News BITS Spring 2009, Volume 4, No. 3 ITS Berkeley

News from ITS

Cal Day 2009 Saturday
April 18: ITS Berkeley invites the University community, the general public, the transportation community, and prospective students to visit our Cal Day events and exhibits from across the Institute’s nine centers.

Longtime ITS Associate Edward Sullivan Dies: A UC Berkeley transportation engineering PhD (’71) whose association with ITS dates back four decades and included a stint as Assistant Director, he died last month from complications related to cancer. He was 64.

TSC Graduate Student Researcher Kitae Jang wins "Excellence in Applied HOV Research" award from the High-Occupancy Vehicle, High-Occupancy Toll, and Managed Lanes Committee of the Transportation Research Board.

Two Tech Transfer Publications Win Industry Awards

February 2: Alexandre Bayen wins National Science Foundation CAREER Award.

February 2: Arpad Horvath wins ASCE Walter L. Huber Prize.


Seminar March 6: "Improving the Performance of Transit Systems Taking Advantage of Automatic Data Collection Systems."

March 1: Robert Cervero

Q & A with Robert Cervero: UCTC’s new director talks about the future of transit-oriented development

Earlier this month, Robert Cervero, a professor of City and Regional Planning, assumed the directorship of the University of California Transportation Center (UCTC), a federally-funded research center established in 1987.

NewsBITS sat down with Cervero to ask him about joint land use and transportation, sustainable transportation, transit-oriented development, public-private partnerships, and the effect of new state legislation....

Robert Cervero, the new director of the University of California Transportation Center, discusses how to use market-based forces in undertakings such as transit-oriented land development to undo our enslavement to cars and rescue us from other perils of sprawl.

Transportation Dissertations at UC Berkeley: A 15-year Look Back

This 15-year retrospective of transportation-related dissertations reflects the changing themes in the Berkeley transportation research community. Ranging from 2008 back through 1994, it also shows how some themes persist or evolve over time....

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http://www.its.berkeley.edu/newsbits/spring2009/
officially succeeds Elizabeth Deakin as director of the University of California Transportation Center (UCTC).

Seminar February 27: "Congestion Pricing Initiatives in San Francisco: Forging the Path from Theory to Reality."

Seminar February 20: "The 21st Century Comes to California Transportation."

Seminar February 13: "Taxing for Takeoff: Incidences of Airport Taxes."

Seminar February 6: "Connecting the Roadside, Car and Traveler: Research in Technologies and Services."

Seminar January 30: "Assessment of mobile probe data and its use in traffic state estimation for highways."

Seminar January 23: "Recommendations for Federal Transportation Funding from the National Surface Transportation Infrastructure Finance Commission."

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Q & A with Robert Cervero: UCTC’s new director talks about the future of transit-oriented development

The new director of the University of California Transportation Center discusses how to use market-based forces in undertakings such as transit-oriented land development to undo our enslavement to cars and rescue us from other perils of sprawl.

Earlier this month, Robert Cervero, a professor of City and Regional Planning, assumed the directorship of the University of California Transportation Center (UCTC), a federally-funded research center established in 1987.

Cervero received master’s degrees in civil engineering and city planning from the Georgia Institute of Technology, and a PhD in urban planning from UCLA. He began teaching at UC Berkeley in 1980 where he is also the Director of the Institute of Urban and Regional Development. His area of expertise is sustainable transportation policy and planning. For the past five years he has been an instructor of transportation planning courses for the National Transit Institute and the World Bank Institute.

NewsBITS sat down with Cervero to ask him about joint land use and transportation, sustainable transportation, transit-oriented development, public-private partnerships, and the effect of new state legislation.

Q: How would you describe your research?
A: I focus on the relationship between cities and regions, transportation, travel behavior, more or less taking the perspective that the design of cities, where people live, work, shop really sets the stage for where people travel and how people travel. In many ways, if you want to get to the systemic nature of a lot of problems, such as congestion, air pollution, it’s centrally tied to how we organize and define our cities. So if there’s a lack of affordable housing near job centers, and if people are displaced way out in Livermore, you’re going to get very long commutes.

So you can simply treat transportation as a way to respond to the symptoms—such as congestion—and design and build more roads. But increasingly the evidence appears to me that in many ways this further spawns sprawl and many other problems.

Q: Where do the solutions lie?
A: Even though I have a master’s degree in engineering and planning, over time I have evolved away from focusing on technology and operations and supply side solutions to more broadly the notion that
how do we more resourcefully and sustainably design cities and regions. I would almost pitch it as a form of demand management. You can manage demand by pricing and parking policies and things like that, but you can also put people closer to jobs and shopping and walking and biking. It’s just another form of demand management.

Q: Not just sprawl, but energy use, congestion, greenhouse gas emissions, right?
A: Increasingly we’ve realized there are a lot of broader environmental benefits. It’s not just reducing congestion and emissions, we have problems of time pollution. We spend so much time traveling to and fro that people no longer have quality time to invest in their neighborhoods or their civic activities. They arrive home exhausted from their long commutes. Sociologists have tied this to social disaffect, where people sort of disassociate themselves from neighborhood affairs. So, I would suggest there are even more deeply-rooted problems associated with transportation problems.

Q: How does this relate to joint development—or integrating transportation and land-use planning?
A: I have long been a believer in mass transit simply because it is the most resourceful means of mobility. Transit, in my view, has always been a means of mobility we should be promoting and advancing. Of course, anyone who has spent time in Europe or in many other parts of the world, realizes what can happen if you carefully coordinate transit investment with urban planning. You get much more walkable, transit-friendly neighborhoods. A good share of trips can be handled more quickly, more efficiently, more economically, more resourcefully by transit.

Q: So you’re saying our system doesn’t work?
A: It’s not to say that our system is broken; a lot of people like the freedom and individualism of the private car. But I think the difference you find in Europe is that people do own cars, they’re just not enslaved to them for any and every trip. They’re much more judicious and selective when they use the car or don’t. So if you live in a place like Stockholm or Copenhagen, if you go into the central city, everybody takes transit. Stockbrokers, day workers, school kids, everyone. But for regional destination trips, shopping, sports events, or if you’re making a late-night trip or doing big volume shopping they drive. For a weekend excursion they drive. So they are not anti-car, but the cities are designed so that transit is a respectable option for many.

Q: You have done a lot of work in the area of transit oriented development, or TOD. Can you explain what that is and how it works?
A: The way I envisage TOD is as a compact, mixed use, walking-friendly development oriented around transit stations, mainly train stations. Ideally, these transit hubs become a focal point around which community planning and design is organized. It’s a centerpiece for the community that often includes a civic square, where people gather for celebrations, public events and holidays, and these public squares are ringed by day-to-day services and retail outlets so people can combine their transit trip with after-work shopping or a daycare center. They play a mobility function, but they’re also a way to organize community planning and development.

In better-planned TOD settings, these transit hubs are regional. The metaphor might be a string of pearls along a transportation corridor. You’d have a sort of low-density green space interspersed with these walkable, compact communities near transit.

I’ve devoted a lot of my research life studying all the benefits of TODs when they’re done well. Benefits from both the public side include a reduction in congestion, energy use, greenhouse gas emissions, as well as from the private side, the benefits that accrue to investors and households. You get premiums and healthier real estate markets, lower vacancy rates, higher occupancy rates and rent premiums. There’s a finite, limited supply of real estate like that and people will bid up the price for the privilege of living or running a business or having and office there. So it’s a good way to quantify the benefits of that.

Now, good planning around transit stations does not mean simply a good physical design. You have to deal with the social aspects of the community--recreational outlets, cultural attractions. In a sense, it’s community building, not just architecture. But if you use a transit station and do good quality community planning and design, you get significant land value returns.

Q: How does this relate to joint development?
A: I’ve long felt it is a mistake to let the private sector reap all the benefits of these land value gains that are created by public investment. These are, after all, taxpayer-financed, publicly-invested transit systems. The private sector should share, and by doing so could help fund all the community enhancements—libraries, city squares, and streetscape enhancements. So transit joint development is a way of capturing the value of the land around transit stations. It’s a way to return some of the benefits that are inferred by the public investments back to the public sector to help partly retire the bonds and costs of building the transit networks.

It’s very expensive to build transit. Heavy rail systems in the U.S. are easily $50 to $100 million a mile. But you can also generate funds to improve the public realm, the streetscape, all the civic attractions that make a fun and viable community.

Q: Some people say this is social engineering. How do you answer them?
A: It's really not social engineering. I would almost submit that most people who live in the suburbs are socially engineered: they have no choice but to drive. Their lifestyles are shaped by that one technology instead of choices. In a sense, we've engineered walking and biking out of day-to-day life. You go to many parts of Europe and you'll find 30 to 35 percent of trips are by bicycle. And we're nowhere near that.

For people who want more choices—and often these are young professionals without kids or empty nesters—they don't exist in many of our suburbs. What TODs can do is create more variety, diversity and choices, particularly in suburban environments where people can select and sort themselves into this type of neighborhood. They're going to pay more for housing, more per square foot, and they're going to give up some size, but they get a lot in return: better quality civic areas, nice walkable communities, and they don't have to fight traffic.

So anyway, it's not social engineering—it's market-based. I would say we have failed to deliver housing choices and neighborhood choices in many suburban environments. Most research suggests that 30 to 35 percent of newly emerging households in metropolitan areas would be receptive to TOD types of environments if given the choice. The problem is, they don't have the choice. In the suburbs you find transit stations surrounded by parking lots. These areas are unplanned, ugly, essentially dead. You can find housing near transit stations in Oakland, but they're not great environments either; there's crime, and people don't want to live there.

Q: So are there any good examples of TODs?
A: Yes, Washington, D.C., which gets us to the subject of public-private partnerships. The Washington Metropolitan Area Transit Authority began with a system of air right development and land leases. They acquired so much land at the time they began building their system—extra land, more than they needed—that they banked the land, and once the prices of land increased, they started leasing it. So they have a very active portfolio. They get roughly $250 million annually in lease revenues from private development around their transit stations. It's not a huge share of their total budget, only about 2.5 percent, but then again it's not inconsequential.

They have things like station connection fees, where at some stations there is a passageway going to a retail store. Here the retail will help pay for the passageway, but the retailers also share some of their gross revenues with the agency. The logic being you've got tens of thousands of transit riders walking through these retail outlets who otherwise wouldn't be buying purses and other things. So they managed to carve out revenue-sharing deals with the retailers.

Q: Have other transit systems tried this approach?
A: The Washington Metropolitan Area Transit Authority has been far more proactive than BART or any other transit system in this country, in good part because early on they set up a real estate development division within their agency and hired seasoned real estate professionals, paid them high salaries to go out and work deals. So they have been far more entrepreneurial.

If you look at a lot of transit agencies, I'd say BART is somewhat the same, their view of the world, their mission, so to speak, is, we're not here to mess around with real estate, we're here to run trains and buses on time. So they see real estate development as a distraction. To me that's wrong-headed. If you want to be a successful transit agency, running trains and buses on time is partly shaped by where the market demand is, and you can shape that market. You can work with the private development community to really steer lots of riders through your own transit stations and reap some large rewards.

Q: What about transit systems in other countries?
A: By far, the most progressive system has been Hong Kong's. Virtually two-thirds of the revenue which is generated by the transit system for Hong Kong comes from real estate development. The administrative region of Hong Kong provides the development rights at a cost prior to rail investment. Once the agency has these development rights, they tell the real estate development community, "We're going to extend the line and build a station here, and we want to lease or sell off this land around the station. You tell us what you'll pay." So they sell the development right to a real estate developer at the "with rail" price. That is, they purchase it pre-rail, then they say we'll build a station here and you tell us what you want to pay, and they take the incremental difference to pay for the rail.

So roughly two-thirds of the cost of these railway extensions is being covered. They're making profits—they're one of the few places in the world where the transit agency is actually making big profits.

In fact, they are not a public transit agency in the pure sense, they're sort of a quasi transit agency. The Hong Kong government owns two-thirds of the agency, and the other one-third is owned by private investors. They sell shares on the Hong Kong stock exchange, so they're accountable to investors for a return on investment and have to be much more entrepreneurial.

Q: You've been active in developing recent legislation, AB32 and SB 375, which would seem to open the doors wider to TOD and joint development, wouldn't it?
A: AB32 says that California is going to reduce by 2020 carbon dioxide levels to the 1990 levels, and Senate Bill 375 says that as part of the metropolitan planning process, cities, regions and counties have to develop regional transportation plans, which include sustainable community strategies, which
will help achieve these targets.

Among the strategies that you find in this initial legislation—and will see all the regions embracing—is more strategic development around transit stations and investment in transit. And the current estimates suggest you might be able to achieve roughly 10 percent of your target, just from land use and transit integration. I think if it's done well, and particularly if it is coupled with things like parking management, car sharing, and other demand management strategies you will get synergistic benefits. Instead of roughly a 10 percent contribution to cutting greenhouse gases, you might be able to see upwards of a 15 or maybe 18 percent rate. And that's an area of research I have been working on and am still working on.

Q: Are you applying the Hong Kong or Washington, D.C. model elsewhere?
A: We've done a lot of research, including a big report available on the Volvo Center website, and we're applying the Hong Kong model to China. As you know, China's cities are just growing incredibly fast, and they're building more rail miles than any place in the world—high-speed rail all over the country. So there are tremendous opportunities to use this model to help not only finance this rail, but to enhance the quality of urban development.

It's important because, unfortunately, the Chinese are committing all the mistakes and sins that we have—which lead to congestion and pollution. So I, and many others, have been trying to advance this idea of joint development and TOD in China because in truth, regardless of what Europe and the U.S. do to reduce greenhouse gases, those efforts will be swamped by what's happening in China.

Q: In your new position as director of UCTC, what type of projects will students be working on?
A: Faculty-led research proposals define the actual projects our students will work on, although there are also dissertation grants where students define the projects. Former directors, Betty Deakin, Marty Wachs (former ITS director), and the late Mel Webber have all held a broad notion of transportation, and I think what we're finding is that people who succeed in this field of transportation don't look at their role through a single disciplinary lens. They certainly focus on a field, but they're broadening their horizon. They're taking more planning and policy courses. They're taking courses that address sustainability and environmental issues. So they're a bit more generalist in nature, and they understand you have to tackle problems from multiple perspectives. And I think that's enriched our field. I think it's led to better thinking and better responses. So it's an exciting area.

Q: And relevant, especially now, yes?
Everything we face out there in our world, everything from how do we stimulate the economy by building bridges and roads to greenhouse gas and climate change policies and energy policies, sprawl, congestion and all of these dilemmas we're facing in our society are so tied to our field in transportation as well as to city and regional planning.

So it's an exciting time and a growth field. We need more and better and more energetic students. Our challenge from UCTC and pedagogically as a research center is to really nurture this.

For more information about Cervero's projects:


PDF of article
This 15-year retrospective of transportation-related dissertations reflects the changing themes in the Berkeley transportation research community. Ranging from 2008 back through 1994, it also shows how some themes persist or evolve over time.

Among the dissertations from 1994 to 1998 is a thesis addressing transit and housing density and how that relates to residents' satisfaction, evocative of today's discussions on transit-oriented development. Transportation finance, which is being hotly debated in Washington and elsewhere around the country, appears as well.

In the next five years, from 1999 to 2003, there are a number of dissertations on logistics and transportation systems, freeway traffic analysis, and travel behavior modeling. Transportation infrastructure is also a frequent theme, including models to better predict the need for repairs and investment.

In the most recent five years, there is the addition of a more global flavor, with studies of transportation systems overseas. Environmental impacts and sustainability are also frequent topics, and a number of dissertations address issues in aviation.

Many of these developments reflect the changes in ITS (the growth of our aviation unit, NEXTOR; faculty interest in systems and modeling; the recent emphasis on sustainability).

But a closer look will also reveal that the doctoral students of one year build on and are connected to the work of those who came before. As these documents become more easily accessible through Internet databases and repositories, it is hoped that this type of cross-fertilization will become even more common. That is part of the aim of publishing this list, complete with links.

A recent example of this process at work occurred with a 2008 dissertation, "Life-cycle Environmental Inventory of Passenger Transportation in the United States," by Mikhail Chester. Chester's thesis, posted online, was downloaded hundreds of times, including by a transportation faculty member at another university. This person, who had been a student of UCLA parking expert Donald Shoup, pointed Chester to additional information about parking facilities that would strengthen his arguments. Chester is developing a new paper for possible publication as a result of this new knowledge.

A few notes about methods and results

- These lists represent results of a number of different types of online searches. The dissertations are arranged in chronological order, more recent first, and by author last name, in three five-year periods.
- They are drawn from several different fields on the UC Berkeley campus, including transportation engineering, city and regional planning, transportation systems, and urban design.
- We have limited this list to dissertations that are available online from the Dissertations and Theses database hosted by ProQuest™, the ITS Publications Database, and the eScholarship Repository for ITS. We encourage you to contact us if you believe there is an online document that should belong in this collection.
- One final note: dissertations that are hosted on our local servers can be downloaded in their entirety by clicking on the link. Those that are hosted by ProQuest™ will be accessible in their entirety only to subscribers to that service.

THIS PAGE: Dissertations from present back to 2004.

Go to Dissertations from 2003 back to 1999.

Go to Dissertations from 1998 back to 1994.

2008-2004

2008

Life-cycle Environmental Inventory of Passenger Transportation in the United States, Chester, Mikhail Vin

The conditional nature of rail transit capitalization in San Diego, California, Duncan, Michael Douglas

Global visions and urban infrastructure: Analyzing the Bay Area Rapid Transit (BART) extension to San Francisco Airport (SFO), Mason, Jonathan Ian

Defining, measuring, and evaluating path walkability, and testing its impacts on transit users’ mode choice and walking distance to the station, Park, Sungjin

The transaction cost economics of highway project delivery; Design-build contracting in three states, Whittington, Janice Marie

2007

World port institutions and productivity: Roles of ownership, corporate structure, and inter-port competition, Cheon, SangHyun

Electric Two-Wheelers in China: Analysis of Environmental, Safety, and Mobility Impacts, Cherry,
Christopher Robin
Increasing mobility in cities by controlling overcrowding, Geroliminis, Nikolaos
Managing uncertainty in the single airport ground holding problem using scenario-based and scenario-free approaches, Liu, Pei-Chen

2006
Automation adoption and adaptation in air traffic control, Bolic, Tatjana Srdija
Airport and station accessibility as a determinant of mode choice, Clever, Reinhard
Environmental knowledge, environmental attitudes, and vehicle ownership and use, Flamm, Bradley John
A case study of pedestrian space networks in two traditional urban neighbourhoods, Hrushowy, Neil James
Uncertainty in infrastructure deterioration modeling and robust maintenance policies for Markovian management systems, Kuhn, Kenneth David
An analysis of HOV lanes: Their impact on traffic, Menendez, Monica
Stochastic-empirical-mechanistic models for infrastructure's crack initiation and progression: Application to pavements overlays, Nakat, Ziad Salim
Facility-level and system-level stochastic optimization of bridge maintenance and replacement decisions using history-dependent models, Robelin, Charles-Antoine

2005
Formation and spatial evolution of traffic oscillations, Ahn, Soyoung
Understanding and Mitigating Capacity Reduction at Freeway Bottlenecks, Chung, Koo-hong
The effects of teleshopping on travel behavior and urban form, Ferrell, Christopher Erin
The making and un-making of the San Francisco-Oakland Bay Bridge: A case in megaproject planning and decisionmaking, Frick, Karen Trapenberg
Crane double cycling in container ports: Algorithms, evaluation, and planning, Goodchild, Anne Victoria
Airline schedule recovery following disturbances: An organizationally-oriented decision-making approach, Huang, Sheng-Chen
The effects of fixed-route transit service contracting on labor, Kim, Songju
Investigation of conditions for moisture damage in asphalt concrete and appropriate laboratory test methods, Lu, Qing
Children's travel: Patterns and influences, McDonald, Noreen Cunniffe
System-level stability and optimality of decentralized supply chains, Ouyang, Yanfeng
Increasing Freeway Merge Capacity Through On-Ramp Metering, Rudjanakanoknad, Jittichai

2004
Equity analysis of freeway ramp metering, Benouar, Hamed
Hybrid models of traffic flow: Impacts of bounded vehicle accelerations, Laval, Jorge Andres
Integrated capacity management for time-differentiated transportation services, Li, Yuwei
Dynamic Stochastic Optimization Models for Air Traffic Flow Management, Mukherjee, Avijit
Deep Discount Group Pass Programs as Instruments for Increasing Transit Revenue and Ridership, Nuworsoo, Cornelius Kofi
Optimal Infrastructure System Maintenance and Repair Policies with Random Deterioration Model Parameters, Park, Sejung

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