape ecology is the analysis of fragmentation by roads and land uses that reduce connectivity for ecological processes such as wildlife movement. Parallel to this analysis is the study of human community connectivity through transportation and land use planning (e.g., transit routes and greenways). This class analyzed human community “connectedness” from several perspectives to provide a picture of human connections that are a corollary to landscape connectivity assessment. The discussions transitioned through growth planning theory and ways that planning can intersect with natural landscapes. The STC funded the instructor for this ad hoc course, which was taken by twenty students.

TTP 289A-007, Public Transit Policy and Management

Anthony Palmere (Winter '10)

This course reviewed public transit issues and applied transit service assessment techniques. Topics included long-range transit corridor planning, service planning and scheduling, performance evaluation, fare policy, labor relations, and organizational issues. Discussions focused on transit analysis methods, including underlying principles, assumptions, data requirements, and applications to transit management. The course also provided an understanding of the historical and contemporary policies associated with public mass transportation. A group project applied the course content to a current transit issue (a proposed trolley line across the UC Davis campus), the findings of which were presented to local officials. The STC funded the instructor and field trips for this ad hoc course, which was taken by seven enrolled students and two auditing students.



TEACHING/COURSES • OUTSTANDING STUDENT OF THE YEAR

LDA 205, Physical Planning and Urban Design**Stephen Wheeler (Fall '09)**

This course introduced twenty students to the design, regulation, and development of the built landscape. Emphasis was placed on how landscapes can be creatively planned and designed in the future to meet social, ecological, and economic goals related to sustainable development. The STC supported a class field trip to Portland, Oregon for a first-hand observation of that region's transportation systems, land use, and urban design. Portland is known worldwide as a leader in many areas of urban planning, including integration of transportation and land use objectives.

ECI 289, Transportation Systems Technologies**Michael Zhang (Winter '10)**

This new course focused on current and future technologies in transportation and offered its eight students an alternative to the current TTP core course on transportation technology (TTP 210). The STC supported a visit by Bill Shao, Transportation Engineer with the Los Angeles Department of Transportation, to present a two-day lecture on the full spectrum of intersection traffic control, from hardware to algorithms. Shao taught on the history and evolution of traffic control systems, and brought some control equipment with him. Other lecture topics included traffic detection systems, loops, tube counters, and data warehouses.

OUTSTANDING STUDENT OF THE YEAR

Nathan Parker, the 2010 UC Davis Sustainable Transportation Center Outstanding Student of the Year, is a Ph.D. student in the Transportation Technology and Policy program and specializes in assessing the potential for greater use of biofuels. As Professor Joan Ogden wrote, "His work has already significantly influenced the transportation and energy arena, furthering one of its most important debates: how to reduce greenhouse gas emissions from the transportation sector." One of Parker's first projects as a graduate student, a statistical analysis of gas pipeline costs, was adopted by the U.S. Department of Energy Hydrogen Program as the best review of the topic and as the basis for its models. His master's thesis identified low-cost solutions for transportation fuel production from crop wastes and showed

that a widely cited study was unduly pessimistic about this renewable energy option. He was invited to speak on the topic to a special seminar at the California Energy Commission, an unusual invitation for a graduate student. Parker is now participating in a national study of biofuel resources and economics with a team of researchers from national laboratories and the U.S. Department of Energy.



The STC's 2010 Outstanding Student of the Year, Nathan Parker, and STC director Susan Handy at the 2010 award ceremony in Washington, D.C.

FACULTY RESEARCH GRANTS

The STC research program supports projects that address both transportation and planning agency concerns and meet rigorous academic standards.

FACULTY RESEARCH GRANTS

During 2009–2010, the STC funded six faculty research grants and two seed grants. Researchers from outside UC Davis reviewed projects and offered input to help select the grant recipients. In addition to supporting the named faculty researcher, each project also supported at least one graduate student, thereby integrating education with research.



**Alison Berry,
Plant Sciences**
**Improving Soil Infiltration
of Runoff and Pollutants
Along Road Edges by Soil
and Vegetation Management
Strategies**

Reducing runoff from paved surfaces is a key ecological challenge in roadside management. Such runoff increases sediment movement, destroys aquatic habitat, and disperses road-source pollutants. This project expands a 2003 California Department of Transportation Roadside Vegetated Treatment Site (RVTS) study that estimated infiltration and contaminant adsorption into the surface of road-edge soil at five California locations. In this project, Professor Berry aims to provide a more detailed analysis of soil texture and infiltration at locations across California. The project examines plots under highly controlled conditions, using soil treatments, native vegetation treatments, and rainfall simulations to test runoff and pollutant adsorption. The results will help guide strategies to reduce runoff and pollutants from roadways, stabilize roadside vegetation communities, reduce exotic invasion, and enhance native habitat. This project also establishes perennial native grasses for future research on how management techniques affect native vs. exotic vegetation.



EVIDENCE OF IMPACT

Professor Berry's research is now being applied in a collaborative project with the city of San Jose, Calif. as part of its recycling and reuse program. The project will apply methods assessed during the STC project—including deep tillage and compost incorporation—in a site installation as part of corrective practices for addressing infiltration issues.



**Yueyue Fan,
Civil and Environmental
Engineering**

*Multistage Network Design
for Sustainable Transportation
System Planning*

Sustainable planning must support economic viability and infrastructure resilience, and adapt to a changing and unpredictable environment. Professor Fan's project establishes modeling and computational methods for multistage network design that adapts to resource constraints, evolving technology, societal needs, and a host of uncertainties. While the focus for this project is transportation systems, the processes are also applicable to water, power, and communication systems. The model has learning capabilities to allow for adaptive decision-making. The multistage decision model and algorithms aim to support smoother transitions to more secure and sustainable future systems. Deliverables include a decision support structure that is geographic information system based, and that provides spatial and temporal strategies as well as technical and policy recommendations.

RESEARCH

FACULTY RESEARCH GRANTS


**Susan Handy,
Environmental Science
and Policy**
**An Exploration into the
Nature and Formation of
Bicycling Preference and
Comfort**


As a healthy, low-polluting, low-cost alternative to driving, bicycling is an important and popular transportation mode for many western countries, though it represents less than 1% of daily trips in urban areas in the U.S. The share is considerably higher in selected places, including in Davis, Calif. Analysis of online survey data collected in Davis and five comparison cities in 2006 shows that cognitive factors play a critical role in explaining bicycling behavior. In this project, Professor Handy explores the formation of these cognitive factors using both quantitative and qualitative methods. First, models of bicycling preference and bicycling comfort were developed using 2006 survey data, identifying key factors. Second, in-depth interviews explore the processes involved in the formation of these factors, building a richer understanding of why people do or don't like biking. The results could be useful in developing programs to increase the number of people bicycling and the frequency with which they ride.


**Patricia Mokhtarian,
Civil and Environmental
Engineering**
**How Do Commuters React to
a Temporary Freeway Closure?
An Evaluation of the Fix I-5
Project in Sacramento, Calif.**


What do commuters do when they are forced to change their normal travel patterns, what factors affect behavior change, and how long does the change last? For nine weeks in 2008, a one-mile stretch of Interstate 5 (I-5) in downtown Sacramento was intermittently closed for reconstruction. This portion of I-5 is part of a major north-south conduit for interregional traffic, as well as a key commute route. Professor Mokhtarian's team conducted an Internet survey of commuters potentially affected by the closure to 1) understand the extent and nature of the impacts on commuters; 2) assess what commuters did in response; and 3) monitor the persistence of any changes. This project deepens

an initial analysis by modeling both the adoption of commute changes and the intention to maintain them after the reconstruction was completed. The results provide a clearer picture of how multiple factors act together to increase or decrease our propensity to change.


**Susan Ustin, Land, Air
and Water Resources**
**Predicting Wildlife
Movement Associated with
Road and Highway Systems**


Generally, highway and other transportation projects are planned, funded, and designed before considering the potential impacts to wildlife and

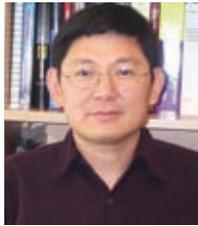
sensitive biological resources. While we are starting to understand more about why wildlife-vehicle collisions occur, we know little about the actual proximate causes or contributing factors. Most contemporary research finds that existing road and highway systems reduce habitat quality and imperil species. If planners can identify critical wildlife movement needs in relation to transportation systems, they can have improved abilities to predict and reduce wildlife impacts. In this project, Professor Ustin studies the occurrence and movement of small- and medium-sized mammals across development and traffic gradients adjacent to Interstate 80 as it bisects the Sierra Nevada.

EVIDENCE OF IMPACT

This project by Professor Ustin and her colleague Fraser Shilling has long-term potential to improve planners' abilities to predict and mitigate wildlife impacts in transportation systems. The project has generated immediate interest at the local level. California Department of Transportation biologists and consultants working with El Dorado County to ensure wildlife connectivity are hoping to apply the results of the project within the county and expand the approach to other highways in the Sierra Nevada.

RESEARCH

FACULTY RESEARCH GRANTS • SEED GRANTS


**Michael Zhang,
Civil and
Environmental
Engineering**
**The Optimal Coarse Toll for
Heterogeneous Commuters
in the Morning Commute**


Historically, governments have built new roadways or expanded existing ones to alleviate traffic congestion. However, as roadway density and the financial and environmental costs rise, planners must consider alternative approaches. Economists argue that a continuous, time-dependent toll can completely

eliminate congestion in the morning commute, but such a fine-grained toll is impractical because it requires frequent price changes. In this project, Professor Zhang investigates a flat toll that would be collected during the morning commute peak. Building a model of departure profiles for different tolls over different time periods with heterogeneous commuters, this project studies how the flat toll affects the departure time choices of different traveler groups, how this affects the efficiency of the system in terms of total travel cost, total travel delay, and travel delay for different traveler groups, and whether this toll scheme can benefit all traveler groups. The tools developed in the study can help planners make informed choices about what will best serve both those designing transportation systems and those who use the systems.

SEED GRANTS

Seed grants are limited to no more than \$10,000, and the majority of the funding supports graduate and/or undergraduate student researchers for at least one quarter. The funds may be used for new research initiatives, for information sharing projects, to leverage funding from other sources, and to support projects that synthesize existing research or evaluate best practices.


Susan Handy, Environmental Science and Policy
Davis Shopping Study


Shopping travel constitutes a significant share of daily travel in the U.S. and significantly impacts energy consumption, air quality, water quality, and climate change. Understanding what influences such travel can inform policies to help meet consumer needs while minimizing environmental costs. This study examines the shopping behavior of residents of Davis, Calif. before and after the opening of a Target store. The decision to allow the Target store in Davis was controversial, as it required an exception to the city's maximum allowed store size. Residents raised many concerns about impacts on local businesses. Others argued that Davis residents shopped at Target in other cities anyway, so having one in Davis would reduce driving and keep sales tax revenues within the city. Narrowly approved by the voters, the Target store opened in late 2009 and offered a unique opportunity to study the causal effects on shopping travel of a significant change in the retail landscape. Few such studies have been documented in the academic literature. This study provides important insights for communities debating bans on "big box" stores and informs current statewide debates over the role of "smart growth" policies in reducing greenhouse gas emissions to meet Assembly Bill 32 requirements.


John Harvey, Civil and Environmental Engineering
Environmental Impacts and Energy Efficiency of Rubberized Warm Mix Asphalt for Sustainable Road Construction


Rubberized Hot Mix Asphalt (R-HMA) adds 15 percent to 20 percent crumb rubber from scrap tires to asphalt binder and is an environmentally friendly alternative to conventional HMA. R-HMA recycles rubber while reducing fatigue and reflective cracking—two primary failure modes for asphalt pavements. However, widespread use of R-HMA is limited by the much higher temperatures needed for its mixes than for conventional HMA, increasing energy consumption, emissions, odors, and fumes. New technologies, known as Warm Mix Asphalt (WMA), now reduce the temperatures by 15°C to 55°C without negatively effecting performance. This project identifies and quantifies the environmental and energy efficiency impacts of R-WMA compared to HMA and R-HMA—producing new data that road and environmental authorities need to support use of R-WMA as a more sustainable alternative. The data will inform a comprehensive work plan and proposal to the National Science

SEED GRANTS

Foundation, California Integrated Waste Management Board, U.S. Department of Energy, and California Energy Commission to ensure that a scientifically valid study identifies and assesses key variables so that decision makers can better determine processes for road rehabilitation projects across the country.

EVIDENCE OF IMPACT:

2006–07 DISSERTATION GRANT: *Discrete Element Modeling of Foamed Asphalt Treated Recycled Asphalt Pavement Materials* & 2008–09 SEED GRANT: *A Website to Promote New Knowledge and New Design Methods for Sustainable Road Rehabilitation Technologies*

UC Davis Ph.D. candidate Pengcheng Fu has worked for six years with UC Pavement Research Center (UCPRC) Director John Harvey and research scientist David Jones on sustainable pavement rehabilitation technologies. Fu's dissertation research, sponsored by the California Department of Transportation (Caltrans) and by a grant from the STC, is a key component of a recently completed comprehensive UCPRC project for Caltrans on foamed asphalt.

These fundamental findings have enabled Caltrans to implement this resource-, energy- and money-saving approach with greater confidence and a higher success rate. In addition to supporting his research, the STC has provided a seed grant to develop a website to enhance researchers' understanding of this technology, inform pavement engineering practice, and promote discussion of further advances in the technology. The website is expected to be online before the end of 2010.

The research has been incorporated into a new Caltrans manual on foamed asphalt—the only comprehensive guideline dealing with road recycling with foamed asphalt that is based on research in the U.S., and targets U.S. engineering practices.

The research has also attracted the attention of the Federal Highway Administration (FHWA). Jason Harrington, a pavement engineer at the Office of Pavement Technology at FHWA, recently contacted a researcher on the team to discuss whether UCPRC can contribute expertise to the FHWA's upcoming activities in pavement recycling.

EVIDENCE OF IMPACT:

2007–08 SEED GRANT: *Central Valley Sustainable Cities Project*

Being ranked last in sustainability by Professor Mark Lubell's policy index has created a fresh opportunity for the city of Maricopa, California to boost local sustainability efforts. Professor Lubell's *Central Valley Sustainable Cities Project* analyzed 100 cities and developed an index based on 50 different measures such as land use and transportation rules. The lowest-scoring city was Maricopa, whose officials took note. A grant writer/administrator for the city wrote to Lubell, "Your report has been the catalyst in the process of creating a more sustainable Maricopa. I will be sharing your email with the City Council and City Manager at our next council meeting. Thank you." Equipped with the report, the city of Maricopa applied for a grant from the state of California to initiate an energy conservation counseling service for city residents.

RESEARCH

VISITING PRACTITIONER PROGRAM • CAMPUS TRAVEL ASSESSMENT

Technology transfer is a critical component of the STC's mission. It enables information-sharing between researchers on the UC Davis campus and at other academic institutions, and between the academic community, policymakers, and practitioners. The STC brings outside experts to campus and supports off-campus student and faculty travel to conferences, meetings, and special events. Other STC outreach activities include the Visiting Practitioner program, the annual campus travel assessment, a new California UTC webinar series, regular updates in the ITS-Davis electronic newsletter, and conference and event sponsorships.

VISITING PRACTITIONER PROGRAM



Richard Lee, Ph.D., the current STC visiting practitioner, is a transportation planning consultant at Fehr & Peers and has taught at UC Berkeley, San Jose State, and Cal Poly San Luis Obispo. During his tenure with the STC, he has collaborated

with Professors Susan Handy and Deb Niemeier on a Caltrans-funded project to develop a new method for predicting vehicle trips generated by proposed "smart growth" development projects, including infill development, transit-oriented development, and mixed-use development.

Smart growth projects tend to foster the use of alternative travel modes, but estimating the effects of such developments on traffic is difficult. The California Environmental Quality Act required developers to estimate the transportation impacts of their proposed developments in the form of a Traffic Impact Analysis (TIA). Based on the TIA, developers may be required to pay mitigation fees or provide facility improvements. Estimating the number and type of trips that a development project will yield is the first step of a TIA, known as "trip generation." Rates in the Institute of Transportation Engineers Trip Generation Handbook most often used for this task tend to over-predict vehicle trips for smart growth projects, leading to an over-provision of facilities for cars while underestimating the need for transit, bicycle, and pedestrian facilities.

The project seeks to identify an accurate methodology for analyzing trip generation that will be sensitive to the trip-reducing qualities of smart growth projects. With guidance from a panel of transportation planning practitioners, the project team identified potential methodologies, assessed their accuracy for a sample of 22 sites in California, and weighed their performance on a number of practical criteria. A recommended approach will be selected by the end of 2010, and the project will move to a data collection phase in 2011.

CAMPUS TRAVEL ASSESSMENT

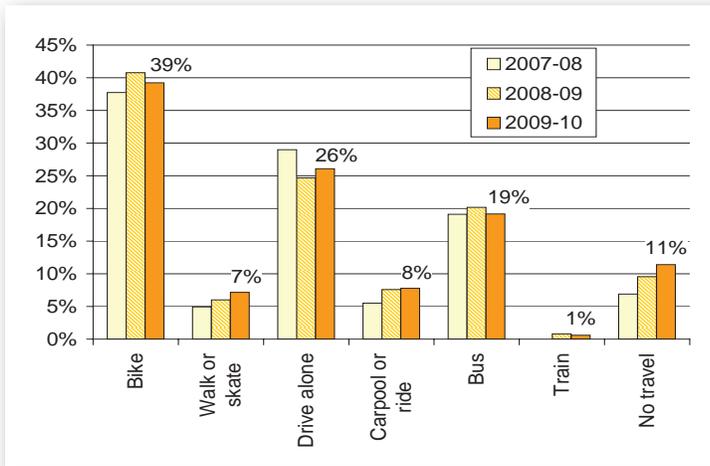
Each fall, UC Davis students, faculty, and staff complete an online survey about their travel to campus for the Campus Travel Assessment, a partnership between the STC and the UC Davis Transportation and Parking Services (TAPS). TAPS and STC together fund a graduate student to administer the survey, analyze the data, prepare a report, and present findings to advisory committees and decision makers on and off campus. TAPS uses the data in its planning for the campus, particularly to gauge its success in promoting travel to campus by means other than solo driving. Kristin Lovejoy, a Transportation, Technology, and Policy Ph.D. student, led the assessment in both 2008 and 2009.

The fourth Campus Travel Assessment shows a shift in the relative shares of people using each means of transportation to commute to UC Davis. While the 2008–09 results had shown an increase in the percent biking and a decrease in the percent arriving in cars, both figures returned to 2007–08 levels in 2009–10. Among those in cars, the share carpooling rather than driving alone has continued to increase, as has the small

CAMPUS TRAVEL ASSESSMENT

share of people who walk to campus. The number of people who do not physically come to campus on any given day, estimated to be about 11 percent of the campus community (and 22 percent of faculty) on an average weekday, continues to grow each year.

The graduate student who conducts the survey has the opportunity to add questions to the survey that can form the basis for a master's thesis or Ph.D. dissertation. The 2009-10 survey included supplemental questions on overnight bike parking, of interest to the university because of the maintenance challenge posed by abandoned bikes and of interest to researchers for understanding the use of bicycles in conjunction with other modes. In total, an estimated 18,120 people have a bike on campus any given day, and 5,400 leave one on campus overnight. Comparing these estimates to actual counts of parked



Comparing the travel mode splits from 2007-08 to 2009-10.

bikes suggests that abandoned bikes make up about a third of all bikes parked on campus at any one time during the day and almost half of those on campus overnight.



TECHNOLOGY TRANSFER

CAMPUS TRAVEL ASSESSMENT

EVIDENCE OF IMPACT:

2006-07, 2007-08 and 2008-09: UC Davis Campus Travel Assessments

Data from the annual campus travel survey has given campus and regional planners critical information for efforts to reduce carbon emissions and improve transportation services. Richard Seyman, co-chair of the Transportation, Air Quality and Climate Change Committee of the Environmental Council of Sacramento, offered this praise:

“The survey in general was a wonderful thing for the community to have available, as it approaches meeting the need for responding to climate change and other environmental and social challenges of the coming decades. Thanks for your highly relevant research.”

The survey showed low campus awareness of existing Transportation and Parking Services (TAPS) programs and services. In response, the department took a stronger approach to marketing them, re-branding its alternative transportation program as the “goClub” and launching a website and marketing campaign for the program.

TAPS also used survey data in initiating new partnerships with carsharing provider Zipcar and ride-share matching service Zimride, including data on potential interest in these services, and estimates of the number of people commuting to campus from different locations and their use of ride-sharing and carpooling.

The university’s Department of Environmental Stewardship and Sustainability relied on survey data in estimating the overall carbon footprint of the campus for its Climate Action Plan. The survey will be used to track the carbon footprint over time as a part of a university-wide sustainability initiative.

Analysts evaluating potential LEED (Leadership in Energy and Environmental Design) certification for several new campus dormitories relied on data from the campus travel survey to estimate the likely share of travel by different modes among residents of those halls.

Finally, representatives from local and regional governments in the Sacramento region have requested data from the survey numerous times to support evaluation of policies and proposals. For example, planners used data from the survey to estimate the number of likely users of a proposed path for small electric vehicles between Davis and Woodland.



CALIFORNIA UTC WEBINAR SERIES

CALIFORNIA UTC WEBINAR SERIES

Since early 2010, the Sustainable Transportation Center has been coordinating an effort by the five California University Transportation Centers (UTCs) to make information-sharing and research dissemination easier and more cost-effective than ever for their state-level funding partner, the Caltrans Division of Research and Innovation. By using webinar technology and offering lunchtime events at monthly intervals, the UTCs are able to present research and engage in discussion with Caltrans without requiring any Caltrans employees to travel or take a single day off from work. Leaders within Caltrans partner with the UTCs by offering introductions and closing remarks for each webinar. During Q&A sessions, online audience members are able to ask questions in real time through the webinar's chat pod, contributing to lively discussions.

In the months of April, May, June, and September 2010, the webinars attracted 155 online participants and 51 in-person audience members. Many participants attended more than one of the webinars, which were free and open to the public. Of the 155 unique online log-ins (which could each have multiple participants), 79 were registered to organizations other than Caltrans. This indicates that the research presented in the webinars is a resource for a wide community of practitioners.

STC Center Coordinator Morgan Kanninen created and maintained the website for the webinar series, created outreach materials, coordinated e-mail promotion, and operated the technical interface for the webinars from the Caltrans Division of Research and Innovation conference room. Recordings of the webinars are posted along with the slides for each presentation on

the webinar website, hosted by the STC. At the debut seminar, STC Director Susan Handy moderated and researcher Patricia Mokhtarian presented findings from her 2009-10 STC Faculty Research Grant project.

The webinar themes for 2009-10 were as follows:

April 14, 2010: *Corridor Management*

May 12, 2010: *Freight and Goods Movement*

June 16, 2010: *Encouraging Sustainable Travel*

September 15, 2010: *Efficient Management of Road Construction and Operations*

More information about the webinars, including the recording for each, is available online:

Spring 2010: <http://stc.ucdavis.edu/outreach/UTC-Caltrans-Materials-S2010.php>

Fall 2010: <http://stc.ucdavis.edu/outreach/UTC-Caltrans-Materials.php>



Seiji Stienmetz, Ph.D. (far right) answers a question as Larry Orcutt, chief of the Caltrans Division of Research and Innovation (far left) listens from the audience.

TECHNOLOGY TRANSFER

CONFERENCE AND EVENT SPONSORSHIPS

CONFERENCE AND EVENT SPONSORSHIPS

The STC sponsored several conferences, receptions, and unique events that advanced the technology transfer component of the center's mission.

Fourth International Conference on Women's Issues in Transportation

Irvine, Calif., October 27-30, 2009

The Transportation Research Board convened the Fourth International Conference on Women's Issues in Transportation on October 27-30, 2009, in Irvine, Calif., with sponsorship from the STC. The conference was designed to enhance the understanding of gender differences in access, mobility, safety, and personal security needs.



STC and other participants in the International Conference on Women's Issues in Transportation: (L-R) Susan Handy, STC director; Deb Niemeier, professor; Pat Mokhtarian, professor; Kristin Lovejoy, Transportation Technology and Policy (TTP) graduate student; Catherine Emond, TTP graduate student; Alex Karner, Civil and Environmental Engineering graduate student; Jennifer Dill, STC External Advisory Committee member and UC Davis alumna; Liang Ye, ITS-Davis visitor; Meiping Yun, ITS-Davis visitor.

Pavement Lifecycle Assessment Workshop

Davis, Calif., May 5-7, 2010

The UC Pavement Research Center and UC Institute of Transportation Studies (Davis, Berkeley, and Irvine) are collaborating to establish common practices for environmental life cycle assessment (LCA) of pavements. Funded by Caltrans and the MIRIAM pooled fund project led by the Danish Road Institute, this collaboration also includes the International Society for Asphalt Pavements and International Society for Concrete Pavement. The STC-sponsored May workshop focused on development of a pavement LCA framework; summarizing system boundaries and

assumptions for the framework, and examination of the pros and cons of alternatives; assessment of models/data for each life cycle phase with regard to project type; and documentation requirements for pavement LCA studies to permit comparison between studies. The results will lead to better understanding of LCA among practitioners, sponsors, and consumers of pavement LCA information.

STUDENT TRAVEL AWARDS • SEMINAR SPEAKERS

ITS-Davis Recruiting Event*Davis, Calif., March 5, 2010*

ITS-Davis hosted a reception for the top admission candidates for the Transportation Technology and Policy (TTP) graduate program, with sponsorship from the STC. TTP faculty, staff and current graduate students welcomed the new candidates with both group and individual meetings. The event included lunch with current graduate students followed by a campus tour. After the tour, the visitors attended a seminar by University of Arizona professor Pitu Mirchandani and met individually with faculty to discuss their research interests.

SEMINAR SPEAKERS

The STC funded two distinguished speakers and one invited seminar speaker in 2009-10. In other seminars, STC Visiting Practitioner Richard Lee and STC Dissertation Fellowship recipient Zhen Qian presented their work.

STC Distinguished Speaker:

Robert Cervero, Ph.D., Professor of City and Regional Planning; Director, University of California Transportation Center; Director, Institute of Urban and Regional Development, UC Berkeley
April 30, 2010

Mobility, Place-making, and Economic Competitiveness



Robert Cervero presents to a full room.

STC Distinguished Speaker:

Pitu Mirchandani, Ph.D., Professor of Computing, Informatics, and Decision Systems Engineering; Director, ATLAS Laboratory, Arizona State University
March 5, 2010

Next Generation of Adaptive Traffic Signal Control



Pitu Mirchandani with UC Davis Professor Michael Zhang.

STC Invited Speaker:

Adam Millard-Ball, Ph.D. candidate, Emmett Interdisciplinary Program in Environment and Resources, Stanford University
April 9, 2010

Reducing Transportation Emissions in the Developing World: The Promise and Perils of Carbon Trading

STUDENT TRAVEL AWARDS

In 2010, STC sponsored travel for five students to attend two conferences: the International Conference on Women's Issues in Transportation, described, and the 16th Annual University of California Transportation Center (UCTC) Student Conference.

The UCTC Conference, held in Irvine, Calif., featured STC student Jacob Teeter, who presented a poster on his thesis research, "Appropriate Policy for Appropriate Technology—the Case of Chinese Rural Vehicles."



(L-R), Gouri Mishra, Jacob Teeter, and Yongling Sun at the UCTC Student Conference.

URBAN LAND USE AND TRANSPORTATION CENTER

URBAN LAND USE AND TRANSPORTATION CENTER

The Urban Land Use and Transportation Center (ULTRANS) was launched in 2008 with core support from the STC. Through research, education, and outreach, ULTRANS aims to improve understanding of the relationships between transportation and land use, and to develop, test, and deploy tools that enable state, regional, and local agencies to effectively integrate transportation and land use policy to achieve sustainability goals.



Staff and researchers of the Urban Land Use and Transportation Center, which the STC helps support.

During 2009-10, ULTRANS partnered with Caltrans on the development of a statewide integrated interregional model (CalSIIM) and has been working toward the completion of the California Statewide Travel Demand Model. A project funded by the California Air Resources Board aims to synthesize existing empirical evidence on the impact of land use strategies on vehicle miles of travel and greenhouse gas emissions, while a project for the California Energy Commission will make use of existing travel survey data to estimate these relationships for a wide range of contexts. With funding through the Governor's Strategic Growth Council, ULTRANS has begun working with the Institute of Local Government to provide outreach and education to state and local governments, nongovernmental organizations, and other stakeholders about the implementation of new state requirements for regional planning. The ULTRANS team developed three new graduate-level seminars related to these activities, to be launched in 2010-11.

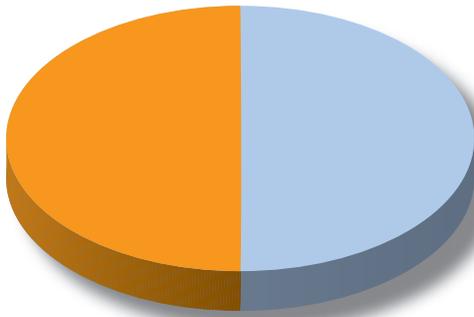
The ULTRANS team, under the leadership of Mike McCoy, includes Susan Handy, Caroline Rodier, Robert Johnston, Mark Lubell, Patricia Mokhtarian, and Deborah Salon. Joan Sollenberger of Caltrans joined the ULTRANS team in fall 2009 to pursue funding opportunities and strengthen ties with government agencies. Liz Grassi serves as program manager.

RESEARCH NETWORKS

The STC often partners with the following research centers:

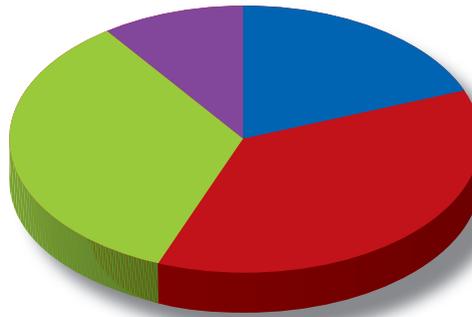
- the UC Pavement Research Center <http://www.ucprc.ucdavis.edu/>
- the Road Ecology Center <http://roadecology.ucdavis.edu/>
- the Center for Regional Change <http://regionalchange.ucdavis.edu/>

FINANCIAL REPORT



FUNDING SOURCES

| | | |
|--------------|-------------|---|
| Federal | 50% |  |
| Caltrans | 50% |  |
| TOTAL | 100% | |



EXPENSE SUMMARY

| | | |
|----------------|-------------|---|
| Research | 36% |  |
| Tech Transfer | 9% |  |
| Administration | 21% |  |
| Education | 34% |  |
| TOTAL | 100% | |

STC UPDATES IN ITS-DAVIS E-NEWS

The “Sustainable Transportation Center Update” is published three times a year in *ITS-Davis e-news*, the electronic newsletter of the UC Davis Institute of Transportation Studies. The update includes student and researcher profiles, summaries of student activities, highlights of research projects, reports on STC-sponsored projects and events, and other activities. In 2009–10, the update included feature articles on two STC projects. The update is also made available in PDF format for easy download and printing at <http://stc.ucdavis.edu/outreach/#newsletters>.

ACKNOWLEDGMENTS

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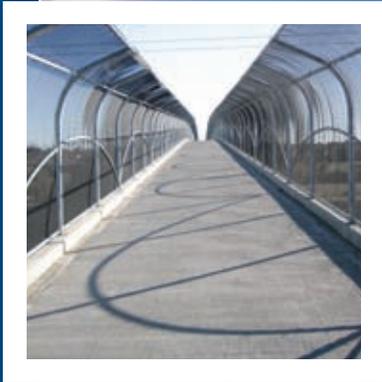
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