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News from ITS

ITS at TRB 2009— PATH at TRB 2009; Traffic Safety Center at TRB 2009; Transportation Sustainability Research Center at TRB 2009.

December 19: Joan Walker Wins National Science Foundation Award.

December 16: Adib Kanafani named the 2009 Chairman of the Transportation Research Board (TRB) Executive Committee.

December 15: Transportation Sustainability Research Center Launches Re-Designed Web site: *Among the new features: downloadable data sets of raw numbers.*

December 5 Seminar: "New paradigms in the collection, interpretation and application of traffic information," *Presented by J.D. Margulici, Associate Director of the California Center for Innovative Transportation at UC Berkeley.*

November: Adib Kanafani Honored by National Research Council *Kanafani is named a lifetime National Associate of the National Research Council for his service.*

November 21 Seminar: "Revisiting the Estimation of Highway Maintenance Marginal Cost" *Presented by Shadi B. Anani, Ph.D. Candidate, Department of Civil and Environmental Engineering, University of California, Berkeley.*

November 14: UC Berkeley and Nokia turn mobile phones into traffic probes with launch of pilot traffic-

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Winter 2008: Stories This Issue

We'll Take Manhattan: Berkeley's High Profile at 15th annual ITS World Congress in NYC

PATH and CCIT brought high-tech demos to city streets, and TSRC's researchers moderated four panels and delivered eight talks at the conference.

Cracking Congestion: Mode by Mode Around the Globe

Vikash Gayah, Ilgin Guler, Josh Pilachowski, Celeste Chavis, Eric Gonzales, and Yiguang Xuan are some of the ITS students researching solutions to urban traffic congestion in three countries.
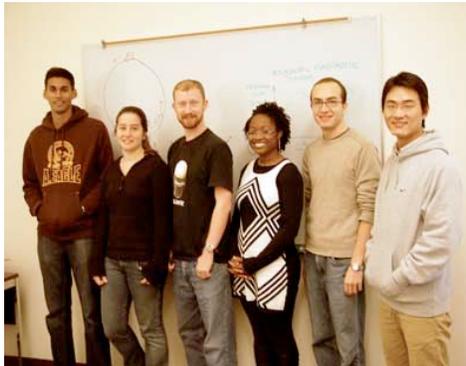
Gender and Mobility: Clark University's Susan Hanson delivers Third Annual Martin Wachs Distinguished Lecture in Transportation

Hanson, former director of Clark's School of Geography, is a member of the prestigious National Academy of Sciences and winner of the Guggenheim Fellowship and the Van Cleef Medal from the American Geographical Society for Innovative work in urban geography. Her talk, "Gender and Mobility: A Feminist Geographer's Perspective," doubled as a kick-off for the City and Regional Planning Department's 60th anniversary celebration.

"Tackling Congestion in an Era of Climate Change:" 2nd Annual California University Transportation Centers-California PATH Conference, November 6-7, 2008

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monitoring software.

November 14 Seminar: "Truck Arrival Sequencing and the Impact on Re-Handling Work at Marine Terminals" *Presented by Anne Goodchild, Ph.D., Assistant Professor, Civil and Environmental Engineering, University of Washington.*

November 3-6 NEXTOR's Airport Systems Planning and Design 37th Annual Short Course *At the International House, UC Berkeley.*

November 7 Seminar: "Reliable Facility Location under Probabilistic Disruptions" *Presented by Yanfeng Ouyang, Ph.D., Assistant Professor, Civil and Environmental Engineering, University of Illinois at Urbana-Champaign.*

October 31: "Availability of Fuel or Other Energy Sources for Transportation" *TSRC Director Dan Kammen's testimony before the California Assembly Transportation Committee.*

October 31 Seminar: "A Random Walk through Transportation Innovation in Barcelona" *Presented by Francesc Robusté, Ph.D., Professor of Transportation, Director of the Center for Innovation in Transport CENIT, Technical University of Catalonia at Barcelona.*

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We'll Take Manhattan

Berkeley Researchers' High Profile at the 15th annual ITS World Congress in NYC

Question: How do you transport a 40-foot research bus from Berkeley, California, to New York City to showcase technology that makes travel safe, efficient, and green?

Answer: Don't move the bus. Just move the technology.

That challenge kept a team of researchers and engineers from the Institute of Transportation Studies' California Partners for Advanced Transit and Highways (PATH) working around the clock this November. The team had one week to rebuild the Networked Traveler, a complex set of mobility and safety applications delivered to travelers and vehicles through multiple wireless links.

The services were developed at PATH's Richmond Field Station facilities and reconstructed in a New York City transit bus for demonstration at the 15th Annual World Congress on Intelligent Transport Systems November 16 through 20.

Research from two other research centers at the institute—the California Center for Innovative Transportation (CCIT) and the Transportation Sustainability Research Center (TSRC)—was also featured prominently at the conference, held at the Jacob K. Javits Convention Center in Manhattan.

In addition to a daily schedule of bus demos, the PATH team presented two live safety demonstrations—vehicle-to-vehicle "situational awareness" and a pedestrian safety alert—as part of the conference's 11th Avenue Theater, which shut down the west-side artery for four hours every day for a live-action show of high-tech crash-prevention demos.
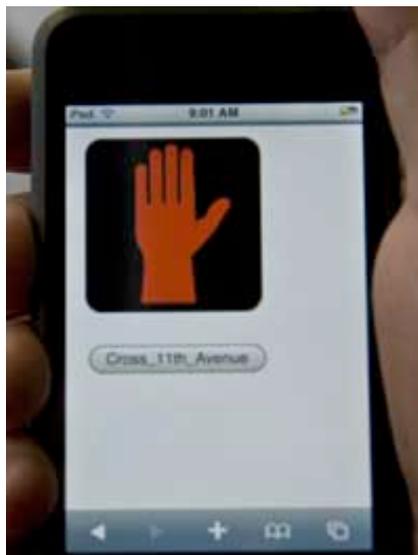
The Networked Traveler bus demo featured the technology's three main services:

"Tell me about my trip" assists trip planning with traffic information, transit connections, and driving choices for an eco-route and a fastest route."

"Tell me about my route" can provide travelers with real-time road-safety conditions, real-time traffic and parking conditions, schedule-driven transit information, real-time GPS-based transit status, and road signage.

"Watch out for me!" includes services such as the pedestrian-to-vehicle safety alert, the vehicle-to-pedestrian safety alert, road-to-vehicle road safety information, road hazard alerts, and work zone alerts.

"The concepts behind the Networked Traveler have their origins in our extensive dedicated short range communications (DSRC) work on our Vehicle Infrastructure Integration (VII) testbed, but the actual demonstrations for the World Congress were developed and delivered in less than six months," said Jim Misener, executive director of PATH

and project manager for the Networked Traveler.

"We reconstructed real-time wireless communications links and 10 distinct demonstration applications on someone else's transit bus," said Misener, who added that the work included accounting for repeated operations in the complex transportation setting and cluttered wireless environment of midtown Manhattan. "Doing all this in a week was an audacious proposition, and a really a super-human feat by our PATH engineers," Misener said. "Thanks to their diligence (and to nearby coffee vendors), the World Congress demos worked smoothly and to an appreciative audience."

A speed zone alert appears on a cell phone.

SafeTrip-21

PATH's Networked Traveler demonstration bus was the centerpiece of the U.S. Department of Transportation's national unveiling of the first technologies it awarded a contract to under its SafeTrip-21 initiative, a federal program to support innovations that leverage current technology to make travel and transit safer and more efficient.

PATH's Jim Misener leads a SafeTrip-21 bus tour.

Submitted to SafeTrip-21 under a $13.4-million Caltrans-led public-private partnership, the PATH project was one of two ITS Berkeley research tracks to win federal support from the new initiative. CCIT's Mobile Millennium was the other ITS Berkeley research project on that contract, and also ran a public demo at World Congress.

The Networked Traveler

For the past four years, PATH has conducted extensive research using DSRC for vehicle-to vehicle and vehicle-to-roadside communications to increase safety and efficiency for travelers by providing information and situational awareness—a few key seconds of road, signage, or vehicle awareness that increase a driver's time window to react.

Spurred by SafeTrip-21, the researchers transformed their futuristic safety applications into a new, near-term vision for open-platform wireless applications—a single travel-information network.

Dubbed "The Networked Traveler," it incorporates existing technologies, including cell phones, 3G networks, and a DSRC gateway, and is accessible via any GPS- and wifi-enabled mobile phone or device with an Internet browser. The goal is to provide travelers with a menu of real-time transit and traffic information services—wherever they are

in their journeys.

A cell phone alert announces an upcoming street closure.

Under the SafeTrip-21 banner, PATH's World Congress demos featured a sampling of the services they are developing: Pedestrian alerts allowed slow-moving pedestrians to signal drivers to watch out; a work zone alert signaled phones on the demo bus to slow down for its approach to the cone area; centralized, real-time transit information helped virtual commuters meet their trains and buses on time; and smart parking simplified a modal switch by helping drivers find and reserve available parking in real-time.

Other items in the demo included updated travel time estimates, next-stop alerts, a hydrocarbon-savings calculator for transit riders, and speed zone and signal priority alerts for drivers.

The Networked Traveler's alert is projected on the 11th Avenue Theater video screen.

"It works like a social networking site for travelers," said Raja Sengupta, UC Berkeley professor of civil and environmental engineering and principal investigator on the project. "You put in only the information you wish to share, such as your position. You take out only what interests you."

Sengupta said typical commuters might use the smart parking feature to find a parking spot at the train station, the transit planner feature to see when their trains will arrive, and a next-stop alert to signal them as they approach their stop. People who exclusively drive or take transit would select from the services that suit their habits. "The key factor is that you personalize it for your own travel needs," Sengupta said.

Shahram Rezaei, senior researcher at PATH, and Sengupta are the lead authors of the paper presented at the conference, "Adaptive Communication Scheme for Cooperative Active Safety System."

Hundreds of conference attendees rode the demo bus over four days, including a congressional delegation and transportation officials from across the country, including Paul Brubaker, administrator of the U.S. DOT's Research Innovative Technology Administration.

In addition to California and federal DOTs and PATH, Networked Traveler partners include map giant Navteq, the Metropolitan Transit Commission (MTC), the Santa Clara Valley Transit Authority, and car maker Nissan. During the World Congress, Caltrans announced a new partner, Parking Carma.

Mobile Millennium at the World Congress

On the morning of November 18, a fleet of 20 cars traveling along a 10-mile loop in Manhattan gathered and broadcast real-time traffic information on side streets (arterials). "Traffic Pilot," the freely downloadable cell-phone software developed by the research team, and Nokia N95 "smart phones," were the drivers' only tools. The data was visualized on screens in the Navteq and U.S. DOT booths in the Javits Center.

CCIT's Mobile Millennium project, an ambitious pilot traffic-information system that uses measurements from mobile phones to glean real-time traffic conditions, also received SafeTrip-21 support under the $13.4 million Caltrans partnership. The system launched in the Bay Area on Nov. 10 with the availability of free cell-phone software for the public. The CCIT team traveled to the World Congress to deliver a first-of-its-kind live demo of arterial traffic information collection and dissemination using only data from cell phone probes.

"What started as a simple concept between J.D. Margulici and Alexandre Bayen has grown—in less than a year—to become one of the most watched ITS development efforts in the nation," said CCIT director Thomas West. Margulici is CCIT's associate director; Bayen is an assistant professor of civil

and environmental engineering and the principal investigator on the project.

"Such an aggressive program has required incredible hard work and sacrifice," West said, acknowledging the team that includes half a dozen Ph.D. candidates, several master's degree and undergraduate students, two post-doctoral researchers and several staffers from CCIT and the Institute of Transportation Studies.

How does it work?

CCIT's February 8, 2008 Mobile Century experiment, a UC Berkeley-Nokia research partnership supported by Caltrans, the National Science Foundation, the Center for Information Technology Research in the Interest of Society (CITRIS), and Tekes, a Finnish research institute, demonstrated that a small percentage of mobile phone-equipped vehicles traveling on highways provide enough data to reconstruct highway traffic very accurately.

The World Congress demo showed for the first time the technology's effectiveness on arterials.

As vehicles pass through the system's virtual trip lines—geographical markers defined by GPS coordinates—the phones send anonymous speed and location readings to servers at Berkeley and Nokia. The data is then integrated into traffic models that produce an estimate of traffic flow.

Those estimates are relayed back to the mobile phones, where they are visualized on maps as green, yellow, red, and black dots, respectively indicating fast, slow, congested, and stopped traffic, to guide users in their choices for navigating roads, or changing to transit.

Bayen says the first phase of the pilot system will focus on traffic data on Bay Area highways, with more highways coming online as more users sign up. By the end of the study researchers expect to have enough users to provide information on some arterial routes in the Bay Area and in Sacramento.

"The New York City demo was a public preview of the arterial traffic information we hope to provide to the early adopters who have downloaded our free software," said Bayen. "Our field testing so far has shown that we need only a very small percentage of users within a given set of coordinates to be able to predict traffic patterns with a very high degree of accuracy."

Just over a month into the launch, the software has been downloaded more than 3,000 times. Researchers will continue to make the free software available to the public through the spring of 2009, after which the team will evaluate the results and determine their next research priorities.

Juan-Carlos Herrera, a Ph.D. student in Berkeley's transportation engineering program, presented a paper at the World Congress on Mobile Century that briefly summarizes the main results of the Mobile Century experiment, in terms of data accuracy and system feasibility. A more thorough version of the paper is under review for publication in the journal *Transportation Research.*

Other related CCIT papers at the conference were presented by Margulici, and Ali Mortavi and Xuegang (Jeff) Ban.

Mobile Millennium is a joint project between CCIT, the Nokia Research Center in Palo Alto, and Navteq, a Nokia-owned corporation based in Chicago, with support from the U.S. DOT's SafeTrip-21 initiative and Caltrans. CITRIS provided seed money for the research and lent key support to the launch.

Sustainability and Intelligent Transport Systems

The institute's **Transportation Sustainability Research Center (TSRC)** also had a significant presence at the November conference. The TSRC team—co-directors Timothy Lipman and Susan Shaheen and senior researcher Caroline Rodier—collectively moderated four podium sessions and gave eight talks over three days.

Lipman moderated discussions about and spoke on electric drive vehicles, exploring the potential linkage among intelligent transportation systems (ITS), vehicles, and alternative fuels. The session examined how ITS may be used in future "smart grids" to link vehicles and electricity infrastructure for storing and selling energy.

Rodier presented her work on streamlining the parking process to meet the growing demand for parking at transit stations in urban areas. Her research investigated the potential of a smart-parking system to be deployed and tested in San Diego in the near future.

Shaheen spoke on eco-driving and CO_2 emissions, carsharing, and ITS for an aging America.

By some calculations, there will be more than 30 million "baby boomers" over age 65 in the United States, many of whom will require public transit and alternative mobility options. As the population ages, their transportation needs will shift. Shaheen's talk on transportation for an aging population focused on the key role ITS can play in extending safe driving years and providing specialized and innovative transport services.

Shaheen moderated and spoke on the growing popularity—and questionable accuracy—of carbon footprinting services. Traveler information services in Europe, America, and Asia-Pacific are increasingly expressing trip options in terms of their carbon contribution. Her session and talk addressed new laws and regulation, increased public awareness, and potential policy implications.

Shaheen also spoke on carsharing and CO_2 emission reduction. "My current research shows nearly 320,00 North Americans, living primarily in urban areas, have made the switch to carsharing," says Shaheen. "When you calculate how many personal vehicles carsharing takes off the road—between six to 10 private vehicles per carsharing vehicle—and reductions in vehicle miles traveled due to this alternative, it is possible to achieve notable emission reductions," said Shaheen.

As sustainability issues continue to be on top of our national and global agendas, Shaheen says TSRC's work to understand and improve the transportation sector's role will continue to grow. "That will involve maximizing our understanding of ITS, alternative fuel vehicles, human behavior, and the interaction among them," said Shaheen.

More papers, more awards

In addition to the research featured here, faculty, research staff, and students from the institute led or coauthored more than 30 papers presented at the conference.

The institute also came up more than once during the Best of ITS America Awards ceremony.

Mobile Century, the precursor to the Mobile Millennium project, was named Best New Innovative Practice.

CCIT, Caltrans, and Sensys Systems were recognized as participating agencies in the award of the Best New Innovative Product or Service for the development of the Sensys Wireless Vehicle Detection System.

ITS California, chaired by PATH's Jim Misener, won the Best Chapter Outreach and Education honors. "It was great for California and the institute that our leadership in intelligent transportation systems was so prominent at this major conference," Misener said.

—Ann Brody Guy

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Gender and Mobility: Clark University feminist-geographer Susan Hanson delivers Third Annual Martin Wachs Distinguished Lecture in Transportation

Clark University Professor Susan Hanson delivered a lively talk in Wurster Hall auditorium on October 17 to an audience of students, alumni, faculty, and guests. The third in the annual Martin Wachs Distinguished Lectures in Transportation, her talk, "Gender and Mobility: A Feminist Geographer's Perspective," doubled as a kick-off for the City and Regional Planning Department's 60th anniversary celebration.

The Martin Wachs Distinguished Lecture series, established in 2006 by a core group of Wachs's students to honor him upon his retirement, attracts provocative thinkers to address pressing issues in transportation. Wachs taught for 35 years at the University of California. A former director of ITS, he retired from Berkeley in 2005 and is now Director of the Transportation, Space and Technology Program at the RAND Corporation in Santa Monica.

Hanson opened with a telling story about one of the 19th century suffragette movement's iconic figures, Frances Willard of Evanston, Illinois, who, in 1895, published a book called *A Wheel Within a Wheel: A Woman's Quest for Freedom.* A best seller at the time, Willard tells the story about how she defied convention -- not to mention the long hoop skirts and binding corsets of her day -- and learned to ride a bicycle at the age of 53.

Willard's bike became an implement of her power and freedom, said Hanson, "offering an exhilarating feeling of liberation, which led to increased confidence, a sense of accomplishment, and expanded possibilities." With that nugget of truth, said Hanson, Willard put her finger on one aspect of an abiding interest in gender and mobility.

But, of course, that's only where Hanson's story begins. Hanson raised two related questions that she and others have pursued in their research: how do patterns of mobility or immobility create or disrupt gender norms? And the opposing query: How does gender shape mobility, or said another way adding a geographer's spin, how does gender shape geographic processes?

"It can mean access to opportunity, as it did for Willard. In some places, mobility is empowering quite simply because it's a way to leave the house and enter the public domain. This, in some incremental way, challenges gender power structures," she said, referring to a colleague's project carried out in 174 villages in norternh India in 2005.

This equation embodies the most common view of how mobility shapes gender. But there's another view to be reckoned with, said Hanson, who has written extensively on the role of gender and context in entrepreneurship, IT, and urban sustainability. "And that is that mobility is not necessarily empowering." What about women in the Bronx who travel long distances on public transit to get to low-wage jobs? Are these women mobile by choice or by constraint?

Hanson went on to discuss women's and men's differing spatial ranges—who drives longer distances to work, who works closer to home and why? What about travel habits outside work? And, as some studies suggest, how do race and ethnicity affect study results? You guessed it. The many variables— race, age, place, time, in other words, geographical and social context—can be significant enough to turn the first theorem of empowerment = mobility on its head.

"Mobility is about the individual embedded in and interacting with the household, family, community, and larger society. As geographers and planners, we know that context matters. All these matter in understanding how and why gender influences mobility." Hanson concluded with a plea for more research, specifically for "research that is place-based and context-sensitive, especially in the emergent area of sustainability science. Work that includes such context," she added, "must do so not in skeletal ways, but by making the relevant elements of place and context absolutely central to the analysis."

Comments from discussants Therese McMillan, Deputy Executive Direction of Policy at the Metropolitan Transportation Commission and Celia Kupersmith, General Manager and CEO of the Golden Gate Bridge, Highway and Transportation District followed, raising those policy, transportation, and quality of life-work issues that dovetailed with Hanson's closing statement made by Marty Wachs. "While many scholars write about the persistence of separate spheres in the workplace and the home,

few have recognized that this phenomenon is also pervasive in our highways and transit systems."

As the Q&A wound down, Wachs leapt to the microphone for some closing remarks. He got a laugh when he told a story about his father, who always washed the dishes at home in gratitude to his mother, but who, when asked by the young Marty, why his father always did the driving, was speechless. "And oh," he remarked, "did you know it's also the 60th anniversary of In-N-Out Burger?"

—Nancy Bronstein

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Climate Change and Congestion: 2nd Annual California University Transportation Centers-California PATH Conference, November 6-7, 2008

Coming two days after conclusion of the 2008 presidential race and Democrat Barack Obama's landslide victory, this year's California University Transportation Centers-California PATH conference indeed took place at the start of a "new era," as noted by **Lawrence H. Orcutt**, Chief of the Division of Research and Innovation (DRI) at the California Department of Transportation (Caltrans), which is a major supporter of both PATH and the UTCs.

Orcutt opened the conference, which was held at the Millennium Biltmore Hotel in downtown Los Angeles November 6-7, by observing that "people are looking to California" in this time of change in Washington and that California was well-equipped with research capabilities, given that it is home to California PATH (Partners for Advanced Transit and Highways) and five university transportation centers, supported by federal and state funds, the most in any state. The University of California Transportation Center, housed on the UC Berkeley campus, was the lead academic supporter, along with PATH, of the conference.

The annual conference, initiated last year, is intended to "link up researchers with practitioners," Orcutt explained. On the practitioners' side, some 200 people from Caltrans districts from all over the state, city and regional planning agencies and government agencies attended. On the research side, there were professors, researchers and graduate students from PATH, the UC campuses of Berkeley, Davis, Irvine, Los Angeles, Riverside and Santa Barbara, University of Southern California, California State University, Long Beach, San Jose State University and California State University, San Bernardino.

"Cities around the world are facing tremendous challenges related to traffic congestion and its impact on climate change, safety, quality of life and overall system performance," organizers noted in their overview of the conference. "This year's California Transportation Centers-PATH conference will tackle these critical issues through presenting new directions in congestion management research and practice. We will examine this topic from all angles — state-of-the art technology, finance, policy, planning, engineering, social and environmental effects, institutional barriers—and will draw from experiences in the United States and abroad."

S. Gail Goldberg, Director, Department of City Planning, City of Los Angeles, delivered the keynote speech. Hired two years ago to Los Angeles' top planning post after 20 years in San Diego, she said, "The challenge I was given, literally, was to change the culture of planning in this city," which is "very, very large" and located in a "mega-region."

"What do you think the biggest problem is?" she asked her audience. "Traffic." Then she asked, "How many of you drove here?," adding that "you may be embarrassed to admit it."
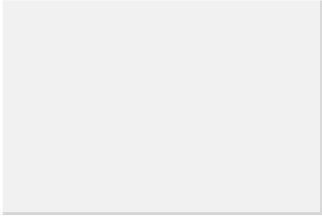
Calling Los Angeles "the last great unfinished city in our country," she said, "it has the potential to be the most walkable and livable." She outlined four initiatives that her department has devised in answer to the question "How can we re-form ourselves?" A recurring theme is that of sustainability, from "green" certification of new buildings, to walkability checklists for every new project. However, "the bottom line in every discussion is traffic."

Although Los Angeles is the most congested urban area in the country, she said, "we do not drive more" than people in many other large cities (it being in the top 14 metro areas). A number of indicators support that: "We are fifth in per capita vehicle miles traveled, fifth in household vehicle ownership, ninth in percentage of employees who drive alone to work," and with a high share of bus and transit.

She pointed to the passage two days earlier of Measure R, which imposes a half-cent Los Angeles County sales tax as proof that voters in the Los Angeles area are willing to pay for measures to ease congestion. In order to find the solutions, she called on each member of the audience of practitioners, researchers, students and professors, to "be a player" in the efforts to reduce congestion, ending with a borrowed line: "Together, yes we can."

The full program of the 2nd Annual California UTC-California PATH conference.

—Phyllis Orrick

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