



Year 15 (2002-2003)

Annual Report

For the

University of California Transportation Center

August 15, 2003

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ANNUAL REPORT

(August 1, 2002-July 31,2003)

University Transportation Centers Program
Region IX

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THE UNIVERSITY OF CALIFORNIA TRANSPORTATION CENTER: FIFTEEN YEARS OF ACCOMPLISHMENT

UCTC has just completed its 15th year; so it seems an appropriate time to assess our accomplishments. Clearly, our most important products have been transportation professionals. We've supported over a thousand students, nearly all of them now working for state and local transportation agencies and as transportation specialists in the private sector. We've helped educate over a hundred PhDs, many of whom are now transportation faculty members at universities across the US. And we've sponsored several dozen conferences, training sessions, and seminars for practicing professionals here in California and beyond.

UCTC has funded nearly 300 faculty research projects over the years. Many of these produced immediate benefits, while others laid the groundwork for substantial long-term gains. Here's a baker's dozen examples.

1. Professor Donald Shoup invented Parking Cash-Out, in which employers who pay for parking for their workers offer them the option of receiving the same amount in cash or in transit passes. Parking Cash-Out is now written into both state and federal law and has proved cost-effective in providing travel alternatives.
2. Professor Amelia Regan and her students developed a method for solving large intermodal fleet-routing problems in rail-maritime operations. In collaboration with the JB Hunt company, they have significantly reduced delays and costs without negatively affecting customer service.
3. Professor Anastasia Loukaitou-Sideris's research on bus stop crime helped allay fear that new transit lines bring crime into neighborhoods and prompted the Los Angeles County Metropolitan Transportation Authority to allocate over \$1 million to retrofit dangerous bus stops.
4. Professor Carl Monismith and his students developed new pavement materials and application strategies, including quick-dry pavements, saving highway agencies millions of dollars. Professor John Harvey, who worked with Monismith as a student at Berkeley, is now on the UC Davis faculty experimenting with using rubber tires and recycled materials in pavement.
5. Professor Michael McNally is testing the market potential for hybrid electric and fuel-cell engines. He is using a GPS-based vehicle monitoring system, developed in UCTC research, to track vehicle use.
6. Professors Robert Cervero, Paul Ong, Evelyn Blumenberg, and Brian Taylor completed a series of studies on reverse commuting and welfare-to-work, showing the diverse transportation requirements of low-income workers and the need for better service management. Their findings were cited in new federal policies and are being used by a new state coordinating committee.

7. Professor Daniel Sperling and his research team carried out a long line of projects on electric and hybrid vehicles, relating vehicle and fuel technology to market studies and organizational analyses. The work has led to testing of electric and hybrid cars and buses, as well as of fuel cells for auxiliary power in trucks.
8. Professor Kenneth Small's research on highway financing, pricing, and travel behavior has influenced federal and state decisions about congestion pricing and public-private transportation finance, including for the State Route 91 HOT lane – the first highway congestion pricing experiment in the US.
9. Professor Patricia Mokhtarian worked with California state agencies to evaluate their telecommuting programs, and found that the programs increased workforce productivity, reduced energy use and air pollutant emissions, and increased job satisfaction. Her findings led several agencies to make their programs permanent and expand them to additional workers.
10. Professor Reginald Golledge developed a real-time GPS data-collection system that can be augmented by speech interface, making the reporting of travel-survey data a simple task for anyone. He also developed ways to provide travel information to people with vision impairments.
11. Professor Samer Madanat developed methods for incorporating information on real-world performance and risk into transportation infrastructure management systems, making for investments that are more cost-effective with respect to maintenance, rehabilitation, reconstruction, and replacement of pavements and bridges.
12. Professor Steven Ritchie created a real-time system for incident detection that has been incorporated into the advanced traffic management system being used by Caltrans. Early detection of incidents is a key way to combat congestion.
13. Professor Theodore Cohn's escalator safety project investigated how people judge – or misjudge – distances to objects. Insights from that study and follow-on research led to improved railroad crossing signals, embedded pavement warning signals, and new warning signals for transit vehicles.

CENTER THEME AND ACTIVITIES

The University of California Transportation is the Federal Region IX University Transportation Center. Headquartered at UC's Berkeley campus, the UCTC supports transportation research, education, and technology transfer designed to advance the state of the art and the state of the practice of transportation. Researchers from any of the ten UC campuses are eligible to participate in UCTC, and researchers from other campuses outside the UC system may join us as research team members.

As it has done since the UCTC's inauguration, the California Department of Transportation (Caltrans) matched US Department of Transportation (US DOT) funds dollar-for-dollar. Although USDOT continued to apply RABA reductions to transportation center budgets, we received more funds than the year before, with a federal allotment of \$916,300. Doubled by our Caltrans match, the resulting budget of

\$1,832,600 allowed us to continue a vigorous program of research, education, and technical transfer activities. We did have nearly \$170,000 less than originally envisioned in our strategic plan, so we again restricted the size of faculty research grants and limited support for conferences and educational innovations. Also, we again delayed increasing our fellowship and dissertation grant funding, which remain at the same nominal levels we set for them over a decade ago. Nevertheless, through careful budgeting and many pro bono efforts of faculty, the UCTC community had a very good year. We thank our two sponsors for making our activities possible.

Highlights of the year included our several conferences and symposia. We continued our two annual conferences, the Lake Arrowhead conference on transportation, land use, and air quality connections, and the UCTC student conference, held this year at UCLA, where former Massachusetts Governor and AMTRAK Board member Michael Dukakis was the luncheon speaker and Prof. Sandra Rosenbloom of the University of Arizona was the dinner speaker. We also funded several symposia during the year, including the Art of Designing Freeways and Bridges, held at Berkeley in September 2002 and attended by over 200 practitioners, faculty members, and students. We funded fifteen new research projects and ten dissertation grants, and were pleased to see our faculty and students win a number of prizes for their work. In addition, we supported new or updated courses at the various campuses on topics ranging from intelligent transportation systems to transportation and the environment, and sponsored a number of seminars and lectures.

The UCTC administrator, Diane Sutch, continued to work with her counterparts in other units and on other campuses to assure the timely transfer of funds and submission of progress and expenditure reports. We continued to “borrow” staff from other campus units to help with accounting tasks and used students and contractors for publication and website services, thus keeping our administrative costs to a minimum.

Editors Mel Webber and Melanie Curry worked with the Berkeley Institute of Transportation Studies to expand the mailing list for our twice-yearly magazine ACCESS, to over 20,000 mail subscribers. With a much-improved web page and both ACCESS and many papers now available electronically, we are now getting over 20,000 website “hits” a year, with 5,000 ACCESS downloads and over 40,000 downloads of articles.

UCTC research focuses on the theme, “Transportation Systems Analysis and Policy.” The development of new methods and approaches for transportation forecasting and analysis, explorations of alternative policy approaches, and evaluations of existing policies and programs are examples of the kinds of projects that UCTC supports. Our researchers come from a variety of disciplines, including planning, engineering, economics, political science, policy studies, management, public health, environmental studies, geography, history, psychology, sociology, and the natural sciences. Increasingly, both our projects and the researchers themselves are multi-disciplinary. We emphasize surface transportation modes (highways, rail, etc.) rather than air or maritime transportation, but we support intermodal research involving the air and water modes if it has significant surface transportation components. Both passenger transport and freight transport topics are investigated through the UCTC.

All UCTC research grants are awarded through a process that relies on outside peer review. The process is highly competitive, as available funds are sufficient to cover less than half of the amounts requested. To handle the difficult process of project selection, we conduct a double-blind review of all proposals, then appoint a panel of outside experts who serve much the same function as an editorial board, advising the Director on the projects that appear most worthy of funding. The Director makes the final choices of projects with the advice of the Executive Committee.

UCTC not only carries out research but also contributes to transportation education. Our objective is to help produce a vibrant network of transportation professionals who will put their education and research findings into practice. Our students are the transportation leaders of the future. The UCTC supports these young transportation specialists through fellowship programs, course support, a competitive PhD dissertation grant program, and the research assistantships offered as part of faculty research projects. Fellowship and course support grants are available to students at the four campuses that have formal transportation programs - Berkeley, Davis, Irvine, and UCLA. Students from any of the UC campuses may apply for a dissertation grant and may work on a transportation project awarded to faculty member on their campus. In Year 15 we spent nearly half of our total budget on fellowships, dissertation grants, and related expenses. Student work on research projects brings the student share up to two-thirds of our total research budget.

The UCTC's technology transfer programs are aimed at communicating research results to a broad audience. Our web page provides information on our programs, summaries of our research, and electronic access to an increasing number of our publications. Free copies of all research papers funded by UCTC are provided to those who request them.. We distribute hard copies of our transportation magazine, ACCESS, which we publish twice a year. Many others read ACCESS in libraries and on the web. Our strong publications program is possible because of the talents of our two editors. Editor in Chief Melvin Webber, who is Professor Emeritus of City and Regional Planning, has a talent for identifying topics that are timely and apt. Both he and our Managing Editor, Melanie Curry, work closely with researchers to produce informative, readable articles, even on topics that are highly technical and specialized.

The substantial support we receive from the University of California and our faculty has made it possible to maintain a strong UCTC program. Substantial permanent financial support comes from the University for transportation research and education programs. The US DOT requires a \$200,000 commitment in regularly budgeted institutional funds for a university to be eligible for Center designation; even a fraction of the salaries and benefits for the full-time faculty members who conduct transportation research at Berkeley, Davis, Irvine and UCLA sums to an amount far in excess of the \$200,000 required. In addition, several permanently (separately) funded research institutes and academic departments administer individual UCTC research grants and fellowships. The Institutes of Transportation Studies at Berkeley, Davis, Irvine and UCLA and the Institute of Urban and Regional Development at Berkeley provide major assistance each year.

UCTC faculty and students also benefit from their access to University computer, data, and library resources. Of particular note is the Library of the Institute of Transportation Studies, which was established in 1948 and is supported with Caltrans funds allocated through a direct line item in the state budget. The resources of the library are available to faculty and students on all campuses. Each year we sponsor an annual visit to each of the four main UCTC campuses by Librarian John Gallwey, as a way of introducing new students to library holdings and services.

As my introductory statement illustrates, in our fifteen years as the Region IX university transportation center the University of California Transportation Center has been productive and innovative. Our research has paid off in better transportation methods and products. Our faculty members serve as senior advisors to government. Our graduates are working throughout the US as well as in California: Over 50 are now faculty members at major universities; two are deans, and hundreds work in private transportation firms, for consultancies, and for government. We look forward to still more productive research, education, and outreach in the years to come.

--- Elizabeth Deakin, Director

MANAGEMENT STRUCTURE AND CENTER STAFF

The University of California Transportation Center is headquartered on the Berkeley campus of the UC system. Center personnel include a half-time director who also is a faculty member, plus a small administrative and editorial staff. Direction for the UCTC comes from a faculty Executive Committee drawn from several campuses of the UC system. Coordination with other California Transportation Centers and with our Caltrans sponsor takes place through meetings held three times a year (once at each of the three California UTCs.) The UCTC also draws upon a variety of institutional resources at participating campuses, including the administrative services of researchers' academic departments and research institutes, whose support is donated.

Center Director

Professor Elizabeth Deakin of the Dept. of City and Regional Planning at UC Berkeley is the UCTC Director, a position she has held since March 1999. Prof. Deakin has been a member of the faculty at the University since 1985 and has had additional affiliations with the Civil Engineering, Urban Design, and Energy Resources groups for much of that time. Her interests include transportation and land use, transportation policy, and the social, economic, and environmental impacts of transportation. She has conducted research with ITS, PATH, and IURD as well as with the UC Energy Institute and the UC Policy Center. She has served on the UCTC Executive Committee since its inception and previously was a member of the ITS and IURD executive committees. She was acting director of the IURD in 1997-98. In addition to teaching at Berkeley, she taught for a year at UCLA in 1992-93. Before joining the Berkeley faculty she was a lecturer (part time) at Stanford. Her familiarity with the University and the UCTC's partners facilitates her management of the UCTC.

Executive Committee

The UCTC Executive Committee is a faculty committee that sets the overall policy direction for the Center and assures coordination with the major transportation research and education groups on the various campuses. Members of the UCTC Executive Committee volunteer significant amounts of time to the Center. They meet in person at least once a year, and transact business in the interim through telephone conference calls and e-mail.

The Executive Committee consists of the UCTC Director, the directors of the four Institutes of Transportation Studies or their representatives, the director of the Institute of Urban and Regional Development or her representative, and faculty representatives of the major transportation degree-granting programs in the UC system. This representative membership facilitates information exchange about education programs, recruiting, and other academic matters and aids in the coordination of research among the campuses and research units. Members of the Executive Committee for 2002-2003 were:

Marlon Boarnet, Assoc. Prof. of Urban & Regional Planning, UC Irvine

Robert Cervero, Prof. of City & Regional Planning, UC Berkeley

Randall Crane, Assoc. Prof. of Urban Planning, UC Los Angeles

Elizabeth Deakin, UCTC Director, Assoc. Prof. of City & Regional Planning, UC Berkeley

Robert Johnston, Prof. of Environmental Science & Policy, UC Davis

Charles Lave, Prof. Emeritus of Economics, UC Irvine

Samer Madanat, Prof. of Civil & Environmental Engineering, UC Berkeley

Patricia Mokhtarian, Prof. of Civil and Environmental Engineering, UC Davis

Will Recker, Director, Institute of Transportation Studies, UC Irvine

Amelia Regan, Asst. Prof. of Civil & Environmental Engineering, UC Irvine
Daniel Sperling, Director, ITS Davis
Brian Taylor, Asst. Prof. of Urban Planning, UC Los Angeles
Martin Wachs, Director, Institute of Transportation Studies, Berkeley
Michael Zhang, Assoc. Prof. of Civil and Environmental Engineering, UC Davis

The Executive Committee is responsible for establishing the theme for the Center and reviewing it from time to time, allocating funds among research, education, and technology transfer programs, determining subject matter priorities for research funding, setting rules for allowable expenditures on research projects, and making final recommendations on research awards. In addition, the Executive Committee conducts an annual review of the Center's overall performance and resources, and redirects funds allocations and activities as necessary. When the Directorship of the UCTC becomes vacant, the Executive Committee conducts the search and recommends a Director to the Office of the President of the University, which so far has always acted favorably on the Executive Committee's recommendations.

The Executive Committee's time is donated.

Center Faculty

Faculty affiliates of the UCTC include individuals throughout the UC system who participate in the research, teaching, and continuing education programs funded by the UCTC. We maintain contact with our faculty affiliates by inviting them to participate in our research, education, and technology transfer programs, by coordinating UCTC research with other research activities these faculty members are conducting, and by providing them with publications and other information services. Table 1 lists current faculty affiliates. The list is updated annually and is posted on the UCTC website, www.uctc.net, with full addresses, telephone and fax numbers, and email addresses.

Staff

The UCTC staff currently consists of the director (half time) plus one administrative staff member at 80% time, a part time student assistant, and a half time staff editor, plus an emeritus faculty member who is paid a nominal sum for his time as editor of ACCESS. The staff members in 2002-2003 were:

Elizabeth Deakin, Associate Professor of City and Regional Planning, Director (half time)

Diane Sutch, Administrator. Ms. Sutch handles budgets and administration for the Center.

Melanie Curry, Editor (half time). Ms. Curry is the managing editor responsible for ACCESS, UCTC's twice-yearly magazine.

Melvin Webber, Professor Emeritus of City and Regional Planning, UC Berkeley and former Director of UCTC. Prof. Webber was the creator of ACCESS magazine and serves as its editor in chief.

Eric Nakajima (Fall) and **Paul Nguyen** (Spring), student assistants (25-50% time), handled publications requests.

We obtain website and computer assistance as well as publications design work on a contract basis. We also contract with the UC Berkeley Institute of Urban and Regional Development and the Institute of Transportation Studies to provide assistance with purchase orders, travel accounting, and ACCESS mailing list updates, allowing us to operate without additional administrative staff.

Table 1. UCTC Faculty Affiliates

First Name	Last Name	Address	City / Campus
Matthew J.	Barth	Ctr. for Environmental Research	Riverside
Antonio M.	Bento	Donald Bren School of Env. Sci. & Mgmt.	Santa Barbara
Evelyn	Blumenberg	Urban Planning	Los Angeles
Marlon G.	Boarnet	Urban and Regional Planning	Irvine
Peter C.	Bosselman	Dept. of City & Regional Plan.	Berkeley
David	Brownstone	Economics	Irvine
David	Bunch	Management	Davis
Andrew F.	Burke	Transportation Studies	Davis
Michael J.	Cassidy	Civil & Environmental Engineering	Berkeley
Robert	Cervero	City & Regional Planning	Berkeley
Ted	Chang	Civil & Environmental Engineering, UC Davis	Davis
Karen	Chapple	City & Regional Planning	Berkeley
Ted	Chira-Chavala	ITS Extension - 452 RFS	Berkeley
William A.V.	Clark	Geography-1255 Bunche Hall	Los Angeles
Linda	Cohen	Dept. of Economics	Irvine
Theodore E.	Cohn	Optometry	Berkeley
Randall D.	Crane	Lewis Ctr. for Regional Studies	Los Angeles
Carlos	Daganzo	Civil & Environmental Engr.	Berkeley
Joy	Dahlgren	PATH-RFS Bldg. 452	Richmond
Kristen	Day	Urban and Regional Planning	Irvine
Karen K.	De Valois	Psych., Vision Sci. & Optometry	Berkeley
Elizabeth A.	Deakin	City and Regional Planning	Berkeley
Mark A.	Delucchi	Environmental Studies	Davis
Joseph	DiMento	Urban and Regional Planning	Irvine
Michael	Disch	Psychology	Berkeley
Harry A.	Dwyer	Mechanical & Aeronautical Engineering, UC Davis	Davis
Bryan	Ellickson	Dept. of Economics	Los Angeles
Wm. Ronald	Fawcett	Chemistry, UC Davis	Davis
Robert	Feenstra	Economics, UC Davis	Davis
J. Gordon	Fielding	Social Sciences	Irvine
Mark	Francis	Environmental Design, UC Davis	Davis
Andrew	Frank	Mechanical & Aeronautical Engineering, UC Davis	Davis
William L.	Garrison	Civil & Environmental Engineering	Berkeley
Bruce C.	Gates	Chem. Engineering & Mtrl. Science, UC Davis	Davis
David	Gillen	Inst. of Transportation Studies	Berkeley
Amihai	Glazer	Economics	Irvine
Steven	Goldman	Economics	Berkeley
Reginald G.	Golledge	Geography	Santa Barbara
Thomas	Golob	Transportation Studies	Irvine
Joanna R.	Groza	Chem. Engineering & Mtrl. Science, UC Davis	Davis
Judith	Gruber	Political Science	Berkeley
Peter	Hall	Urban and Regional Development	London
Susan	Handy	Environmental Science and Policy	Davis
Michael	Hanemann	Agr. & Res. Econ.	Berkeley

Table 1 cont.

Mark	Hansen	Civil Engineering	Berkeley
Robert	Harley	Civil Engineering	Berkeley
John	Harvey	Civil and Environmental Engineering	Davis
J. Karl	Hedrick	Mechanical Engineering	Berkeley
Wolfgang	Homburger	Inst. Transp. Studies	Berkeley
Arpad	Horvath	Civil & Env. Eng.	Berkeley
Linda	Howe-Steiger	ITS Extension - 452 RFS	Richmond
Judith	Innes	City and Regional Planning	Berkeley
Allan B.	Jacobs	City and Regional Planning	Berkeley
R.	Jayakrishnan	Civil Engineering	Irvine
Bryan M.	Jenkins	Bio. & Ag. Engineering, UC Davis	Davis
Robert A.	Johnston	One Shields Ave.	Davis
Adib	Kanafani	Chair, Civil & Environ. Engr.	Berkeley
Dean	Karnopp	Mechanical & Aeronaut. Engr.	Davis
Ryuichi	Kitamura	Transp. Engr., Davis (Prof., U Kyoto)	Davis
Michael	Kleeman	Civil & Environmental Engineering, UC Davis	Davis
Daniel B.	Klein	Dept. of Economics	Irvine
Jess	Kraus	Public Health-Epidemiology	Los Angeles
Kenneth	Kurani	Inst. Of Trans. Studies, Davis	Davis
John	Landis	City & Regional Planning	Berkeley
Charles A.	Lave	Dept. of Economics	Irvine
Robin	Liggett	Urban Planning	Los Angeles
Anastasia	Loukaitou-Sideris	Urban Planning	Los Angeles
John	Lysmer	Civil Engineering	Berkeley
Elizabeth	Macdonald	City and Regional Planning	Berkeley
Samer	Madanat	Civil & Environmental Engr.	Berkeley
Michael G.	McNally	Civil & Environ. Engineering	Irvine
James A.	Misener	PATH	Berkeley
Patricia	Mokhtarian	Civil & Environmental Engineering	Davis
Deb	Niemeier	Dept. of Civil & Environmental Engineering	Davis
Raymond W.	Novaco	Social Ecology	Irvine
Paul	Ong	3250 Public Policy Bldg.	Los Angeles
Christos	Papadimitriou	Computer Science - 689 Soda Hall	Berkeley
Nadesan	Permaul	Parking and Transportation	Berkeley
Steven C.	Pitts	Center for Labor Research and Education	Berkeley
John M.	Quigley	Public Policy	Berkeley
John	Radke	Landscape Department	Berkeley
David R.	Ragland	Public Health	Berkeley
Steven	Raphael	Public Policy	Berkeley
Will	Recker	Institute of Transportation Studies	Irvine
Amelia	Regan	Inst. of Transp. Studies	Irvine
Stephen G.	Ritchie	Chair, Civil & Environ. Engr.	Irvine
David M.	Rocke	Management	Davis
Paul A.	Ruud	Economics	Berkeley

Table 1 cont.

Paul	Sabatier	Environmental Studies	Davis
Robert F.	Sawyer	Dept. of Mech. Engr.	Berkeley
Allen J.	Scott	Urban Planning	Los Angeles
Steven	Shladover	Deputy Dir., PATH-RFS Bldg. 452	Richmond
Donald C.	Shoup	Institute of Transportation Studies	Los Angeles
Alexander	Skabardonis	Department of Civil Engineering	Berkeley
Kenneth A.	Small	Dept. of Economics	Irvine
Michael	Southworth	City and Regional Planning	Berkeley
Robert C.	Spear	Public Health -EHS	Berkeley
Daniel	Sperling	Institute of Transportation Studies	Davis
Aaron	Steinfeld	PATH	Berkeley
Michael A.	Stoll	Policy Studies	Berkeley
Jayashankar	Swaminathan	Haas School of Business	Berkeley
Brian D.	Taylor	Urban Planning	Los Angeles
Thomas	Turrentine	UC Davis - ITS	Aptos
Karen	Valois	Psychology	Berkeley
Kurt	Van Dender	Economics	Irvine
Pravin	Varaiya	EECS - 271M Cory Hall	Berkeley
Steven A.	Velinsky	Mech. & Aero. Engineering, UC Davis	Davis
Martin	Wachs	Institute of Transportation Studies	Berkeley
Melvin	Webber	UC Transportation Center	Berkeley
Margaret	Weir	Sociology	Berkeley
Anthony	Wexler	Mech. & Aero. Engineering, UC Davis	Davis
Arthur	Winer	Public Health	Los Angeles
Candace	Yano	Chair, Ind. Engr. & Oper. Res. (IEOR)	Berkeley
YB	Yim	PATH Program	Richmond
Carol	Zabin	Center for Labor Research and Education	Berkeley
H. Michael	Zhang	Civ. & Environ. Engr.	Davis

Updated 7/31/02

Institutional Support

The UCTC depends upon the support of several academic departments and research institutes for most of its day-to-day operations. The departments and research institutes manage education grants, fellowship funds and research grants, and contribute the office and laboratory space, instructional facilities, computational equipment, accounting services and other administrative support needed to carry out these programs and activities. Most of this support is provided without charge. In addition, the University provides administrative services, but does not charge overhead on the portion of funds used for fellowships. To date the University also has waived overhead on matching funds from Caltrans, recognizing that Caltrans UCTC's administration and that Caltrans does not control the research agenda . It is only because the UCTC can rely on these university resources that we are able to devote most of our funding to the direct costs of research, education, and technology transfer.

The University also provides resources in the form of access to data centers, computer facilities, and libraries. The University is a federal data repository and has developed extensive capabilities to support the efficient retrieval and analysis of information from a variety of sources. A US Census Center at UC Berkeley makes this important data source far more accessible. Our computer facilities include advanced software for modeling, analysis, and data display. A major resource is the University of California library system. We are especially proud of the Harmer E. Davis Library of the Institute of Transportation Studies at Berkeley, which houses one of the largest collections of transportation materials in the world and provides a wide range of support services to UCTC faculty and student researchers on all campuses. ITS also provides publicity for UCTC events.

Faculty members' time commitments to research projects are another highly valuable resource provided to the UCTC. Faculty members typically hold nine-month (academic year) appointments that are fully funded by the University. They are expected to spend a substantial portion of this University time on research. Consequently, UCTC faculty grant recipients typically devote a third or more of their time during the academic year to their research projects. The UCTC itself funds only a portion of their summer salaries. For the past several years we have limited faculty payment on UCTC research to one summer month as a way of stretching our dollars and compensating, in part, for the RABA reductions in federal funds (and consequent loss of part of our state matching funds.) The UC-funded time on research multiplies the UCTC's salary support for research by a factor of three or four. Likewise, students with fellowships from the University, from NSF, and from a variety of other sources often participate in UCTC projects without being paid with UCTC funds.

Participation in the governance of the UCTC is a second way that faculty time is donated. Indeed, the willingness of faculty members and others to provide these services is critical to the Center's mode of operation. Faculty members serve on the Executive Committee, on committees that review fellowship applications and dissertation grant proposals, and on ad hoc committees formed to develop conferences, workshops, and other outreach activities.

California University Transportation Centers Coordinating Committee

Two other University Transportation Centers have been established in California, the Norman Y. Mineta International Institute for Transportation Policy Studies (the Mineta Center) at California State University, San Jose, and METRANS - the Center for Metropolitan Transportation Studies at the University of Southern California in Los Angeles. These two centers, like UCTC, receive matching support from Caltrans. To coordinate our efforts, the Center Directors and key administrators meet together with Caltrans staff three times a year, with the meeting location rotating among campuses.

ACCOMPLISHMENTS: EDUCATION, RESEARCH, TECH TRANSFER

Education Programs

Formal programs and concentrations in transportation are offered by the Berkeley, Davis, Irvine, and UCLA campuses' civil engineering, city and regional planning, economics, and public policy departments. Additional courses with significant transportation content are offered in other departments at these universities and at other campuses of the UC system, including Riverside, Santa Barbara, and San Diego. Computer science, energy resources, environmental studies, management, geography, political science, law, economics, sociology, mechanical engineering, electrical engineering, chemical engineering, operations research, architecture, landscape architecture, and urban design now include transportation topics in one or more courses, reflecting the increased faculty interest in transportation largely generated by the UCTC.

As a research unit, the UCTC does not itself offer courses, admit students, hire faculty, or award degrees; instead, we provide support to the academic departments and units that do carry out these functions in the UC system. This support is available both as direct funding for courses and through research opportunities, as many students receive course credit for participation in UCTC-funded faculty projects.

Course support may be requested by any campus offering a transportation degree or specialization. Faculty applications for course support are reviewed and approved by the Director, and may be for specialty courses, the development of a new course intended to become part of the curriculum, or the refinement or significant update of an existing course. In 2002-3, UCTC funding supported the refinement of new courses on transportation and the environment at UC Irvine, the refinement of a graduate course on Intelligent Transportation Systems and an undergraduate course on transportation planning at UC Berkeley, the initiation of an undergraduate seminar at UCLA, and the offering of specialty seminars and short courses at UC Davis.

Graduate Programs

Ten formal degree graduate programs or concentrations in transportation are now offered in the UC system, with three each at Berkeley, Davis and Irvine, and one at UCLA. The civil and environmental engineering departments at Berkeley, Davis, and Irvine offer transportation engineering degrees. Programs in transportation planning and policy are offered at Berkeley, Davis, Irvine, and UCLA, and a concurrent degree program in transportation engineering and planning is also offered at Berkeley. At Irvine, the Department of Economics administers an interdisciplinary doctoral program in transportation science. Davis has recently established an interdisciplinary program in Transportation Technology and Policy.

The campuses have slightly different program emphases. The Davis transportation engineering program provides a focus on energy and air quality, and Irvine and Davis both emphasize demand analysis and travel behavior. Irvine also has an especially strong program in transportation economics. The Berkeley transportation program has strong offerings in traffic operations, logistics, systems analysis, and transportation science; Berkeley also has extensive offerings in transportation, land use, and urban design. UCLA is developing a specialty in equity and the transportation needs of low-income communities.

Each of the campuses continues to maintain and improve their transportation programs, and to add new course offerings and programmatic specialties as opportunities arise. At Berkeley, a proposal to establish a new interdisciplinary Metropolitan Studies program was approved, with faculty from planning,

engineering, and political science and sociology all playing a major role. Transportation education will be a significant focus of this new initiative when it gets underway (with 4-5 new faculty hires over the next several years.)

While the other UC campuses do not have formal transportation programs, several campuses do offer courses and research opportunities in transportation. In particular, both UC Santa Barbara and UC Riverside have added transportation content to degree programs and to courses over the past several years.

Undergraduate Education Programs

UCTC funding for undergraduate education at the various campuses has continued to be focused on the development of new transportation courses. Undergraduate transportation courses offered with UCTC sponsorship have been well subscribed and well received, and have helped to spark interest in careers in transportation. A number of the undergraduates from these courses enroll in graduate transportation programs at UC or other top transportation programs.

During Year 15, the UCTC supported a new undergraduate transportation planning course at Berkeley and provided assistance to student recruitment efforts on all the campuses. The Berkeley campus approved an undergraduate urban studies major, which will include transportation courses. However, the more extensive undergraduate programs on all campuses proposed in our strategic plan again had to be postponed because of the reduction in federal funds.

Continuing Education

Transportation courses and other education and training opportunities are offered through the ITS Extension (which operates statewide) and the Extension programs of the various campuses. These courses reach transportation professionals and others who need a better understanding of transportation to effectively carry out their work in fields such as air quality planning and land use planning. UCTC research is frequently included in short courses offered by the University Extension. The UCTC actively encourages researchers to participate in these activities and provides support for them to do so, to the extent that resources permit. In Fall 2002, several UCTC faculty affiliates, including Professors Martin Wachs, Brian Taylor, Elizabeth Deakin, and Randall Crane, participated in the transportation conference held at Lake Arrowhead, California, in cooperation with the UCLA Public Policy Extension and Caltrans. The conference was so well received that, at the request of East Coast participants, it was repeated for a Washington, DC audience in June 2003.

Fellowships

US graduate students in the Berkeley, Davis, Irvine and UCLA transportation programs are eligible for UCTC fellowships, which provide support for university fees and living expenses and may be combined with part-time research appointments. Academic departments nominate the students on the basis of grades, test scores, letters of recommendation, and record of accomplishments. Students must demonstrate that they have an exceptional record and outstanding potential for a career in surface transportation to receive a UCTC fellowship. Overall fellowship funding is coordinated through the departments in accordance with University and departmental rules to assure an equitable distribution of financial support for top students, so that a student who is offered a transportation fellowship from another program is generally not awarded full UCTC funding.

In 2002-2003, the UCTC provided \$460,000 in graduate student fellowships at the Berkeley, Davis, Irvine, and UCLA campuses. This accounted for about 35% of the total UCTC budget.

Graduate Student Research Appointments

Graduate student research appointments accounted for about 30% of the total UCTC budget in 2002-2003. Funding cuts necessitated the imposition of a general limitation on research project support for graduate student researchers (GSRs) to one half-time position per research project. Because some projects were carried over from the previous year and some students worked less than half time, we were able to support some 50 students as GSRs.

GSRs are considered to be junior colleagues of the principal investigator and other faculty participants and often play a major role in the actual conduct of the research. Graduate student contributions to research projects are acknowledged in any publication resulting from research funded in whole or in part by the Center. The acknowledgment can range from a footnote recognizing the student's participation and assistance to full co-authorship of reports and articles, depending upon the nature and extent of student contributions.

Doctoral Dissertation Grants

Each year, the UCTC offers ten doctoral dissertation grants of \$15,000 (plus indirect costs if applicable). Applicants must be students at the University of California and must be carrying out dissertation research on transportation topics consonant with UCTC's theme of systems analysis and policy. Applicants must have advanced to candidacy for the Ph.D. degree prior to the application deadline and must submit a brief synopsis of their dissertation proposal for review, along with a curriculum vita, graduate school transcripts, and a letter of nomination from the student's principal academic advisor.

The pool of applications is reviewed by a committee of faculty and/or recent PhDs from several UC campuses, appointed by the UCTC Director. Grants are awarded on the basis of reviewers' assessments of the originality and significance of the research topic, the applicant's overall record of academic and professional accomplishment, and the relevance of the research topic to current issues in transportation policy. Applications for the grants are due April 1 for funding the next fall, and November 1 for funding in the winter/spring term. The RFP for dissertation grants is maintained on the UCTC website, and notices of impending due dates are sent to faculty associates for distribution.

The dissertation grant abstracts are listed on our website along with faculty research projects.

Student of the Year

Each year UCTC Executive Committee members choose a Student of the Year, who is awarded \$1000 and the costs to attend the award ceremony held during the annual meeting of the Transportation Research Board (TRB) in Washington, DC each January.

Pablo Durango-Cohen won the UCTC's student of the year award for 2002-2003. Durango-Cohen, who received his Ph.D. in Civil and Environmental Engineering from the University of California, Berkeley, is now the Louis Berger Junior Assistant Professor of Civil Engineering at Northwestern University.

He wrote his dissertation on the development of infrastructure management policies in cases where a decision-maker either lacks a performance model or has access to several competing models. Prof. Samer Madanat was his thesis adviser.

Tracking Alumni

During the 2002-2003 academic year, in consultation with administrators at the degree-offering departments at the four campuses, we continued to develop our system for tracking transportation students and alumni in programs on the four campuses that grant transportation degrees, and expanded the system to transportation alumni from other UC campuses. The tracking system was co-funded by the UC Office of the President and the UCTC and was developed under the direction of Lyn Long of the UC Irvine campus. The website, which continues to be refined, can be found at <http://transalum.its.uci.edu/>

Research Programs

Research grants to faculty and PhD candidates total to about 45 percent of the UCTC's budget. Hence, a substantial portion of the UCTC's work is devoted to the solicitation of research proposals, proposal review, selection of projects, and performance monitoring. In Year 15 we again maintained a high level of interest in our program, as indicated by the 35 faculty proposals and 25 PhD dissertation grant applications received.

The research funded by the UCTC must respond to the Center's theme, transportation systems analysis and policy. The UCTC Director and Executive Committee annually review our research selection procedures to evaluate their objectivity and fairness, and make adjustments as appropriate. We also meet to discuss our theme and the scope and mix of the projects we are funding, and from time to time issue special calls for research on particular topics to improve the overall balance and policy relevance of the UCTC research program or to respond to particular concerns of the state DOT or MPOs.

The UCTC's success in research relies upon a carefully managed solicitation and project selection process, designed to support creative and innovative work on a variety of topics relevant to current and emerging policy needs, and to communicate our results to a broad audience. The process for dissertation research grants was described under the educational programs. For faculty research, the general procedure for project awards is as follows.

Research Solicitation Process

UCTC makes research project awards either to individuals or to teams of researchers. The Principal Investigator must be a faculty member within the UC System; researchers from universities outside the University of California may be included through a subcontract with the PI's campus.

The UCTC request for proposals (RFP) is maintained on our website. About two months before proposals are due, we send an email notification to faculty members on our associates list as well as to deans, department heads, and research directors for circulation to their faculty. The deadline for faculty proposals is Feb.1 of each year.

Each proposal must be prepared in two parts. Part A is a description of the proposed research. Part B includes the vita of the principal investigator, a summary of accomplishments from the applicant's past UCTC research grants (if any), including a list of working papers and other publications produced, and a

statement identifying any research funding from other organizations for work on the topic of the proposal. (Multiple sponsors are encouraged, as they expand the feasible scope of the research that can be supported with UCTC funds.) An itemized budget is also included in Part B.

Due to funding reductions, budget restrictions have been in place since 1999-2000. Summer salary for faculty is limited to one month and most projects are limited to one graduate student researcher or undergraduate intern for the academic year. Costs of supplies, postage, computer expenses, travel, etc. are limited to \$1500 unless additional, itemized expenses were justified as necessary for the conduct of the research. Secretarial and clerical support services are not allowed

The 35 proposals received in response to the Year 15 RFP came from five UC campuses and 15 departments.

Proposal Review Process

All faculty research proposals undergo confidential external review by university researchers and practicing professionals in the field of transportation. The UCTC Director selects three or four persons to review each proposal; three completed reviews are required for each proposal. Additional reviewers are sought if those initially contacted are unable to complete their reviews in a timely fashion.

Reviewers are chosen based on their expertise with the subject matter of the proposal. They are drawn from universities, the US DOT, other federal agencies, Caltrans, other state agencies, regional agencies, local government, research groups, foundations and private organizations. This year 110 individuals served as reviewers for the Year 15 grant cycle, with 50 from universities, 25 from private firms, 10 from Caltrans, and 25 from other government agencies.

External reviewers were asked to consider the following in their written evaluations:

- Extent to which the proposed research is original or creative and an important intellectual contribution to transportation scholarship
- Extent to which this research will advance professional practice or inform public opinion
- Appropriateness of the research methodology to the research question
- Appropriateness and feasibility of the data collection plan
- Reasonableness of the budget for the scope of work proposed (sufficient to allow for the successful completion of the project without being extravagant)
- Competence of the PI and other researcher(s) in the area of the proposed research
- Extent of student involvement
- Any other issues the reviewer deems important.

Project Selection Process

Following a procedure we developed in the previous year, outside experts assisted the Director in evaluating the proposal reviews and identifying the proposals of greatest merit. Dr. Jonathan Gifford of George Mason University and Dr. Jonathan Gifford of the University of Michigan ranked the proposals based on the reviews received and, particularly when reviews were mixed, their own evaluations.

The Executive Committee was asked to comment on each PI's past performance on UCTC-funded projects (if any) and to evaluate the overall fit of the proposed work to the UCTC theme. The UCTC Director then used the reviews, the outside experts' recommendations, and the Executive Committee's comments in selecting projects for funding. The Director further took into account the desirability of continuing an ongoing research project into a second phase, or initiating research on a new topic of importance.

The Director asked for changes on some proposals, for example, to fund selected tasks only or to seek revisions in response to reviewers' comments. Some proposals received "seed funding" – a small grant to start up a new research topic and further develop the ideas and approach with the possibility of applying for additional funds in later years.

As in previous years, we received far more highly rated proposals than available funds could support. All 35 proposals received reviews of very good to excellent. We were able to provide funding for 17 proposals, with five limited to "seed funding." (See Research Status Reports section for descriptions of these projects and the work to date.)

Research Performance Tracking

The UCTC Director and administrator monitor research performance through periodic progress reports as well as through informal communications with researchers. We expect UCTC-funded researchers to publish their results, and consider their publication record in any subsequent applications for UCTC funding. We also provide funding for researchers to present their work at conferences and symposia, reprint papers sponsored by UCTC, and publish research in the form of working papers, and final reports, web page postings, and ACCESS magazine articles.

Our success in producing innovative, policy-relevant results is demonstrated by their use in practice. We count the following among the indicators of the success of our transportation research:

- adoption of UCTC-developed analysis methods
- use of UCTC-developed databases
- appointment of UCTC researchers to important policy-making and advisory positions
- invitations for UCTC researchers to testify before elected and appointed officials
- requests for UCTC researchers to participate in meetings, briefings, and other collaborative activities and exchanges
- requests for UCTC researchers to provide technical assistance to government or the private sector
- changes in federal, state, regional and local transportation policies following recommendations based on UCTC research.

Our research results also have proven useful to other researchers in academia, government, and the private sector, both here and abroad, as evidenced by academic awards, citations in the literature, invitations to organize and participate in important conferences and meetings, requests for guest lectures, and other collaborative activities and exchanges. Faculty members testify before Congress and the State Legislature, advise regional planning agencies, and assist private firms in improving their practices, drawing in each case upon their UCTC research.

Technology Transfer

The UCTC's technology transfer aims for the availability of research results in a form that a variety of users can readily apply. We view technology transfer as including publications, both on the web and in hard copy; continuing education offerings; conferences and symposia; policy advising and public service; and outreach efforts to business and community groups and the general public. Our ultimate objectives are to increase public understanding of transportation problems and opportunities for improvement, and to produce a cadre of skilled, creative, connected transportation professionals who will effectively address these problems and develop innovations and improvements.

The UCTC encourages its researchers to engage in a variety of public service and professional activities, through which they communicate UCTC-funded research findings to a broad audience. These activities include appointments to committees and boards of federal, state, regional, and local transportation agencies; provision of expert testimony and advice to the Congress, State Legislatures, and regional and local bodies; technical assistance to public and private transportation organizations; and public service on transportation and related matters. When needed, the UCTC provides travel expenses or other support to enable faculty to provide these public services.

Our faculty and students regularly are asked to advise government and the private sector. The UCTC also provides information on transportation to the general public. We do this through faculty engagement in lectures, symposia and other events designed to inform the general public and through exchanges with the popular press designed to help educate a broader audience on transportation issues. We put special emphasis on our publication of working papers and our twice-yearly ACCESS magazine as ways of communicating our research results.

Publications

The UCTC considers publications to be a vital way to communicate our research findings. Each project funded by the UCTC ordinarily produces several papers and reports, which we disseminate both in hard copy and increasingly, on the Web. In addition, we produce the twice-yearly ACCESS Magazine, which summarizes UCTC-sponsored work in a style designed for a general audience.

In 2002-2003, our faculty associates added 104 publications to our list, bringing the total to 664 papers and reports. Table 2 lists the Year 15 publications. (For a full listing of publications, see the UCTC website.) In addition, we now list a dozen books and three videos produced with UCTC support. Graduate students also completed several dissertations funded with UCTC's assistance.

We distribute UCTC publications free of charge, and also make reprints of UCTC-funded journal articles available. Approximately 1000 requests for hard copies of papers and articles were filled in 2002-2003; increasingly, UCTC publications are available over the web, so many more copies are obtained electronically. We average about 40 website hits a day, or 15,000 a year; many visits to the website result in downloads of numerous articles and reports.

In addition, we have over 20,000 hard-copy subscribers to ACCESS magazine, and additional readers on the Web. ACCESS has proven to be an especially valuable way to communicate our work to a broad audience; academics, business leaders, elected officials, and government staff members all over the United States and abroad read ACCESS.

Conferences and Symposia

In addition to publishing all work supported by the Center, UCTC grant recipients are expected to participate in occasional UCTC-sponsored conferences and symposia, including the annual student conference sponsored by the UCTC. We expect UCTC researchers to give public lectures and seminars in the ongoing events series held at the four campuses, as well as in national and international meetings on transportation research and practice. Travel to conferences is supported as part of research grants, and additional travel grants are made on a case-by-case basis when funds are available.

Numerous UCTC affiliates participate each year in the annual meeting of the Transportation Research Board in Washington, DC. In addition, the UC Transportation Center jointly hosted a reception at TRB with other UC transportation groups, attended by over 300 faculty, students, and friends.

UCTC has been a major sponsor of two permanent conferences, the annual Lake Arrowhead Conference on the Transportation/Land Use/ Air Quality Connection and the biennial Asilomar Conference on Transportation and Energy Policy. These conferences bring together policy makers and opinion leaders in retreat settings to discuss critical policy issues facing the region. They have been widely cited as effective and influential. Several important pieces of transportation legislation, such as the California Employer Parking Cashout legislation and efforts to incorporate remote sensing of vehicular air pollutants into ongoing state pollution control programs, originated from discussions that have taken place at these conferences. This year's Lake Arrowhead Conference was offered again in Washington, DC, at the request of enthusiastic fall participants.

UCTC also helps faculty members to organize special research conferences and events as opportunities arise. Dinner seminars organized by the Institute of Urban and Regional Development at UC Berkeley and research seminars organized by the Institute of Transportation Studies at UC Davis have become regular events with UCTC support, and attract elected officials and public and private agency leaders as well as academics. A special feature of the 2002 events at Berkeley was the address given by former Massachusetts Governor and Amtrak Board member Michael Dukakis, who discussed the role of conventional and high speed rail in California's growth plans.

Finally, the UCTC student conference is an annual event of growing importance to the transportation community at the various campuses. Students at the UC Berkeley, Davis, Irvine and UCLA campuses take turns organizing the conference, which includes student presentations and poster sessions and allows transportation students and faculty from all of the UC campuses to meet and interact. Caltrans representatives also attend the conference and meet with students there. Students from the Mineta and METRANS transportation centers are invited to participate as well.

UCTC-Sponsored Conferences and Symposia, Year 15- 2002-2003

The Art of Designing Bridges and Highways, Berkeley, CA, September 20, 2002

This interdisciplinary symposium examined the concepts and practices that inform the design of bridges and freeways and analyzed the policy processes that shape their form. Participants examined ways to improve the aesthetic quality of these two critical types of transportation infrastructure, and to promote good design as an integral objective of transport planning and investment. The symposium brought together over 200 engineers, planners, architects and designers from government, academia, and the private sectors. An exhibit of bridge and freeway design accompanied the symposium

**Transportation / Land Use / Air Quality Symposium, Lake Arrowhead, CA, Oct. 19-21, 2002
Gauldet University, Washington, DC, June 26-27, 2003**

This year's Lake Arrowhead Fall Symposium, focusing on traffic congestion, was convened by the UCLA Extension Public Policy Program in association with UCTC and a number of government, private and nonprofit sponsors on October 19-21, 2002. Presentations and discussions examined strategies for reducing congestion and their connections to emissions, land use patterns, economic development, and other important topics. The invitational retreat had 130 participants, including academics and researchers from UC and other universities, federal, state and local policy-makers and advisors, public agencies responsible for transportation and air quality; environmental organizations; and private industry (including developers, utilities, and other industry groups.) Upon invitation from participants from the East Coast, the program was offered a second time in Washington DC in June 2003.

IURD Seminar Series, Berkeley, CA, Fall and Spring Semesters, 2002-2003

UCTC provided support for the Institute of Urban and Regional Development (IURD) Dinner Seminar Series. Each seminar brings together a small group of 20-30 faculty members, state and local elected officials, senior staff members from state and local agencies and the Legislature, and other interest group members to hear a talk about a current policy issue and to discuss the issue in depth. The seminars this fall addressed environmental concerns, development practices, and growth issues. Seminars in the Winter semester addressed the implementation of new transportation technologies, among other topics.

Transportation Research Board Annual Meeting, Washington, DC, January 2003

Three dozen faculty members and graduate students affiliated with UCTC presented papers at sessions of the annual meeting of the Transportation Research Board this January in Washington, DC. In addition, the UC Transportation Center jointly hosted a reception at TRB with its ITS partners from the Berkeley, Irvine, Davis, and LA campuses, the UC PATH program, the UC Center for Traffic Safety, and the National Center of Excellence for Aviation Operations Research. Over 300 faculty and students from all UC campuses, alumni of the UC transportation programs and UCTC, and friends from many other transportation centers and research groups joined us in the Cotillion Foyer of the Marriott Wardman Park Hotel on Monday, Jan. 13, 2003.

9th Annual UCTC Student Conference, Los Angeles, CA, February 2003

Students at UCLA hosted the 9th Annual UCTC Student Research Conference on February 2003. The conference offers students working on transportation issues an opportunity to present their work and discuss research issues with other students and faculty. Prof. Sandra Rosenbloom of the University of Arizona gave the Mel Webber Lecture following dinner on the first day of the event.

Table 2. UCTC Publications, Year 15 – 2002-2003

Madanat, Samer M., Jorge A. Prozzi, and Michael Han	Effect of Performance Model Accuracy on Optimal Pavement Design	2002, Fall	561
Prozzi, Jorge A., and Samer M. Madanat	A Non-linear Model for Predicting Pavement Serviceability	2002, Fall	562
Guillaumot, Vincent M., Pablo L. Durango, and Samer M. Madanat	Adaptive Optimization of Infrastructure Maintenance and Inspection Decisions under Performance Model Uncertainty	2002, Fall	563
Prozzi, Jorge A., and Samer M. Madanat	Development of Pavement Performance Models by Combining Experimental and Field Data	2002, Fall	564
Cohn, Theodore E., Sabrina Chan, Johnny Liang, and Jessica Vann	Photometric Insights Gained from Watching an Audi	2002, Fall	565
Cohn, Theodore E.	Roadwise Signaling in the New Millennium	2002, Fall	566
Cohn, Theodore E.	Can We Save Energy Used to Power Traffic Signals Without Disrupting the Flow of Traffic?	2002, Fall	567
Cohn, Theodore E., and Daniel Greenhouse	Looking Beyond Photometry: What Can We Predict About the Effect of Light on the Human Eye?	2002, Fall	568
Ong, Paul M., Douglas Houston, John Horton and Linda L. Shaw	Los Angeles County CalWORKS Transportation Needs Assessment	2002, Fall	569
Golob, Thomas F., and David A. Hensher	Searching for Policy Priorities in the Formulation of a Freight Transport Strategy: An Analysis of Freight Industry Attitudes	2002, Fall	570
Golob, Thomas F., and Amelia C. Regan	Freight Industry Attitudes Towards Policies to Reduce Congestion	2002, Fall	571
Golob, Thomas F., and Amelia C. Regan	Impacts of Information Technology on Personal Travel and Commercial Vehicle Operations	2002, Fall	572
Golob, Thomas F.	TravelBehavior.Com: Activity Approaches to Modeling the Effects of Information Technology on Personal Travel Behavior	2002, Fall	573
Golob, Jacqueline M., and Thomas F. Golob	Studying Road Pricing Policy with Panel Data Analysis: The San Diego I-15 HOT Lanes	2002, Fall	574
Brownstone, David, Thomas F. Golob, and Camilla Kazimi	Modeling Non-Ignorable Attrition and Measurement Error in Panel Surveys: An Application to Travel Demand Modeling	2002, Fall	575
Golob, Thomas F., and Amelia C. Regan	Trucking Industry Adoption of Information Technology: A Structural Multivariate Discrete Choice Model	2002, Fall	576

Golob, Thomas F., and Amelia C. Regan	The Perceived Usefulness of Different Sources of Traffic Information to Trucking Operations	2002, Fall	577
Gould, Jane, and Thomas F. Golob	Consumer E-Commerce, Virtual Accessibility and Sustainable Transport	2002, Fall	578
Golob, Thomas F., and Amelia C. Regan	Traffic Congestion and Trucking Managers' Use of Automated Routing and Scheduling	2002, Fall	579
Golob, Thomas F.	Structural Equation Modeling for Travel Behavior Research	2002, Fall	580
Brownstone, David, Arindam Ghosh, Thomas F. Golob, Camilla Kazimi, and Dirk van Amelsfort	Drivers' Willingness-to-Pay to Reduce Travel Time: Evidence from the San Diego I-15 Congestion Pricing Project	2002, Fall	581
Blumenberg, Evelyn	En-gendering Effective Planning: Transportation Policy and Low-Income Women	2002, Fall	582
Blumenberg, Evelyn, and Daniel Baldwin Hess	Measuring the Role of Transportation in Facilitating the Welfare-to-Work Transition: Evidence from Three California Counties	2002, Fall	583
Kean, Andrew J., Robert F. Sawyer, Gary R. Kendall, and Robert A. Harley	Trends in Exhaust Emissions from In-Use California Light-Duty Vehicles, 1994-2001	2002, Fall	584
Sperling, Daniel	Public-private technology R&D partnerships: lessons from US partnership for a new generations of vehicles	2002, Fall	585
Nesbitt, Kevin, and Daniel Sperling	Fleet purchase behavior: decision processes and implications for new vehicle technologies and fuels	2002, Fall	586

Brodrick, Christie-Joy, Tomothy E. Lipman, Mohammed Farshchi, Nicholas P. Lutsey, Harry A. Dwyer, Daniel Sperling, S. William Gouse, III, D. Bruce Harris, and Foy G. King, Jr.	Evaluation of fuel cell auxiliary power units for heavy duty diesel trucks	2002, Fall	587
Sperling, Daniel	Updating Automotive Research	2002, Fall	588
Muñoz, Juan Carlos, and Carlos F. Daganzo	Fingerprinting traffic from static freeway sensors	2002, Fall	589
Brownstone, David, and Xuehao Chu	Multiply Imputed Sampling Weights for Consistent Interference with Panel Attrition	2003, Spring	590
Golob, Thomas F., Jane Torous, Mark Bradley, David Brownstone, Soheila Soltani Crane, and David S. Bunch	Commercial Fleet Demand for Alternative-Fuel Vehicles in California	2003, Spring	591
Brownstone, David	Discrete Choice Modeling for Transportation	2003, Spring	592

Brownstone, David, and Robert G. Valletta	Modeling Earnings Measurement Error : A Multiple Imputation Approach	2003, Spring	593
Brownstone, David	Multiple Imputation Methodology for Missing Data, Non-Random Response, and Panel Attrition	2003, Spring	594
Brownstone, David, David S. Bunch, Thomas F. Golob, and Weiping Ren	A Transactions Choice Model for Forecasting Demand for Alternative-Fuel Vehicles	2003, Spring	595
Brownstone, David, and Kenneth Train	Forecasting New Product Penetration with Flexible Substitution Patterns	2003, Spring	596
Brownstone, David, David S. Bunch, and Kenneth Train	Joint Mixed Logit Models of Stated and Revealed Preferences for Alternative-Fuel Vehicles	2003, Spring	597
Golob, Thomas F., David S. Bunch, and David Brownstone	A Vehicle Use Forecasting Model Based on Revealed and Stated Vehicle Type Choice and Utilization Data	2003, Spring	598
Clark, William A. V., and Youqin Huang	Commuting Distance Sensitivity by Race and Socio-Economic Status	2003, Spring	599
Zhou, Jianyu (Jack), and Reginald Golledge	A GPS-based Analysis of Household Travel Behavior	2003, Spring	600
Golledge, Reginald G., and Tommy Gärling	Cognitive Maps and Urban Travel	2003, Spring	601
Golledge, Reginald G., and Tommy Gärling	Spatial Behavior in Transportation Modeling and Planning	2003, Spring	602
Ong, Paul, and Douglas Houston	Travel Patterns and Welfare to Work	2003, Spring	603
Cervero, Robert, and Michael Duncan	Residential Self Selection and Rail Commuting: A Nested Logit Analysis	2003, Spring	604
Brownstone, David, and Charles Lave	Transportation Energy Use	2003, Spring	605
Bagley, Michael N., and Patricia Mokhtarian	The Role of Lifestyle and Attitudinal Characteristics in Residential Neighborhood Choice	2003, Spring	606
Bagley, Michael N., and Patricia Mokhtarian	The Impact of Residential Neighborhood Type on Travel Behavior: A Structural Equations Modeling Approach	2003, Spring	607
Bagley, Michael N., Patricia L. Mokhtarian, and Ryuichi Kitamura	A Methodology for the Disaggregate, Multidimensional Measurement of Residential Neighborhood Type	2003, Spring	608
Salomon, Ilan, and Patricia L. Mokhtarian	What Happens When Mobility-Inclined Market Segments Face Accessibility-Enhancing Policies?	2003, Spring	609
Salomon, Ilan, and Patricia L. Mokhtarian	Driven to Travel: The Identification of Mobility-Inclined Market Segments	2003, Spring	610
Koenig, Brett E., Dennis K. Henderson, and Patricia L. Mokhtarian	The Travel and Emissions Impacts of Telecommuting for the State of California Telecommuting Pilot Project	2003, Spring	611

Bunch, David S., David Brownstone, and Thomas F. Golob	A Dynamic Forecasting System for Vehicle Markets With Clean-Fuel Vehicles	2003, Spring	612
Liggett, Robin, Anastasia Loukaitou-Sideris, and Hiroyuki Iseki	Bus Stop - Environment Connection: Do Characteristics of the Built Environment Correlate with Bus Stop Crime?	2003, Spring	613
Liggett, Robin, Anastasia Loukaitou-Sideris, and Hiroyuki Iseki	Journeys to Crime: Assessing the Effects of a Light Rail Line on Crime in the Neighborhoods	2003, Spring	614
Shoup, Donald C.	Buying Time at the Curb	2003, Spring	615
Shoup, Donald C.	Truth in Transportation Planning	2003, Spring	616
Bedsworth, Louise Wells, and William E. Kastenber	Science and Uncertainty in Environmental Regulation: Insights from the Evaluation of California's Smog Check Program	2003, Spring	617
Quinet, Emile, and Daniel Sperling	Environmental Protection	2003, Spring	618
Sperling, Daniel, and Timothy Lipman	International Assessment of Electric-Drive Vehicles: Policies, Markets, and Technologies	2003, Spring	619
Cairns, Shannon, Jessica Greig, and Martin Wachs	Environmental Justice & Transportation: A Citizen's Handbook	2003, Spring	620
Deakin, Elizabeth, et al.	Intelligent Transportation Systems: A Compendium of Technology Summaries	2003, Spring	621
Bhatia, Pratyush	Vehicle Technologies to Improve Performance and Safety	2003, Spring	622
Bhatia, Pratyush	ITS / Commercial Vehicle Operations	2003, Spring	623
Cheon, Sanghyun	An Overview of Automated Highway Systems (AHS) and the Social and Institutional Challenges They Face	2003, Spring	624
Cheon, Sanghyun	The Deployment Efforts for Intelligent Infrastructure and Implications and Obstacles	2003, Spring	625
Cheon, Sanghyun	Emerging Vehicle Technology and Implementation Barriers	2003, Spring	626
Conroy, Pat, and Jean-Luc Ygnace	Institutional and Organizational Factors for the Successful Deployment of Intelligent Transportation Systems (ITS): International Comparisons	2003, Spring	627
Flamm, Bradley	Explaining Intelligent Transportation Systems to the Public: California transportation planning agencies and the World Wide Web	2003, Spring	628
Flamm, Bradley	Advanced Technologies in Public Transportation	2003, Spring	629

McDonald, Noreen	Multipurpose Smart Cards in Transportation: Benefits and Barriers to Use	2003, Spring	630
Ni, Jason, and Elizabeth Deakin	On-Board Advanced Traveler Information Systems	2003, Spring	631
Leigland, Adam	Transportation Management Systems	2003, Spring	632
Thomas, John	Survey and Focus Group Report: Local Governments and the National ITS Architecture	2003, Spring	633
Regan, Amelia C., and Jiongjiong Song	An Industry in Transition: Third Party Logistics in the Information Age	2003, Summer	634
Golob, Thomas F., and Amelia C. Regan	CVO Perspectives on the Usefulness of Various Sources of Traffic Information	2003, Summer	635
Song, Jiongjiong, and Amelia C. Regan	Transition or Transformation? Emerging Freight Transportation Intermediaries	2003, Summer	636
Song, Jiongjiong, and Amelia C. Regan	An Auction Based Collaborative Carrier Network	2003, Summer	637
Song, Jiongjiong, and Amelia C. Regan	Approximation Algorithms for the Bid Construction Problem in Combinatorial Auctions for the Procurement of Freight Transportation Contracts	2003, Summer	638
Golob, Thomas F., and Amelia C. Regan	Trucking Industry Preferences for Driver Traveler Information Using Wireless Internet-enabled Devices	2003, Summer	639
Song, Jiongjiong, and Amelia C. Regan	Combinatorial Auctions for Transportation Service Procurement: The Carrier Perspective	2003, Summer	640
Wang, Chuanxu, and Amelia C. Regan	Reducing Risks in Logistics Outsourcing	2003, Summer	641
Daganzo, Carlos, and Karen R. Smilowitz	Asymptotic Approximations for the Transportation LP and Other Scalable Network Problems	2003, Summer	642
Forster, Paul W., and Amelia C. Regan	Electronic Integration in the Air Cargo Industry: An Information Processing Model of On-Time Performance	2003, Summer	643
Goldman, Todd, and Martin Wachs	A Quiet Revolution in Transportation Finance: The Rise of Local Option Transportation Taxes	2003, Summer	644
Zhou, Jianyu (Jack), and Reginald Golledge	An Analysis of Variability of Travel Behavior within One-Week Period Based on GPS	2003, Summer	645
Blumenberg, Evelyn, and Kimiko Shiki	How Welfare Recipients Travel on Public Transit, and Their Accessibility to Employment Outside Large Urban Centers	2003, Summer	646

Boarnet, Marlon G., and Saksith Chalermpong	New Highways, House Prices, and Urban Development: A Case Study of Toll Roads in Orange County, CA	2003, Summer	647
Cervero, Robert	Induced Demand: An Urban and Metropolitan Perspective	2003, Summer	648
Atamtürk, Alper, and Juan Carlos Muñoz	A Study of the Lot-Sizing Polytope	2003, Summer	649
Kim, Taewan, and H. Michael Zhang	An Empirical Study of the Time Gap and its Relation to the Fundamental Diagram	2003, Summer	650
Li, Jianling, and Martin Wachs	The Effects of Federal Transit Subsidy Policy on Investment Decisions: The Case of San Francisco's Geary Corridor	2003, Summer	651
Houston, Douglas, and Paul M. Ong	Child Care Availability and Usage Among Welfare Recipients	2003, Summer	652
Ong, Paul M., and Douglas Houston	Spatial and Transportation Mismatch in Los Angeles	2003, Summer	653
Ong, Paul M., and Hyun-Gun Sung	Exploratory Study of Spatial Variation in Car Insurance Premiums, Traffic Volume and Vehicle Accidents	2003, Summer	654
Blumenberg, Evelyn, and Kimiko Shiki	Spatial Mismatch Outside of Large Urban Areas: An Analysis of Welfare Recipients in Fresno County, California	2003, Summer	655
Verhoef, Erik T., and Kenneth A. Small	Product Differentiation on Roads: Constrained Congestion Pricing with Heterogeneous Users	2003, Summer	656
Brown, Jeffrey	Statewide Transportation Planning: Lessons from California	2003, Summer	657
Brown, Jeffrey	Statewide Transportation Planning in California: Past Experience and Lessons for the Future	2003, Summer	658
Brown, Jeffrey	A Tale of Two Visions: Harland Bartholomew, Robert Moses, and the Development of the American Freeway	2003, Summer	659
Nombela, Gustavo, and Ginés de Rus	Flexible-Term Contracts for Road Franchising	2003, Summer	660
Zheng, Yi, Bo Wang, H. Michael Zhang, and Debbie Niemeier	A New Gridding Method for Zonal Travel Activity and Emissions Using Bicubic Spline Interpolation	2003, Summer	661
Zhang, H. Michael, and T. Kim	A Car-Following Theory for Multiphase Vehicular Traffic Flow	2003, Summer	662
Zhang, H. Michael, and T. Kim	Understanding and Modeling Driver Behavior in Dense Traffic Flow	2003, Summer	663
Cassidy, Michael J., and Shadi B. Anani	Stationary Models of Unqueued Freeway Traffic and Some Effects of Freeway Geometry	2003, Summer	664

RESEARCH PROJECT STATUS

Twenty-nine faculty research projects have been underway during UCTC's Year 15, 2002-2003. The projects include 12 projects carried over from Year 14 and 17 new projects funded in Year 15. All projects are one year grants that can be extended upon request of the Principal Investigator for a second year. Most commonly, extensions are requested when funding reaches the UC campus after the school term has already begun, making it difficult to arrange student appointments until the following term.

All twelve Year 14 projects carried over into Year 15 were completed this year, allowing that year to be closed. Four Year 15 projects were completed and an additional 13 are continuing.

Table 3 lists the Year 14 projects completed in Year 15, and Table 4 lists the projects awarded in Year 15, also indicating project status. Following the tables are project status reports for all of the faculty research projects underway at UCTC in Year 15. The reports cover performance through July 31, 2003.

Table 3. Year 14 (2001- 2002) Research Projects (15 Projects - All Reported Here)

A. Projects Completed Previous Year - 3

How Does Travel Behavior Change When Households Change Jobs?

William Clark, UCLA

Design of Vehicle Routes and Driver Shifts for Systems with Uncertain Demand

Carlos Daganzo, UC Berkeley

Effect of Driving Mode on Light-Duty Vehicle Emissions Measured On-Road

Robert Harley, UC Berkeley

B. Projects Completed this Year - 12

Using the Spatial Configuration of Cities to Estimate The Impact of Commuting Time on Hours of Work

Antonio Bento, UC Santa Barbara

Evaluation of the California Safe Routes to School Program

Marlon Boarnet and Kristen Day, UC Irvine

Forecasting Demand and Values of Travel Time Savings for Freeway HOV, Toll and HOT Facilities: Incorporating Attitudes and Perceptions into Commuter Choice Models

David Brownstone and Thomas Golob, UC Irvine

Transit-Based Housing: Residential Sorting and Its Influence on Mode Choice

Robert Cervero, UC Berkeley

Real-time Travel Data Collection System Augmented with Speech Interface

Reginald Golledge, UC Santa Barbara

Life -Cycle Environmental and Economic Assessment of Using Recycled Materials for Asphalt Pavements

Arpad Horvath, UC Berkeley

Reinforcement Learning in Transportation Infrastructure Management

Samer Madanat, UC Berkeley

Dissonance between Desired and Current Residential Neighborhood Type: Relationships to Travel-Related Attitudes and Behavior

Patricia Mokhtarian and Ilan Salomon, UC Davis

Optimal Control Policies for Urban Corridor Management

Wilfred Recker, UC Irvine

The Impact of Motor Vehicle Transportation on Water Quality

Jean Daniel Saphores, UC Irvine

Putting Back the Pleasure in the Drive: Reclaiming Urban Parkways for the 21st Century

Anastasia Loukaitou-Sideris, UCLA

Equity and Environmental Justice in Transportation

Martin Wachs, UC Berkeley

Table 4. Year 15 (2002- 2003) Research Projects

A. Projects Completed This Year - 4

Judging the Speed of Pedestrians and Bicycles at Night

Karen K. De Valois, UC Berkeley

Policies for Safer and More Efficient Truck Operations on Urban Freeways

Thomas Golob and Amelia Regan, UC Irvine

Incorporating Seismic Risk Considerations in Transportation Infrastructure Management

Samer Madanat, UC Berkeley

Car Ownership, Insurance Premiums and Employment Outcomes

Paul Ong

B. Projects Continuing in 2003-2004 - 13

Expanded Evaluation of the California Safe Routes to School Program

Marlon Boarnet, Kristen Day, and Craig Anderson, UC Irvine

Verifying Regularities in Queued Freeway Traffic

Michael Cassidy, UC Berkeley

Commuter Rail, Land Use and Travel Behavior

Robert Cervero, UC Berkeley

Comparing White and Minority Household Commuter Behavior

William Clark, UC Berkeley

Storage System Dynamics and Management Policies

Carlos Daganzo, UC Berkeley

High-Coverage Point-to-Point Transit

R. Jayakrishnan, UC Irvine

Handheld Travel Survey Technology to Supplement Vehicle Tracking

Michael McNally, UC Irvine

I/O Analysis of Communications and Travel for Industry

Patricia Mokhtarian, UC Davis

Public Transit and Residential Location Choices of Minorities and Transit Dependents

John Quigley and Stephen Rafael, UC Berkeley

An Evaluation of Employer-Based Transit Programs

Donald Shoup, UCLA

Effects of Contracting on Fixed-Route Bus Cost-Efficiency

Brian Taylor, UCLA, and Martin Wachs, UC Berkeley

Exploring the Marketability of Fuel-Cell Electric Vehicles

Thomas Turrentine, UC Davis

Theoretical and Empirical Investigations of Traffic Flow at Highway Merges

Michael Zhang, M., UC Davis

PROJECT STATUS REPORTS

Year 14 Projects Completed in Year 15

Using the Spatial Configuration of Cities to Estimate The Impact of Commuting Time on Hours of Work

Principal Investigator:

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Abstract:

We investigate the causal impact of fixed time costs (commuting) on labor supply. While a limited number of studies have estimated the correlation between hours of work and observed commuting, they have not dealt with the endogeneity of commuting and thus yield biased estimates. We attempt to isolate the exogenous impact of commuting using a novel instrumental variables approach based on the dispersion of residential locations within and across cities. A credible estimate of the elasticity of hours of work with respect to commuting time is clearly important to our understanding of labor supply behavior and therefore the reaction of people to urban transportation policies aimed at changing commuting patterns **Key Words:** commuting time; labor supply; urban spatial structure

Work Completed to date:

Project completed

Papers to date:

Bento, Antonio M., Maureen L. Cropper, Ahmed, Mushfiq Mobarak, and Katja Vinja, "The Impact of Urban Spatial Structure on Travel Demand in the United States," Working Paper, UCTC 2004.

Conferences Attended:

Summer Institute of the National Bureau of Economic Research

Other Accomplishments:

None

Percent Complete: 100%

Direct Cost: \$38,514

Evaluation of the California Safe Routes to School Program

Principal Investigator:

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Other Key Participants:

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Dr. Craig Anderson
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Abstract:

We conducted a pre and post-evaluation of the California Safe Routes to School (SR2S) construction program, which allocates \$20 million to local governments for street, sidewalk, and neighborhood and/or traffic design and construction projects to improve the safety and feasibility of walking and bicycling to school. We observed pedestrian and bicyclist behavior and are surveying parents before and after SR2S construction at a sample of sites to obtain information on attitudes and perceptions of safety. These data allow an evaluation of the effectiveness of different neighborhood and traffic interventions in improving the safety of children's non-motorized travel near schools, the frequency of walking and bicycling among children, and the interaction between perceived safety, traffic patterns, the physical environment, and walking and bicycling behavior. **Key Words:** school access, safety, pedestrians, bicycles, sidewalks

Work Completed to Date:

Project completed.

Papers to Date:

[1] Craig Anderson, Marlon G. Boarnet, Tracy McMillan, Mariela Alfonzo, and Kristen Day, "Walking And Automobile Traffic Near Schools: Data To Support An Evaluation Of School Pedestrian Safety Programs," Poster presented at Transportation Research Board annual meetings, January, 2003, and working paper, UCTC, 2003.

[2] Marlon G. Boarnet, Kristen Day, Craig Anderson, Final Report UCTC Year 14 Research Grant: Evaluation of the California Safe Routes to School Construction Program, UCTC, July, 2003.

Tracy McMillan, Walking and Urban Form: Modeling and Testing Parental Decisions about Children's Travel, Ph.D. dissertation, University of California, Irvine, July, 2003.

Conferences Attended:

1. Cooper Institute Conference on Public Health Interventions to Promote Physical Activity, October 2001, "Analytical Methods and Data for Understanding Walking Behavior." (Marlon Boarnet)
2. Symposium on Cities and Transportation: Choices and Consequences, Simon Fraser University, February 2002, "Science and Land Use-Travel Behavior Interactions." (Marlon Boarnet)
3. Transportation Research Board Annual Meeting, 2002
4. Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None

Percent Complete: 100%

Direct Cost: \$71,902

Forecasting Demand and Values of Travel Time for Freeway HOV, Toll and HOT Facilities

Principal Investigators:

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Abstract:

Accurate forecasts of demand for restricted roadway facilities – high occupancy vehicle (HOV) lanes, toll lanes (including congestion pricing), or combined HOV and toll (HOT) lanes on freeways and bridges – are key to the success of such projects. Yet the track record for predictions for such projects throughout the U.S. is dismal; transportation professionals have not been successful in understanding traveler behavior regarding such choice alternatives. The objective of this research is to explore reasons for these failings and to make recommendations regarding priorities for better models. Alternative model specifications documented in the literature are compared on a common dataset. The most effective dataset for this purpose is the panel survey collected in 1997-1999 for evaluation of the San Diego I15 Congestion Pricing Project, combined with recorded toll data and traffic speed data from freeway loop detectors and floating car measurements. The key new feature of this work is the joint modeling of commuters' choices, perceptions of key trip attributes, and attitudes about road pricing. These variables are related to commuter's socio-demographic information as well as objective traffic network data typically used in demand analysis. This new model is designed to predict both the economic and political feasibility of a project.

Key words: travel demand forecasting, hot lanes, HOV lanes, value pricing

Work Completed to Date:

Project completed

Papers to Date:

[1] "Modeling Non-ignorable Attrition and Measurement Error in Panel Surveys: An Application to Travel Demand Modeling." (with C. Kazimi and T.F. Golob), in Groves, R.M., D. Dillman, J.L. Eltinge and R.J.A. Little (eds.), Survey Nonresponse. New York: Wiley, pp. 373-388, 2001. Based on earlier UCTC funded work using earlier waves of the panel data.

[2]"Drivers' Willingness-to-Pay to Reduce Travel Time: Evidence from the San Diego I-15 Congestion Pricing Project." (with C. Kazimi, A. Ghosh, T.F. Golob, and D. van Amelsfort), Transportation Research A, 37, pp. 373-387, 2003. Based on earlier UCTC funded work using earlier waves of the panel data.

[3]"Heterogeneity in Commuters' "Value of Time" with Noisy Data: a Multiple Imputation Approach" (with S. Steimetz), May 2003. Submitted to Transportation Research B.

[4]"Valuing Time and Reliability: Assessing the Evidence from Road Pricing Demonstrations" (with K. Small), June 2003. Revised version of paper presented at AEA meetings in Washington, DC, January 2003. This paper will be presented at the IATBR meeting in Lucerne, Switzerland, August 2003.

Conferences Attended:

Transportation Research Board Annual Meeting, 2002, 2003

Other Accomplishments:

None

Percent Complete: 100%

Direct Costs: \$14,690

Transit-Based Housing: Residential Sorting and Its Influence on Mode Choice

Principal Investigator:

Prof. Robert Cervero
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Abstract:

This research examines the impacts of transit-based housing on both residential location and mode choice. The degree to which ridership benefits are a product of self-selection or the inherent advantages of proximity to transit is gauged. An operative hypothesis is that high ridership is a product of households consciously sorting themselves into rail station areas for the very purpose of economizing on commuting. Living near rail stops is thought to also lower vehicle ownership rates. The combination of “residential sorting” and fewer cars are dominant factors in explaining mode choice for journeys to work, as was tested using nested logit models and year 2000 data on residential location, car ownership, and commute mode choice from the San Francisco Bay Area. Models predict whether households reside within a half-mile ring of a rail station and how this in turn influences mode choice. Separate analyses are carried out for the BART heavy rail system, the CalTrain commuter rail system, and the VTA light rail system. The results of the research can help inform policymaking in the areas of transit joint development and affordable housing production, including policy initiatives like Location Efficiency Mortgages. **Key**

Words: mode choice, location choice, housing policy, transit policy

Work Completed to Date:

Project completed

Papers to date:

Cervero, Robert, and Michael Duncan, "Residential Self Selection and Rail Commuting: A Nested Logit Analysis," December 2002.

Conferences Attended:

Transportation Research Board Meeting, 2002, 2003

Other Accomplishments:

None

Percent Complete: 100%

Direct Costs: \$45,284

Real-Time Travel Data Collection System Augmented with Speech Interface

Principal Investigator:

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Abstract:

In this research develop a conceptual model of a real time activity data collection device. This is operationalized as a prototype wearable computer complete with GPS recorder and speech input card. The wearable computer is tied to a wireless local area network (WLAN) and real-time travel decisions (e.g. en-route changes in destinations and routes) can be immediately entered by voice into a database contained in a central server. We pilot the results using pedestrian travel on the UCSB campus, and suggest ways of extrapolating from a localized pedestrian domain to a larger scale vehicular environment at an urban scale. **Key Words:** equity, environmental justice, civil rights, social impact

Work Completed to Date:

Project complete.

Publications to date:

- [1] Golledge, R. G. (1997). Dynamics and ITS: Behavioral responses to information available from ATIS. 8th Meeting of the International Association for Travel Behavior Research (IATBR), Austin, TX.
- [2] Zhou, J. and R. G. Golledge (2000). An analysis of household travel behavior based on GPS. IABTR, Gold Coast, Australia.
- [3] Zhou, J. and R. Golledge (2000). A GPS-Based Analysis of Household Travel Behavior. Western Regional Science Association, Kauai, Hawaii.
- [4] Zhou, J. (2000). Analysis of variability of weekly travel behavior using GPS-recorded data. Geography. Santa Barbara, University of California, Santa Barbara.

Conferences Attended:

IABTR
Western Regional Science Association

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$54,537

Life Cycle Environmental and Economic Assessment of Using Recycled Materials for Asphalt Pavements

Principal Investigator:

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Abstract:

The public, industry and governments have become increasingly interested in green design and engineering to improve environmental quality and sustainability. Pavement construction is one of the largest consumers of natural resources. Recycling of pavements represents an important opportunity to save the mining and use of virgin materials, conserve energy, divert materials away from landfills, and save scarce tax dollars. How much pollution, energy, natural resources, and money could be saved by using secondary materials in road construction? What are the engineering limits of using recycled materials in roads? Can we recycle over and over again pavements that contain rubber, glass, and other secondary materials? This research quantifies the environmental and economic costs and benefits of recycling asphalt pavements, and using secondary materials for their construction. The impacts can be traced through the related lifecycles and supply chains for material and energy inputs, water consumption, hazardous and non-hazardous waste generation, toxic discharges, and greenhouse gas as well as particulate matter emissions. Lifecycle environmental and economic assessment methods are coupled with construction process models. Stakeholders will be able to use the resulting computer tool for decision-making and scenario analysis as parameters of the pavement recycling model change over time and from region to region. **Key Words:** pavement management, lifecycle costs, environmental costs

Work Completed to Date:

Project completed

Publications to Date:

A technical report has been prepared, and papers are being prepared on the research results for targeted publication in Environmental Science & Technology and J. of Construction Engineering and Management.

Conferences Attended:

A. Horvath, presentation at the conference "Beneficial Use of Recycled Materials in Transportation Applications", Washington, DC, November 13, 2001.

Transportation Research Board Annual Meeting, 2002, 2003

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Costs: \$45,546

Putting Back the Pleasure in the Drive: Reclaiming Urban Parkways for the 21st Century

Principal Investigator:

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Other Key Participants:

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Abstract:

This research investigates the problems and prospects of urban parkways by focusing on the "first freeway of the West," the celebrated Arroyo Seco Parkway. Hailed in the 1920s and 1930s as marvels of engineering innovation, and as safe and efficient alternatives to conventional arterials, urban parkways are facing a series of problems today that include high accident rates and congestion. The Arroyo Seco Parkway was originally built to carry 27,000 automobiles per day at 45mph. Today it carries over 120,000 cars per day at speeds often exceeding the official limit of 55mph. While the parkway is a cherished part of the area's heritage, is eligible for the National Register of Historic Places, and has been recently designated as an American Civil Engineering Landmark, the historic and aesthetic significance of the road is not recognized from an operational and legal perspective. The parkway is a case in point to evaluate the prospects for managing existing historic parkways, and to investigate the relationship between the physical qualities of parkways, their usefulness as transportation corridors, and their relative safety.

Key Words: Urban parkways, Arroyo Seco Parkway

Work Completed to Date:

Project completed

Papers to date:

[1] Loukaitou-Sideris, A. and Gottlieb, R. (2003) "Putting Pleasure Back in the Drive: Reclaiming Urban Parkways for the 21st Century," *Access*, 22, 2-8

[2] Loukaitou-Sideris, A. and Gottlieb, R. (2003) "Take a Freeway Stroll for a New Look at the 110," *Los Angeles Times*, Part B: California, B23, June 7, 2003.

[3] Loukaitou-Sideris, A. and Gottlieb, R. "A Road as a Route and Place: Evolution and Transformation of the Arroyo Seco Parkway," submitted to *California History*.

Conferences Attended:

Transportation Research Board Annual Meeting, 2002, 2003

Other Accomplishments:

None to Date

Percent Complete: 100%

Direct Cost: \$49,284

Reinforcement Learning in Transportation Infrastructure Management

Principal Investigator:

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Abstract:

Infrastructure Management Systems support agencies in developing efficient policies to monitor, maintain and repair deteriorating facilities in transportation infrastructure networks. Infrastructure Management Systems have been based on a time-invariant characterization of a facility's deterioration process. However, a constant single model of a facility's deterioration may not be appropriate given the variability over time of causal factors such as traffic and environmental conditions. When this variability over time is accounted for, the infrastructure management problem becomes a Reinforcement Learning problem. One possible approach for solving this Reinforcement Learning problem is to represent facility deterioration process using a time-varying stochastic model. The problem of finding optimal policies to manage infrastructure facilities and networks can then be formulated as an adaptive control problem, where observations of facility condition over time can be used to update the parameters of the models. An alternative to this approach is to use temporal difference learning. This approach allows us to develop policies without having to model a facility's deterioration process. Instead, the information that is gathered by the transportation agency is used to evaluate maintenance and repair policies directly, without using a stochastic process to represent facility deterioration. **Key Words:** infrastructure deterioration, infrastructure management, difference learning models

Work Completed to Date:

Project completed.

Papers to date:

- [1] Durango P. and Madanat S., "Optimal Maintenance and Repair Policies for Infrastructure Facilities under Uncertain Deterioration Rates: An Adaptive Control Approach", Transportation Research, Part A, Vol. 36, No. 9, Elsevier Science, 2002.
- [2] Guillaumot V., Durango P. and Madanat S., "Adaptive Optimization of Infrastructure Maintenance and Inspection Policies under Performance Model Uncertainty", accepted for publication in the ASCE Journal of Infrastructure Systems.
- [3] Durango P., "Reinforcement Learning in Infrastructure Management", Proceedings of the Conference on Application of Advanced Technologies to Transportation, ASCE.

Conferences Attended:

Annual Meeting of the Transportation Research Board, 2002, 2003

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$70,582

Telecommuting over the Long Term: Patterns of Engagement and Impacts on Residential Location

Principal Investigator:

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Other Key Participants:

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Abstract:

Studies show that telecommuting reduces vehicle miles traveled in the short term, but there is little empirical evidence on its longer-term impacts on residential relocation (and hence travel). This study analyzes a data set providing 10-year retrospective telecommuting and residential/job relocation histories for a sample of 227 employees of the State of California (including non-telecommuting control group cases). We analyze telecommuting frequencies, durations, and patterns of engagement for the current and former telecommuters, and compare their residential relocation behavior to that of the non-telecommuters. The research provides evidence on the long-range effects of telecommuting. The findings can serve as useful background to policies that promote telecommuting as a trip reduction strategy. **Key Words:** telecommuting, residential location, cluster analysis

Work Completed to Date:

Project completed.

Papers to date:

- [1]Mokhtarian, Patricia L. and Gustavo O. Collantes (2003) Telecommuting, Residential Location, and Commute Distance Traveled: Evidence from State of California Employees. NECTAR (Network on European Communication and Transportation Activities Research) conference: A New Millennium – Are Things the Same? Ume, Sweden. June 13-15, 2003; and at the conference on City.Net: Cities in the Age of Telecommunications, Bauhaus University, Weimar, Germany. June 18-20, 2003.
- [2] Collantes, Gustavo O. and P.L. Mokhtarian (2003) Telecommuting and Residential Location: Relationships with Commute Distance Traveled for State of California Workers. Research Report No. UCD-ITS-RR-03-xx, Institute of Transportation Studies, University of California, Davis
- [3]Gertz, Carsten and P. L. Mokhtarian (1999) The Long-Term Effects of Telecommuting on Travel Behavior and Residential Location. Report to BMW AG, Verkehrskonzepte Munchen, Germany, July (in German).

Conferences Attended:

Transportation Research Board Annual Meeting, 2002, 2003
A New Millennium – Are Things the Same? Ume, Sweden. June 13-15

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$46,489

Optimal Control Policies for Urban Corridor Management

Principal Investigator:

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Abstract: This project aims to develop an integrated traffic operations-travel demand modeling approach for use in developing optimal control systems. The embedded travel demand model reflects drivers' response to the control system that determines on-ramp metering rates and vehicle-actuated arterial signal timing settings in corridor networks. A primary goal of the work is to demonstrate that congestion within corridor networks can be reduced in a more effective way if the control strategies for each component sub-network are geographically integrated and coordinated to reflect interaction among systems, allowing the various traffic control measures to cooperate rather than compete. The integrated control problem relating to on-ramp and urban signal control strategies is formulated as an optimal control problem of determining such control variables as the on-ramp metering rates, the minimum green duration, the maximum green duration (or force off), background cycle length (if coordinated) and the critical time gap for vehicle actuated urban signals, subject to the control constraints, so as to minimize the system total travel time. The approach takes into consideration the interaction between the control strategy and drivers' response to it. A numerical method is used for the solution of the formulated optimal control problem. **Key Words:** signal timing, ramp metering, demand analysis, optimal control strategy

Work Completed to Date:

Project completed

Papers to Date:

- [1] Y. Pavlis and W. Recker, "A methodological framework for integrated control in corridor networks," Proceedings of the 2001 IEEE Conference on Intelligent Transportation Systems, Oakland, CA, August 25-29, pp. 637-642.
- [2] Y. Pavlis and W. Recker, "Mathematical Models for Optimal Control of Corridor Networks: Overview, Needs, Specifications," Internal Report, October 2002, 37 pages.
- [3] Y. Pavlis and W. Recker, "Transforming Conditional Piece-wise Functions via Logic-Based Methods into Mixed-Integer Models. Part I: Developing Models for a Surface Street (Sub) Network," Internal Report, February 2003, 130 pages.
- [4] Y. Pavlis and W. Recker, "Transforming Conditional Piece-wise Functions via Logic-Based Methods into Mixed-Integer Models. Part II: Model Development for a Fully Actuated Signal Control Strategy," Internal Report, Under Review.
- [5] Y. Pavlis and W. Recker, "Transforming Conditional Piece-wise Functions via Logic-Based Methods into Mixed-Integer Models. Part III: Developing Equivalent Representations of the Cell-Transmission Model for the Freeway Component," Internal Report, Under Preparation.

Conferences Attended:

IEEE Conference on Intelligent Transportation Systems, Oakland, CA, 2001
Transportation Research Board Annual Meeting, 2002, 2003

Other Accomplishments:

None to date.

Percent Complete: 100%.

Direct Cost: \$33,784

The Impact of Motor Vehicle Transportation on Water Quality

Principal Investigator:

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Abstract: This research will analyze the impact of road transportation by motor vehicles on water quality in California. Air pollution and noise externalities have been the object of many studies to inform public policy on pollution control, yet the impact on water quality of operating motor vehicles on roadways has not received much attention. Our investigation will include the impacts on water quality from constructing motor vehicles and road infrastructure, operating vehicles, and disposing of used motor vehicles. We will review the engineering, planning, and economic literatures; collect information about relevant policies in OECD countries and at the federal, state, and local levels; quantify pollution impacts whenever possible; identify data gaps; and critically review the policies that have been proposed to deal with this problem. Better understanding sources of water pollution is important at a time where the population of California is growing and there are few options for new supplies of water. Finally, we will develop policy recommendations tailored to the situation in California. **Key Words:** road transportation, water quality, environmental quality

Work Completed to Date:

Project completed.

Papers to Date:

- [1] Nixon, H. and J.D. Saphores (2001), Used Oil Policies to Protect the Environment: An Overview of Canadian Experiences, Proceedings of the Third International Conference on Traffic and Transportation Studies in China, July 2002
[2] Nixon, H. and J.D. Saphores (2002), The Environmental Impacts of Motor Vehicle Operation on Water Quality: A Preliminary Assessment, Working Paper, University of California Irvine.

Conferences Attended:

Transportation Research Board Annual Meeting

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$48,109

Equity and Environmental Justice in Transportation

Principal Investigator:

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Abstract:

The Environmental Justice movement in transportation has based many claims on concerns for equity in transportation finance and in the distribution of direct and indirect costs and benefits of transportation. Under Title VI of the Civil Rights Act and under several executive orders, the U.S. Department of Transportation requires transit agencies and metropolitan planning agencies to report on the equitability of their programs. In addition, there is a body of scholarly literature on the theme of equity and its measurement. This project has produced a report on environmental justice and equity in transportation for use by practitioners and citizens. The report reviews alternative definitions of equity and discusses analytical measures by which equity in transportation can be measured. It also reviews concepts and measures of equity used by public agencies and by environmental justice advocacy groups. The report discusses ways to advance the cause of environmental justice by providing better measures for use in the analysis of transportation projects or programs. **Key Words:** equity, environmental justice, civil rights, social impact

Work Completed to Date:

Project completed

Papers to date:

Shannon Cairns, Jessica Greig, and Martin Wachs, Environmental Justice & Transportation: A Citizen's Handbook. Institute of Transportation Studies, University of California, Berkeley, 2003. ISBN 0-9673039-9-0, 30 pages.

Conferences Attended:

Transportation Research Board Annual Meeting

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$53,937

YEAR 15 STATUS REPORTS

Projects Completed This Year – 4 Projects

Judging the Speed of Pedestrians and Bicycles at Night

Principal Investigator:

Karen K. De Valois
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Abstract: Flashing lights are often worn by both pedestrians and cyclists in an attempt to increase their visibility to drivers. The question we raise is whether the temporal properties of the variation in light intensity affect observers' ability to judge the translational speed of the wearer. With partial funding from the U. C. Transportation Center, we will assess the apparent speed of light dots that flash off and on as they move across the visual field. If initial measures show that repetitively flashing a moving light affects an observer's judgment of its translational speed, we will systematically examine the effects of waveform and temporal frequency to determine whether there are combinations that can eliminate the perceptual error. **Key Words:** safety improvements, bicycles, pedestrians, vision

Work Completed to Date:

Project completed

Papers to date:

A research report is being completed.

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$15,000

Policies for Safer and More Efficient Truck Operations on Urban Freeways

Principal Investigator: Thomas F. Golob Institute of Transportation Studies University of California Irvine, CA 92697-3600 Tel. 949-824-6287 Email: tgolob@uci.edu	Other Key Participants: Amelia C. Regan Department of Civil and Environmental Engineering University of California Irvine, CA 92697 949-824-1074 Email: aregan@uci.edu
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Abstract: Trucks carry 63% of all freight shipments in California by ton-mile and 72% of all shipments by value. The shippers and receivers of most of this trucked freight, as well as the major intermodal facilities (particularly seaports and airports) are located within California's major urban areas. Consequently, freeways with the heaviest truck traffic are also those that carry heavy volumes of commuters. Customer schedules for pickup and delivery and intermodal operations require that trucks operate on these freeways during congested periods. The California Department of Transportation monitors truck traffic volumes and also maintains a database of traffic accidents. Preliminary analyses of these crash data in combination with truck volume data factored by time of day show that truck-involved crashes are more likely on certain freeway segments, after controlling for differences in levels of truck exposure. We use appropriate statistical analysis methods to identify freeway locations and times at which trucks mixes are problematic. We survey the literature and consult both trucking industry and metropolitan planning sources to identify and evaluate policy initiatives that can be used to re-route and re-schedule some truck traffic to safer places and times. **Key Words:** trucks, crashes, freeway management

Work Completed to Date:

Project completed

Papers to date:

[1] Golob, T and A. Regan, Truck-Involved Crashes And Traffic Levels On Urban Freeways, submitted for presentation at the 2004 meeting of the Transportation Research Board, in preparation for submission to the Journal of Transportation Statistics.

[2] Golob, T and A. Regan, Trends in Truck-involved Freeway Accidents in Orange County, California, 1996 through 2001, in preparation for submission to a journal.

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$65,826

Incorporating Seismic Risk Considerations in Transportation Infrastructure Management

Principal Investigator:

Samer Madanat

Department of Civil and Environmental Engineering

University of California

Berkeley, CA 94720-1712

Tel. 510-642-5672

Email: madanat@ce.berkeley.edu

External Project Contact : All UCTC projects are co-sponsored by Caltrans, Contact Sallybeth Scott, Caltrans, 1120 N St., Sacramento, CA 94305, tel. 916 324-2440

Abstract: The objective of this research is to incorporate seismic hazard and risk analysis considerations, which are concerned with the occurrence of earthquakes and the vulnerability of structures, into transportation infrastructure management systems, with an emphasis on bridges. This will require developing a decision model for optimizing bridge MR&R policies that takes into account the occurrence of earthquake events. This model is not meant to be very detailed or comprehensive, but rather to allow us to obtain qualitative implications of including seismic considerations in Bridge Management Systems. Seed funding for this research will allow us to develop a case study design and initiate 1-2 case studies. We expect to find that accounting for the probability of earthquake occurrence in a bridge MR&R decision-making model will have a significant impact on the probability distribution of the bridge condition-state, the optimal policies, and their total cost. Possible policy implications from this research may include the need to account explicitly for natural hazard risk considerations, or more generally unexpected events, in the process of managing transportation infrastructure facilities. **Key Words:** seismic hazard, risk analysis, bridge management systems

Work Completed to Date:

Project completed

Papers to date:

Research report under final review.

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$15,000

Car Ownership, Insurance Premiums and Employment Outcomes

Principal Investigator:

Paul Ong

SPPSR

University of California, Los Angeles

Box 951656, 5287 Public Policy Bldg.

Los Angeles, CA 90095-1656

310-825-8775

Email: pmong@ucla.edu

Abstract: This study examines the interaction between car ownership, automobile insurance premiums, and employment outcomes, with a focus on disadvantaged populations and neighborhoods. The existing literature indicates that car ownership has an impact on improving employment outcomes, but appropriate methods must be used to account for simultaneity. Minorities face both a “spatial mismatch” and a “transportation mismatch” that limit their opportunities. The central hypothesis is that a higher cost of ownership due to insurance “red lining” lowers car ownership, which in turn adversely affects employment. **Key Words:** car ownership, auto insurance, low income / minority households

Work Completed to Date:

Project completed

Papers to date:

[1] Paul M. Ong and Douglas Miller, "Spatial and Transportation Mismatch in Los Angeles," working paper, June, 2003, also submitted to Journal of Planning Education and Research.

[2] Paul Ong with Hyun-Gun Sung, "Exploratory Study of Spatial Variation in Car Insurance Premium, Traffic Volume and Vehicle Accidents," July, 2003

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 100%

Direct Cost: \$15,000

Projects Continued To July 31, 2004 – 13 Projects

Expanded Evaluation of the California Safe Routes to School Program

Principal Investigator: Marlon Boarnet Institute of Transportation Studies University of California, Irvine Irvine, CA 92697-3600 Tel. 949 824-7695 Email: mgboarne@uci.edu	Other Key Participants: Kristen Day Institute of Transportation Studies University of California, Irvine Irvine, CA 92697-3600 Tel. 949 824-5880 Email: kday@uci.edu
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Abstract: This research expands an ongoing pre- and post-evaluation of the California Safe Routes to School (SR2S) construction program, which allocates \$44 million to local governments for infrastructure projects to improve the safety and feasibility of walking and bicycling to school. We are evaluating 12 SR2S sites in Southern California and sites in Northern California. The research includes: (1) assessment of changes to SR2S sites that are associated with the construction program; (2) observations of pedestrian, bicyclist, and driver behavior before and after SR2S construction at each site; and (3) surveys of parents before and after SR2S construction at each site to assess attitudes and perceptions of safety. The evaluation examines the effectiveness of different neighborhood and traffic interventions in improving the safety of children's non-motorized travel near schools, the frequency of walking and bicycling among children, and the interaction between perceived safety, traffic patterns, the physical environment, and walking and bicycling behavior. **Key Words:** school, pedestrian, bicycle, safety, sidewalks

Work Completed to Date:

Project completed

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$62,690

Verifying Regularities in Queued Freeway Traffic

Principal Investigator:

Michael Cassidy
Civil and Environmental Engineering
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University of California, Berkeley 94720-1720
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Abstract: This work seeks to make sense of at least two puzzling phenomena of queued freeway traffic: 1) stop-and-go oscillations and 2) the wide scatter invariably observed in plots of queued flows vs. density or occupancy. Recent (preliminary) evidence suggests these are not the results of chaotic driver behavior as has been commonly theorized, but to behaviors that are more regular and easily explained. By measuring queued freeway traffic from video and processing these data in careful ways, we expect to verify that stop and go oscillations are created by the vehicle lane-changing maneuvers that abound near ramps. The details of this suspected cause and effect relation are examined. We further expect to confirm that the scatter observed in flow-density plots is merely the result of extracting (and plotting) data from transition zones between queued and un-queued traffic; these zones may be (spatially) long and likely arise because drivers respond to shocks by changing speeds gradually. The findings should advance current understanding of vehicular traffic and help sort-out which theories adequately describe certain traffic phenomena and which phenomena are not yet described by theory. **Key Words:** traffic theory, queues, freeway on-ramps.

Work Completed to Date:

We have completed a review of recent literature on the topic and are assembling data for the analyses.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$50,614

Neighborhood Design, Physical Activity, and Travel

Principal Investigator:

Robert Cervero

UC Berkeley

Email: robertc@uclink.berkeley.edu

Abstract: There's a growing interest in the relationships among neighborhood design, physical activity, and travel choices. Research has linked obesity and other public-health problems to sedentary lifestyles. Some evidence further suggests that postwar residential designs are associated with increased reliance on automobile travel and low levels of walking and cycling. This project will use the BATS 2000 (activity based) survey to extract trip records for limited trip purposes over limited trip ranges – e.g., personal services, convenience-neighborhood shopping, eating, social-recreation, and school travel (over 0 to 5 mile distance ranges). Mode choice for these short trips will be investigated, using metrics that capture walking-scale attributes of built environments – namely street connectivity and block dimensions - along with land-use data and density measures, other attributes of built-environments.. **Key**

Words: public health, biking, walking, mode choice

Work Completed to Date:

We have assembled the data and reviewed it in detail, extracting records needed for this analysis.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$15,000

Comparing White and Minority Household Commuting Behavior: Measuring the Differences

Principal Investigator:

William Clark
Dept. of Geography
UCLA

Los Angeles, CA

Email: wclark@geog.ucla.edu

Abstract: Previous research developed a model of the responses to work-residence separation that linked the probability of moving closer to the job to increasing distance from the work place. Households beyond a threshold distance moved closer to the job when they changed residence. The current project uses that model to examine the commuting behavior of white and minority households, and is specifically interested in how race affects the probability of moving closer to the job when households change residence. Do black, Hispanic and Asian households also move closer to their jobs when they relocate? Do black and Hispanic households who have “constrained” residential choices incur greater commuting costs which arise from the greater spatial separation. The project uses a specialized data set of work residence relationships from the Fulton County school district to examine the patterns of commutes of middle income households, and their dispersed commuting in the Atlanta metropolitan region. The study will provide important new data, on how relatively affluent minority households make commuting decisions in a complex metropolitan environment. **Key Words:** commuting behavior, commuting costs, spatial separation, dispersed commuting

Work Completed to Date:

We have reviewed the recent literature on the topic. We also have assembled and evaluated data for the analysis.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$36,658

Storage System Dynamics and Management Policies

Principal Investigator:

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416 McLaughlin Hall
University of California
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Email: daganzo@ce.berkeley.edu

Abstract: This study investigates the dynamics of networks with link-to-link interactions caused by storage effects and develops effective management policies. Street networks, supply chains and transit lines are the kinds of systems in which instabilities commonly arise when the outflow of a sub-network decreases if some input flows increase. The phenomenon receives different names for different modes (“gridlock” for freeways, “bullwhip effect” for supply chains, and “pairing” for transit systems), but its causes are similar. Instabilities undermine system performance and make management difficult. This research shows how the behavior of storage networks of various kinds can be predicted and managed effectively with new methods. The work focuses on two difficult but related problems: (i) managing the morning commute in a congested city, and (ii) stabilizing freight networks driven by inventory considerations. The morning commute problem is a prototype of systems with centralized management. For this problem, we quantify, based on a physically realistic network model, the connection among residence location and the distribution of congestion costs. Government policies such as tolls, taxation and land-use regulations are evaluated. The freight network problem is a prototype of decentralized systems with multiple managers. For this problem, we demonstrate how to eliminate the “bullwhip effect” and minimize costs with decentralized policies. **Key Words:** networks, flows, congestion, freight management

Work Completed to Date:

We have reviewed the literature and the current research on the topics covered here. We also have begun to refine the theoretical approach to the problems.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$54,544

High-Coverage Point to Point Transit: Institutional Feasibility and Demand Study of Agencies, Users and Operators

Principal Investigator:

R. Jayakrishnan
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UC Davis
Davis, CA 92697-2175
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Email: rjayakri@uci.edu

Abstract: We examine demand for and acceptability of a new design for private-public transit, named High-Coverage Point to Point Transit (HCPPT.) The technical and design details of HCPPT are currently under development by the PI in a separately funded project. The design is based on jitney or shuttle-style operations with a large number of deployed vehicles coordinated using advanced information supply and fast routing and route optimization. The system design ensures that no more than one transfer is needed for the travelers, by using transfer hubs and re-routable and non-re-routable portions in vehicle travel plans. Simulation studies have shown that with enough deployed vehicles, the system can be substantially better than more conventional fixed route and demand-responsive transit systems. In the UCTC funded research we investigate (1) the acceptability of the system to public and private transit agencies, (2) acceptability to operators, primarily drivers; and (3) the responses from potential travelers. **Key Words:** transit, advanced transit technologies, simulation, demand

Work Completed to Date:

We have reviewed previous work on the topic and have assembled some of the data we need for this analysis.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$15,000

Handheld Travel Survey Technology to Supplement Vehicle Tracking in a Shared-Use Station Car Program

Principal Investigator:

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Irvine, CA 92697-3600
tel. (949) 824-8462
fax (949) 824-8385

Email: mmcnally@uci.edu

Abstract: An experimental shared-use station car program using electric vehicles is being implemented in association with several public and private sector organizations in Irvine, CA. The goal of this program is to demonstrate the potential of linking shared-use electric vehicles with conventional line-haul public transit services to provide automobile-like accessibility at the ends of the commute trip. GPS-based in-vehicle tracking technologies are being utilized with web-based travel surveys to determine how participants schedule activities before and after shared-use vehicles become a travel option. In this project we supplement the survey research using a GPS-based handheld device to track travel and activity when not using program vehicles. The handheld device continuously records and stores spatial position, then dumps the data via a wireless link to the in-vehicle device when completing activities. In conjunction with current program technologies and as a stand-alone technology, the handheld technology is assessed for its acquisition of comprehensive data on daily travel and activities, as well as user effort and inconvenience. The devices also are evaluated as a means of providing remote access to reservation systems and as keyless access to program vehicles. **Key Words:** travel surveys, new technologies, GPS

Work Completed to Date:

We have begun to analyze the data quality from hand held devices and other performance measures are being developed.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$53,659

An Input-Output Analysis of the Relationships between Communications and Travel for Industry

Principal Investigator:

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Email: plmokhtarian@ucdavis.edu

Abstract: Numerous public policies have been promulgated on the assumption that telecommunications will be a useful trip reduction instrument. However, many scholars have suggested that the predominant effect of telecommunications may be complementarity – increasing travel. Although short-term, disaggregate studies of single applications such as telecommuting have tended to find a substitution effect, more comprehensive studies, on the aggregate scale, are needed. One of the few such studies used input-output analysis to examine relationships between transportation and communication input intensities across 44 industry classes in Europe for 1980, and found strong evidence of complementarity. The present study would apply a similar methodology to the input-output accounts for the US across multiple points in time (at least 1982, 1987, 1992, 1996, 1997, 1998). This important extension would permit analysis both of industry-specific differences in the relationships of interest, and of how those relationships change over time (e.g. with the increasing adoption of the Internet and other telecommunication technologies). The result will be a more informed view of the extent to which it is realistic to expect telecommunications to substitute for travel, at least in the industrial context, which constitutes a sizable proportion of the total demand for telecommunications and transportation. **Key Words:** telecommunications, industrial development, input-output analysis

Work Completed to Date:

We have reviewed and critiqued previous work on the topic and have assembled data for the US case. Analysis is underway.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$59,200

**Public Transit Systems and the Residential Location Choices of Minority and Transit-Dependent Households
Seed Grant**

Principal Investigator: John M. Quigley Dept. of Public Policy 2607 Hearst Avenue University of California Berkeley, CA 94720 Tel. 510-642-4670 Email: quigley@econ.berkeley.edu	Other Key Participants: Steven P. Raphael University of California Berkeley, CA 94720 Email: raphael@socrates.berkeley.edu
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Abstract: In this project, we analyze the impact of several recent extensions of the Bay Area Rapid Transit (BART) system on the residential location choices of minority households and other households that are particularly dependent on public transit. We compare before-after changes in the resident populations of census tracts serviced by the new stations to similar changes in comparable areas located in the region's suburbs but located far from the new stations. Data from the 1990 and 2000 U.S. census are used to measure population change. We characterize the distance between each census tract in the East Bay suburbs to each of the three new BART stations, e.g., physical distance between the centroids of each tract and the nearest station, or .commute time estimates between each tract and the nearest station,, and construct a merged data set at the census tract level describing the residential populations of each for 1980, 1990, and 2000. This data set is constructed using 1990 tract definitions (which will require some imputation of 1980 variables) and is used to construct the dependent variables, measures of population change, as well as to construct a set of variables from the 1980 and 1990 data describing initial conditions. **Key Words:** residential location, transit impacts, minority household

Work Completed to Date:

We have assembled Census data on resident populations for 1990 asnd 2000 and have characterized the distance and time from centroids to BART stations. We are undertaking the analysis at this time.

Papers to date:

None to date

Conferences Attended:

None to date

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$10,752

Unlimited Access to Work: An Evaluation of Employer-Based Transit Programs

Principal Investigator:

Don Shoup
Institute of Transportation Studies
School of Public Policy and Social Research
University of California, Los Angeles
Los Angeles, Ca 90095-1656
Tel. 310-825-5705

Email: shoup@ucla.edu

Abstract: Transit agencies have found a new way to increase ridership: offer transit-pass programs that cater to specific user groups. In these programs, a group purchases the right for all its members to ride public transit without paying a fare. Because all members of the group can ride free, they ride public transit more often. We refer to these programs collectively as Unlimited Access. Unlimited Access programs have been developed for the university, the workplace, and the home. Previous research has examined university programs, and has shown that they increase transit ridership, reduce vehicle travel, reduce parking demand, and increase transit riders' incomes. The largest potential market for Unlimited Access is for workplace transit programs, but there have been few studies of these programs. We examine these workplace programs and: 1) explain how the programs work, 2) examine the programs' effects on employee transit ridership, vehicle travel, and parking demand, 3) analyze the programs' effects on transit agency performance, 4) calculate the programs' costs and benefits, and 5) recommend best practice guidelines. Unlimited Access appears to be a promising innovation with great potential, and we will evaluate its potential benefits for employers, transit agencies, and society. **Key Words:** transit fares, transit pass, commuting

Work Completed to Date:

We have identified workplace programs and are in the process of gathering data for each program in accordance with the tasks listed above.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$54,827

The Effects of Contracting for Service on the Cost-Efficiency of Fixed-Route Bus Transit in the U.S.

Principal Investigator: Brian Taylor SPPSR University of California, Los Angeles Box 951656, 5383 Public Policy Bldg. Los Angeles, CA 90095-1656 310-825-7442 Email: btaylor@ucla.edu	Other Key Participants: Martin Wachs Dept. of Civil and Environmental Engineering 110 McLaughlin Hall University of California Berkeley, CA 94720-1712 Email: mwachs@uclink.berkeley.edu
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Abstract: This study examines the economic effects of contracting for fixed-route bus service. Previous research has examined whether contracting for bus service has reduced costs. Our focus in this project is on how contracting affects cost-efficiency, recognizing that earlier studies don't account for the fact that cost-efficiency problems are likely to motivate transit systems to contract for service in the first place. To account for such causality questions, we use advanced regression analysis methods on a rich, new merged cross-sectional data set to examine the influence of contracting for transit service cost-efficiency. The merged data set for this study is drawn primarily from two sources: (1) the National Transit Database maintained by the FTA and 2) a transit service contracting database compiled from a recent Transportation Research Board survey of transit agencies nationwide. **Key Words:** transit, contracting, costs, efficiency

Work Completed to Date:

We have conducted a literature review and assembled data. Analysis has begun.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$15,000

Exploring the Marketability of Fuel-Cell Electric Vehicles

Principal Investigator: Thomas Turrentine Institute of Transportation Studies University of California, Davis Davis, CA 95616 530-752-6500 Email:	Other Key Participants: Kenneth Kurani Institute of Transportation Studies University of California, Davis Davis, CA 95616 Email: knkurani@ucdavis.edu
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Abstract: Fuel-cell vehicles (FCVs) promise to reduced greenhouse gases and criteria pollutants, as well as improve fuel efficiency for light-duty motor vehicles. But lack of a developed “green-car” market and uncertainty that such a market is possible has limited industry and government commitment to current green car technologies. We take two first steps in market research for FCVs: 1. A FCV focused review of recent research on consumer response to refueling range, fuel types, social benefits, and fuel distribution; 2. A design and pilot test of custom interactive stated-preference methods for FCV markets with a sample of vehicle owners who currently use and understand in-vehicle power plants—such as RV owners and small businesses who carry generators. **Key Words:** fuel cells, market research, stated preference surveys.

Work Completed to Date:

We have completed a detailed review of the literature including recent news articles on fuel cells and new vehicle technologies. We have reviewed the consumer response literature. We are starting on the design of stated preference research.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$15,000

Experimental and Theoretical Investigations on Traffic Flow at Highway Merges

Principal Investigator:

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University of California, Davis
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Abstract: In this project, we gather and analyze empirical data at merge sites to study the possible combinations of stationary states at merges. To get a clearer picture of the underlying relations between stationary states at merges, we study isolated merges, especially those without the presence of significant immediate upstream/downstream diverges, so as to avoid the complications arising from interactions between merges and diverges. We examine a number of data sources to find such merges with usable data, such as the PEMS database, the Berkeley Highway Lab database, the Toronto QEW database. We identify, from a large amount of data collected at certain merges, all possible combinations of stationary states existing in these merges. Stationary states of congestion can be categorized into recurrent and non-recurrent, according to whether they appear from day to day or not. We also are interested in free flow states. The findings of this study should be useful in understanding on merge traffic dynamics, and should suggest better strategies for traffic management and control. **Key Words:** traffic congestion, queues, merges

Work Completed to Date:

Data collection and assessment of data issues has been completed.

Papers to date:

None to date

Conferences Attended:

Transportation Research Board Annual Meeting, 2003

Other Accomplishments:

None to date

Percent Complete: 50%

Direct Cost: \$15,000

C. FUNDING SOURCES AND EXPENDITURES

It is the UCTC's longstanding policy to commit all funds received from our sponsors, the US Department of Transportation and the California Department of Transportation, in the year that they are received. If funds are not fully expended in the year received, the funds may be carried over into the next fiscal year with the permission of the UCTC Director, but remain committed to the categories to which they were initially allotted.

Table 5 presents 2002-2003 program allotments, using funds received from our sponsors for Year 15: \$916,300 from the US DOT matched dollar-for-dollar by the California Department of Transportation. Additional contributions not counted in this total include unbilled faculty and student time devoted to research projects, UC waiver of overhead on state funds, and most UC administrative services.

Table 5. Allocated Amounts for Year 15 (2002- 2003)

University Transportation Centers Program
Grantee: University of California
Grant Year: Aug. 1, 2002 - July 31, 2003 (Year 15)

ITEM	BUDGET
Center Director Salary	65,000
Faculty Salaries	92,875
Administrative Staff Salaries	47,000
Other Staff Salaries	69,000
Student Salaries	227,447
Staff Benefits	53,070
Total Salaries and Benefits	554,392
Scholarships	902,014
Permanent Equipment	5,000
Expendable Property & Supplies	21,422
Domestic Travel	44,200
Foreign Travel	0
Other Direct Costs (Specify)	266,572
Total Direct Costs	1,793,600
Facilities & Admin. (Indirect) Costs	39,000
TOTAL COSTS	1,832,600
Federal Share	916,300
Matching Share	916,300
TOTAL AVAILABLE FUNDS YR. 15	1,832,600

Approximately 43 percent of total revenues was spent on scholarships and fellowships, including graduate student researcher tuition and fees, and about 31 percent was spent on research. Access magazine and other tech transfer expenses account for 12% of the total, and support for education (new courses) for 5%. About 9 percent of UCTC revenues were spent on administration including the Director's salary, and 2%

was spent on indirect costs, for a total of 11% direct and indirect administrative costs. University overhead is waived on scholarships as well as on the Caltrans portion of the grant.

Figure 1 illustrates revenues and Figure 2 illustrates direct expenditures for UCTC in 2002-2003 (Year 15.)

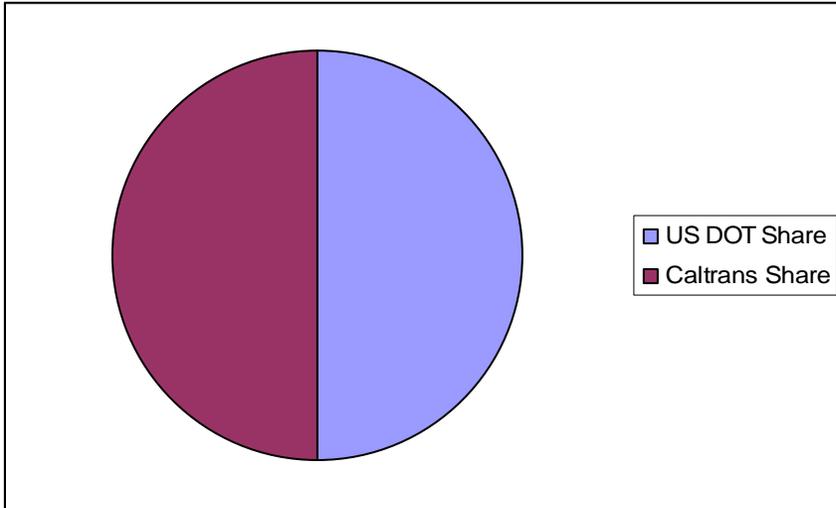


Figure 1. UCTC Revenues, Year 15 (2002-2003)

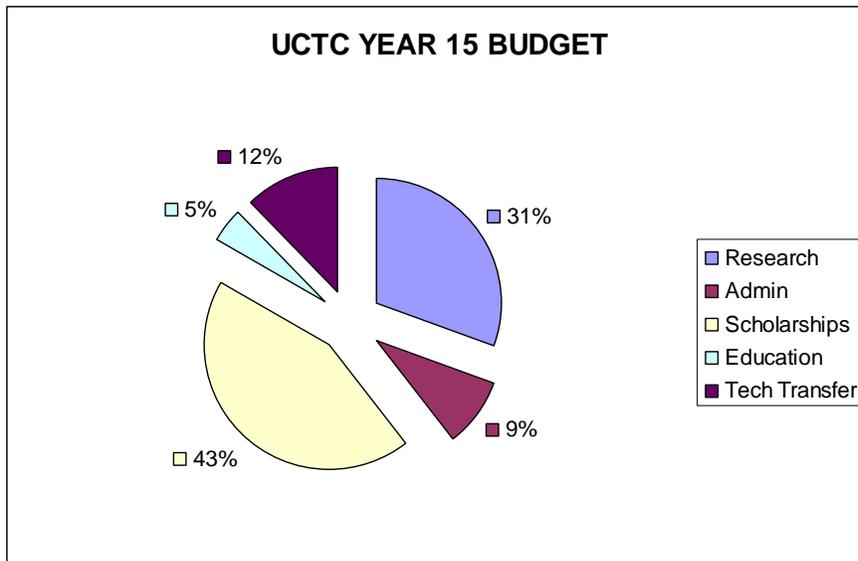


Figure 2. UCTC Expenditures, Year 15 (2002-2003)
(not including 2% indirect costs)

Appendix 1. Glossary

ACCESS - the research magazine published by the University of California
CAD- computer-aided design
CALTRANS- the California Department of Transportation
CMA- Congestion Management Agency, special-purpose county-level organizations in California
CUTC - Council of University Transportation Centers
EPA- the Environmental Protection Agency
FHWA- the Federal Highway Administration of the US Department of Transportation
FTA- the Federal Transit Administration of the US Department of Transportation
FTE- full-time equivalent (a measure of staffing levels)
GIS- geographic information science / geographic information systems
GSR- graduate student researcher
IGS- the Institute of Governmental Studies at UC Berkeley
IITPS- the Norman Y. Mineta International Institute for Transportation Policy Studies at San Jose State University
ISTEA- the Intermodal Surface Transportation Efficiency Act
ITS - the Institute of Transportation Studies at the UC Berkeley, UC Davis, UC Irvine, and UCLA
IURD - the Institute of Urban and Regional Development at UC Berkeley
METTRANS- the Center for Metropolitan Transportation Studies at the University of Southern California
MPO- Metropolitan Planning Organization
NSF- National Science Foundation
OECD- the Organization for Economic Cooperation and Development
PATH- Program for Advanced Transit and Highways
PI- Principal Investigator
TEA 21- the Transportation Efficiency Act for the 21st Century
TRB- the Transportation Research Board
UC- the University of California, a nine-campus public institution
UC BERKELEY- the Berkeley campus of the University of California
UC DAVIS- the Davis campus of the University of California
UC IRVINE- the Irvine campus of the University of California
UCLA- the Los Angeles campus of the University of California
UCTC- the University of California Transportation Center
USC - the University of Southern California, a private university
US DOT- the US Department of Transportation
UTC Program- the University Transportation Centers Program