METRANS
Transportation Center
USC CSULB

NATIONAL CENTER FOR METROPOLITAN TRANSPORTATION RESEARCH

ANNUAL REPORT
FISCAL YEAR ENDING JUNE 30, 2004

Sections
Management Structure
&
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A. CENTER THEME

The theme of the National Center for Metropolitan Transportation Research (METRANS) is transportation within large metropolitan areas. METRANS works on developing and examining solutions to the transportation problems of major metropolitan areas using an integrated approach that blends engineering, policy, planning, business administration, and public administration expertise. Within the context of large metropolitan areas, METRANS addresses national transportation issues such as advanced transportation technologies, urban transportation research, transportation infrastructure technologies, intermodal efficiency, and transportation and the environment. METRANS also has become a national resource for information on solutions to metropolitan transportation problems.

The Center addresses problems related to all five of DOT's Strategic Science and Technology Goals, with focus on the types of problems that occur within the Southern California region:

Provide a Safer Transportation System

- Enhanced safety for the transportation infrastructure, public transit patrons, drivers and passengers, and pedestrians

Achieve a High Level of Transportation System Security

- Safety, security, productivity and survivability of the transportation infrastructure under natural disasters, such as earthquakes and floods

Improve Environmental Quality and Energy Efficiency

- Reduced air pollution impacts of transportation
- Upgrading United States Immigration and Naturalization Service (INS) and United States Customs Service (Customs) border operations to enhance and expedite passenger and cargo processing, thereby reducing air pollution
- More energy efficient transportation systems

Foster Economic Growth and Productivity

- Reduced congestion on highways, rail, shipping, and air transport systems
- Development of the infrastructure and processes to better support international trade and transportation industries

Ensure Improved Access and Increased Mobility

- Mobility and accessibility for immigrant, disadvantaged, aged, and minority populations
- Improved logistics through ports and the transportation corridors serving them

METRANS also directs its work at several of DOT's Strategic Partnership Initiatives, with research focused in the following areas:

- Enhanced Goods and Freight Movement at Domestic and International Gateways

- Accessibility for Aging and Transportation-Disadvantaged Populations
- Monitoring, Maintenance, and Rapid Renewal of the Physical Infrastructure
- Environmental Sustainability of Transportation Systems
- Smart Vehicles and Operators
- Physical Infrastructure

Our research directed at these initiatives also crosses into several other DOT initiatives, such as National Intelligent Transportation Infrastructure, and Next Generation Motor Vehicles. Research is conducted in these areas as a means to solve problems in metropolitan areas.

METRANS also serves DOT's needs in International and Multidisciplinary Education, and in Mid-Career Training. USC and CSULB are uniquely positioned in these areas because of their highly diverse and international student bodies, diverse faculty, excellent facilities, location in the center of the nation's dominant region for international trade with Asia, and unique course offerings and degree programs. For example, USC has created an interdisciplinary certificate program in transportation, and CSULB has an established reputation for professional education in international trade and port operations. In March 2001, CSULB began instruction in the new MA in Global Logistics program to train professionals to deal with the complexities of supplier relations, supplier selection, purchasing negotiations, operations, transportation, inventory, warehousing, third-party vendors, electronic commerce, and customer relations.

METRANS complements the two other University Transportation Centers in California by placing special emphasis on transportation issues in Southern California, an area encompassing more than 5 percent of the nation's population and nearly 2/3 of California's population. This includes study of Southern California's major investments in transportation (e.g., goods movement and transit) as well as the prominent problems of congestion, air pollution, and limited mobility for disadvantaged populations. In addition, METRANS' emphasis on blending technology and policy research, and on technology transfer, is unique.

METRANS is committed to focusing on high-priority topics and issues in metropolitan regions. In its first two calls for proposals, METRANS requested research on methods for improving mass transit and methods for improving goods movement and logistics. In its third call for proposals, METRANS added the area of infrastructure renewal to mass transit and goods movement, and a new area, safety and security, was added this year. Using Southern California as our laboratory, our goal is to improve the efficiency and effectiveness of the urban transportation system, while simultaneously building the human resource capacity to improve transportation in the United States.

Summary of Accomplishments

This Annual Report covers the sixth year of METRANS' existence, the second year of funding at the $1 million level. We have expanded existing activities and launched new activities. Our 1999 Strategic Plan objectives have been largely achieved, and we are now planning for the next six years.

Highlights of the 2003-2004 year include:

- METRANS issued a sixth RFP. We received 18 proposals requesting a total of $1,440,565. Proposals came from 30 faculty representing 10 different departments. After and extensive peer review process, 9 excellent proposals were selected for funding this year. Three additional proposals that had been deferred from the 2002-3 round were also funded.

- The new applied research program, *Monitoring the Ports*, was launched with two projects at CSULB. The applied research program funds data collection, monitoring, and short-term research that supports outreach and technology transfer in goods movement and international trade.

- This year METRANS joined with the new Keston Institute for Infrastructure at USC to sponsor a conference, "The Alameda Corridor: Blueprint for the Future?" held in February 2004. The conference brought together academics and stakeholders in the goods movement and international trade community to consider the Alameda Corridor as a model for future transportation infrastructure investments. Speakers included key leaders in the development and financing of the Alameda Corridor. The conference was held jointly with the METRANS semi-annual Advisory Committee Meeting, allowing members to see first-hand one of METRANS' outreach activities. A supporting White Paper and conference summary were published.

- The Sixth Annual Center for International Trade and Transportation (CITT) *State of the Trade and Transportation Industry Town Hall Meeting* was held in March 2003. Entitled, Quality of Life and Port Operations: Challenges, Successes and the Future, the Town Hall addressed the challenge of managing growth of international trade while maintaining quality of life in Southern California.

- Graduate students continue to win awards and recognition, **Ms. Jennifer Russell**, PhD student in Industrial and Systems Engineering, USC, was selected for the Eno Transportation Foundation 2004 Leadership Development Conference. Others received various outstanding student awards.

- Two USC undergraduates won scholarship awards to conduct transportation research. **S. Tyler McHenry** won a Communications Critical Pathways scholarship to conduct research on remote programming of sensors networks to be used for vehicle classification. **David Wesley Gerald** received a McNair Scholarship to conduct research on improving public transit service in Los Angeles.

- METRANS Director **Genevieve Giuliano** served as Chair of the Transportation Research Board's Executive Committee for calendar year 2003.

- CSULB Professor **Hamid Rahai**, Department of Mechanical Engineering, won the 2004 Northrop Grumman Excellence in Teaching Award.

- The new GLS-Online certificate program was launched in June. After nearly two years of development, the online version of the Global Logistics Certificate (GLS) started its first class. The GLS is a unique and highly successful professional training program in logistics and supply chain management. The online version was developed to serve ever increasing demand and to make it available outside the Southern California region.

- The first class of the Master of Arts Degree in Global Logistics graduated in Fall 2003 with 19 students. The MAGL combines the analytical skills of a traditional MBA with a strong emphasis on logistics in a global setting.

- METRANS continues to attract matching funds. In addition to the full dollar-for-dollar match provided by Catrans, USC researchers have received $323,000 in research funding from the Los Angeles County Metropolitan Transportation Authority (LACMTA) for grants in progress 2002 through 2004. Additional funding of $150,000 from Caltrans was provided for various research and training projects. The Ports of Los Angeles/Long Beach continue to support the CITT Town Hall (nearly $20,000 this year), and have now established scholarships for the Master of Arts Degree in Global Logistics at CSULB.

B. DESCRIPTION OF MANAGEMENT STRUCTURE

University of Southern California holds the prime grants that fund METRANS from the US DOT and CALTRANS. Center administration is the responsibility of the USC Principal Investigator, but all policy matters are jointly decided by USC and CSULB through the METRANS Executive Committee. A full-time staff member serves as METRANS Administrator. Staffing for CSULB activities is allocated on a task specific basis. Only one change in the management of METRANS took place this fiscal year; the Associate Director position was eliminated. Executive Committee membership remains the same as last year.

Executive Committee

The Executive Committee is responsible for all METRANS project selections (research, education, and technology transfer) and for setting METRANS policies. Current membership is:

- Anastasios Chassiakos, Professor and Department Chair of Engineering Technology, CSULB
- Genevieve Giuliano, Professor of Policy, Planning, and Development, USC
- Randolph Hall, Professor of Industrial and Systems Engineering and Associate Dean of Research, School of Engineering, USC
- Petros Ioannou, Professor of Electrical Engineering-Systems, USC
- Joe Magaddino, Professor of Economics and Chair, Department of Economics, CSULB
- Mike Mahoney, Professor of Computer Science and Dean, School of Engineering, CSULB
- James E. Moore II, Professor of Industrial and Systems Engineering, and Public Policy and Management, USC
- Marianne Venieris, Executive Director, Center for International Trade and Transportation, CSULB
- Emeritus: Dan Barber, Professor of Public Administration, CSULB

Executive committee membership is a voluntary (unpaid) service activity.

Director

Genevieve Giuliano, Professor in the School of Policy, Planning, and Development is Director of METRANS. The Director is responsible for the overall management of METRANS, including reporting, matching fund solicitation, outreach, publications, education, supervision of the METRANS Administrator, project management and development of the center research agenda, and requests for proposals/qualifications. The center director is responsible

for chairing meetings of the Executive Committee (joint CSULB/USC) and the Advisory Committee.

Deputy Director

Marianne Venieris serves as METRANS Deputy Director. Ms. Venieris has been responsible for the CSULB technology transfer activities since METRANS' inception. She is an experienced manager and the leading force behind METRANS' goods movement outreach activities. Ms. Venieris is Executive Director of CITT and Director of Transportation Programs, CSULB Foundation.

The Deputy Director is responsible for collecting performance statistics related to CSULB activities, distributing information to CSULB faculty and students and overseeing the METRANS technology transfer program. The Deputy Director works under the direction of the METRANS Director.

Associate Director

The Associate Director position was eliminated this year. Student activities and outreach events are now established, and the position is no longer required. The former Associate Director, Professor James E. Moore II, continues to serve informally as liaison for USC School of Engineering student activities. The Director has taken responsibility for other student activities, and a part-time graduate student provides assistance. In addition to serving as Director of the Civil Engineering Department's graduate program in Transportation Engineering, Prof. Moore now serves as Chair of the Department of Industrial and Systems Engineering.

Center Administrator

Jacquette Givens of USC serves as Center Administrator. She is responsible for the day-to-day administration of center activities, reporting to the Center Director. This includes coordination of outreach efforts; gathering information needed for annual reporting; coordination of the proposal review and report review processes; coordination of special conferences, seminars, and other events; and managing the METRANS accounts.

CSULB Administrator

Alix Traver serves as CSULB administrator. The position is responsible for the collection of performance data at CSULB, and for communicating METRANS information to CSULB faculty, staff, and students. The position is also responsible for assisting with the METRANS Annual Conference, and for developing center promotions. The CSULB Administrator works under the guidance of the Deputy Director and the Center Administrator.

Promotion Manager

Marianne Venieris, METRANS Deputy Director and Executive Director of the CITT at CSULB, has served as the Promotion Manager. This position is responsible for developing outreach materials and managing the development of the website. Ms. Venieris managed the development of new promotional materials and the METRANS News.

Webmaster

Greg Raitz of CSULB Foundation serves as webmaster. He is responsible for developing and maintaining the METRANS web page. He works under the direction of the Center Administrator and Center Director.

Advisory Committee

The Director has formed an Advisory Committee (Table 1), composed of representatives from agencies and companies that participate in center activities. The Advisory Committee is used to solicit suggestions for research, to assist in student job placements, and to assist in outreach and technology transfer activities. The Advisory Committee met twice during the 2003-04 fiscal year.

Faculty Members

METRANS has funded 36 faculty at USC and CSULB, 35 of which are members of the METRANS Center (one retirement). Keeping to METRANS' interdisciplinary theme, the faculty represent four branches of engineering (civil, electrical, industrial, and mechanical), computer science, as well as business, economics, geography, public policy, planning, and public administration. These faculty act as principal investigators on METRANS-funded projects, and have responsibility for overseeing individual research projects. They also come together periodically to share insights through coordination meetings and conferences.

Tridib Banerjee	Policy, Planning, and Development	USC
Satish Bukkapatnam	Industrial & Systems Engineering	USC
Anastasios Chassiakos	Engineering Technology	CSULB
Maged Dessouky	Industrial & Systems Engineering	USC
Michael Driver	Business Administration	USC
Genevieve Giuliano	Policy, Planning, and Development	USC
Peter Gordon	Policy, Planning, and Development	USC
Lisa Grobar	Economics	CSULB
Karl – H. Grote	Mechanical & Aerospace Engineering	CSULB
Randolph Hall	Industrial & Systems Engineering	USC
Le Dam Hanh	Civil Engineering	USC
John Heidemann	Information Sciences Institute	USC
Petros Ioannou	Electrical Engineering Systems	USC

Clara Irazabel	Policy, Planning and Development	USC
Ken James	Electrical Engineering	CSULB
Erik Johnson	Civil Engineering	USC
Tim Jordanides	Electrical Engineering	CSULB
Behrokh Khoshnevis	Industrial & Systems Engineering	USC
Ilias Kosmatopoulos	Electrical Engineering Systems	USC
John Kuprenas	Civil Engineering	USC
Joe Maggadino	Economics	CSULB
Naj Meshkati	Civil Engineering	USC
Kristen Monaco	Economics	CSULB
James E. Moore II	ISE and SPPD	USC
Dowell Myers	Policy, Planning and Development	USC
Fernando Ordonez	Industrial & Systems Engineering	USC
Emily Parentela	Civil Engineering	CSULB
Hamid Rahai	Mechanical Engineering	CSULB
Mansour Rahimi	Industrial & Systems Engineering	USC
Christian Redfearn	Policy, Planning and Development	USC
Harry Richardson	Policy, Planning and Development	USC
Paul Ronney	Mechanical Engineering	USC
Maria Todorovska	Civil Engineering	USC
Reza Toossi	Mechanical Engineering	CSULB
Chris Williamson	Geography	USC
Hung Leung Wong	Civil Engineering	USC

Table 1. METRANS Advisory Committee

Name	Title	Organization
Joel Anderson	Executive Vice President	California Trucking Association
Sandra Balmir	Transportation Planner	Federal Highway Administration
Dan Beal	Manager, Public Policy and Programs	Auto Club of Southern California
Rebecca Brewster	President and CEO	American Transportation Research Institute
Susan Collette	Supervising Transportation Planner	Los Angeles World Airport
James de la Loza	Executive Officer County Wide Planning and Development	Los Angeles County Metropolitan Transportation Authority
Doug Failing	Director, District 7	California. Department of Transportation
M.J. Fiocco	Transportation Specialist	U.S. Department of Transportation
Jim Gosnell	Deputy Executive Director	Southern California Association of Governments
Richard Hollingsworth	President and CEO	Gateway Cities Partnership, Inc.
Randell Iwasaki	Acting Senior Deputy Director,	California Department of Transportation
Norm King	Executive Director	San Bernardino Association of Governments
Geraldine Knatz	Director of Planning	Port of Long Beach
Ronald Knipling	Chief, Research Division	U.S. Department of Transportation
Stephen Lantz	District, Communication and Development	Metrolink (Southern California Regional Rail Authority)
Jack Levis	Portfolio Project Manager	United Parcel Service
Domenick Miretti	ILWU Senior Liaison	Ports of Long Beach and Los Angeles
Michael Onder	Freight Management and Operations Team	U.S. Department of Transportation
Cindy Quon	Director, District 12	Caifornia Department of Transportation
Tom Teofilo	Vice President, Southern California Operations	Pacific Merchant Shipping Association
Lynn Terry	Deputy Executive Officer	California Air Resources Board
Barry Wallerstein	Executive Officer	South Coast Air Quality Management District

C. DESCRIPTION OF RESEARCH PROGRAMS

The funding delays of past years have shifted the METRANS RFP and project award schedule. FY 02-03 matching funds from Caltrans were not received until late June 2003, so the 02-03 round of projects did not start until July 2003. In addition, uncertainties regarding federal reauthorization made it necessary to retain some funds from prior years to cover possible interruptions in funding in 03-04 and 04-05. Three projects from 02-03 were deferred until sufficient funding could be assured; these were authorized and started in September 2003. The 03-04 RFP was authorized at a lower level of funding than 02-03, again in order to conserve funds for future possible interruptions.

Changes in Caltrans policies have also affected the RFP process. Caltrans is seeking to coordinate its various research programs and to more closely align their funding with the operational goals of the agency. In years past, METRANS has made special efforts to incorporate Caltrans' topical interests that fall within the focus areas of METRANS. The 03-04 RFP referred faculty to a list of projects of interest to Caltrans and encouraged proposals on these topics.

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Table 2 gives the chronology of all completed research rounds. The bottom row gives the chronology for the 2003-4 round. The RFP was issued in September. Proposals were due October 15, 2002, and selections were made by the Executive Committee in early January so that projects could begin at the start of the Spring semester.

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Table 2: Timing of METRANS Requests for Proposals and Project Selection

Fiscal Year	RFP Issued	Due Date	Selections	Start Date
98/99	3/19/1999	4/28/1999	6/1/1999	7/1999 to 9/1999
99/00	7/7/1999	8/11/1999	9/27/1999	1/1/2000
00/01	2/11/2000	3/17/2000	5/8/2000	8/2000
01/02	12/12/2000	2/23/2001	4/24/2001	8/15/2001
02/03	8/16/2002	10/15/2002	1/12/2002	07/01/2003
03/04	9/5/2003	10/15/2003	12/27/2003	01/05/2004

METRANS' goal has been to make selections within three months after the RFP is issued. This allows about 5 weeks for proposal preparation, 4 weeks for peer review, and 3 weeks for compilation of results and communication with the METRANS Executive Committee. In order to assure that proposal evaluation is as neutral as possible, academic peer reviewers are drawn from outside USC and CSULB. The smaller number of proposals in this round (due to reduced funding availability and many PIs busy with projects from 02-03) made the review process easier and allowed us to keep to the January 2004 start date. There were no significant funding delays this year, and the selected projects were largely able to begin in January.

The first two METRANS RFPs restricted proposals to the two focus areas of goods movement and public transit. For the third and fourth RFP, infrastructure renewal was

added as a third focus area. For the fifth RFP, four focus areas were identified: 1) commercial goods movement and international trade, 2) mobility of urban populations, 3) highway infrastructure and infrastructure renewal, 4) safety, security and vulnerability. These focus areas remain unchanged. A summary of the submitted proposals by focus area is provided in Table 3. As in previous years the largest number of proposals falls into the goods movement category, followed by urban mobility. A large change occurred in the last two categories, with only one infrastructure proposal, and 6 in safety. The safety proposals included both safety topics (e.g. reducing crashes) and security topics. We received three proposals from CSULB faculty and five joint USC/CSULB proposals. The remaining proposals were from USC faculty.

Table 3: Summary of Proposals Submitted to METRANS

			Number of Proposals by Focus Area				
FY	Proposals	Requested	Goods	Mobility	Infra-structure	Safety	Multiple
98/99	15	$808,497	6	8	0	0	1
99/00	12	451,335	6	5	0	0	1
00/01	17	906,370	10	6	1	0	0
01/02	16	882,261	7	2	5	0	2
02/03	29	2,696,136	10	8	6	5	0
03/04	18	1,440,565	7	4	1	6	0
Total	107	7,185,164	46	33	13	11	4

The selection process was competitive. The Executive Committee selected nine projects for funding in the 2003-4 fiscal year, a selection rate of 50%. Because of general smaller total budgets, we were able to fund a larger share of projects in this round, despite the reduced total available.

A cumulative list of funded projects is summarized in Table 4.The FY 02-03 row has been revised from last year to reflect the 3 deferred project that were funded in September 2003. We have now funded a total of 52 projects totaling about $3.4 million. About $1.7 million represents ongoing projects, the result of increased funding in the past two years and the compression of awards into a 1.5 year period.

The awards retain the center's strength in goods movement and freight (4 awards), while also sustaining activities in mobility (3 awards). Two projects were awarded in safety; none were awarded in infrastructure. Of the nine awards, one was to CSULB, two were joint USC/CSULB, and the remainder was awarded to USC.

Table 4: Summary of Proposals Awarded by METRANS

			Number of Awards by Area				
FY	Awards	Amount	Goods	Mobility	Infra-structure	Safety	Multiple
98/99	6	$294,299	3	2	0	0	1
99/00	7	324,898	4	3	0	0	0
00/01	11	580,882	5	6	0	0	0
01/02	7	446,602	3	1	1	0	2
02/03	12	1,079,721	5	4	3	0	0
03/04	9	667,271	4	3	0	2	0
Total	52	3,393,673	24	19	4	2	3

In reference to DOT subject areas (Table 4b), seven of the new projects are in the Transportation System Performance area: two in Measurement, Characterization and Modeling ($217,289), two in Transportation and Logistics System Operation ($214,982); one in Behavioral Sciences and Human Performance ($20,000), and two in Transportation Planning, Economics, and Institutional Issues ($95,000). The remaining projects are in Information Infrastructure (traffic management, $75,000), and Vehicles (design and manufacture, $35,000). The additional 02-03 projects are in Transportation System Performance ($180,000) and Physical Infrastructure ($80,000)

With respect to goals, our greatest emphasis continues to be on mobility (4 projects and $245,000) and economic growth and trade (3 projects and $367,271). These are consistent with METRANS' emphasis on transportation problems of large metropolitan regions, such as Southern California. In terms of enabling research, the projects are rather evenly spread across the various categories. For modal emphasis, highways are the most prominent in seven of the new projects ($572,271), reflecting our research on highway infrastructure and trucking. Four of the seven cover more than one mode, hence maritime, rail and transit are represented in greater proportion than appears in the categorization.

As intended, all projects selected by METRANS are directed toward DOT's strategic initiatives. The following list is cumulative, covering all funding rounds to date:

Enhanced Goods and Freight Movement at Domestic and International Gateways

- Hanh and Moore: Landside Surface Transportation Impact of Short Sea Shipping in Southern California (03/04)
- Ioannou and Chassiakos: Development of Methods for Handling Empty Containers with Applications in the Los Angeles/Long Beach Port Areas (03/04)
- Giuliano and Magaddino: Evaluation of the Terminal Gate Appointment System at the Los Angeles/Long Beach Ports (03/04)
- Dessouky and Ioannou: A Novel Approach to Routing and Dispatching Trucks based on Partial Information in a Dynamic Environment (02/03)
- Hall: Freight Routing and Containerization (02/03)

- Ioannou and Chassiakos: Cooperative Optimum Time Window Generation for Cargo Delivery/Pick-up with Application to Container Terminals (02/03)
- Richardson, Gordon and Moore: Measuring California's Role in Supporting Interstate Goods Movement: Comprehensive Assessment of Interstate Freight Flows (02/03)
- Hanh: Re-engineering the Logistics of Empty Cargo Containers in the SCAG Region (01/02)
- Gordon and Williamson: Development and Test Methodology for the Evaluation of Highway Widening Plans to Facilitate Freight Flows Throughout a Major Metropolitan Area (01/02)
- Ioannou and Chassiakos: Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Areas (01/02)
- Grobar and Barber: An Integrated Approach to Managing Local Container Traffic Growth in the Long Beach/Los Angeles Port Complex Phase II (00/01)
- Hall: Alternative Access and Locations for Air Cargo (00/01)
- Ioannou and Chassiakos: Dynamic Optimization of Cargo Movements by Trucks in Metropolitan Areas with Adjacent Ports (00/01)
- Kosmatopoulos: Design and Optimization of a Conceptual Automated Yard Using Overhead Rail Systems (00/01)
- Parentela: Developing Risk Model for Commercial Goods Transport (00/01)
- Bukkapatnam: Dynamic Coordination Framework for Resource Allocation in Trucking Operations (99/00)
- Gordon: Assembling and Processing Freight Shipment Data: Developing a GIS-Based Origin-Destination Matrix for Southern California Freight Flows (99/00)
- James: Non-Invasive Means of Investigating Container Contents for Customs Agents at Ports (99/00)
- Jordanides: Use of Robotics and Expert Systems in Improving the Handling of Containers at the Port Terminals (99/00)
- Grobar and Barber: Implementing a Statewide Goods Movement Strategy and Performance Measurement of Goods Movement in California (98/99)
- Ioannou and Chassiakos: Modeling and Route Guidance of Trucks in Metropolitan Areas (98/99)
- Khoshnevis: 3D Virtual and Physical Simulation of Automated Container Terminal Facilities and Analysis of Impact on In-land Transportation (98/99)

Accessibility for Aging and Transportation-Disadvantaged Populations

- Giuliano: Travel Patterns of the Elderly (00/01)
- Dessouky and Rahimi: A Task Decomposition Model for Dispatchers in Dynamic Scheduling of Demand Responsive Transit Systems (98/99)
- Giuliano: The Role of Public Transit in Mobility of Low Income Households (98/99)

Environmental Sustainability of Transportation Systems

- Kuprenas: Reduction of Construction Project Risk to Pedestrians, Drivers and Transit Passengers through Analysis of Historical Accident Records (03/04)
- Richardson and Gordon: What Can We Learn from CTPP 2000? (03/04)
- Ordonez and Palmer: Confidence Intervals for Estimated Traffic Demand (03/04)
- Redfearn: Transit Investment and the Capitalization of Access into Land Values (03/04)
- Moore: Improved Modeling of Transportation Network Flows Including Land Use Transportation Interactions: A Research Collaboration between METRANS and Caltrans District 7 (02/03)
- Toossi: Hydrogen Storage System for Transportation Applications (02/03)
- Gordon: Neighborhood Attributes and Commuting Behavior: A Comparative Study of California's Major Metropolitan Areas (02/03)
- Banerjee, Myers, and Irazabal: Increasing Bus Transit Ridershop: Dynamics of Density, Land Use, and Population Growth (02/03)
- Rahai: Reducing Pollutants from Mobile Sources (01/02)
- Rahimi and Dessouky: A Methodology for Joint Optimization of Service and Life Cycle Environmental Assessment of Transportation Systems (01/02)
- Toossi: Assessment of Hybrid Vehicle Control Strategies in Planning Future Metropolitan/Urban Transit Systems (00/01)
- Williams: Solid State Sorption Air Conditioner System for Containerships and Vehicles (99/00) (Phase 2, 00/01)
- Ronney: Improving Fuel Economy and Emissions Performance of Commercial Goods Transportation and Mass Transit Vehicles Using Throttleless Engines (98/99)

Physical Infrastructure

- Todorovska and Trifunac: Methodology for Probabilistic Assessment of Permanent Ground Displacement Across Earthquake Faults for the Transportation System (02/03)
- Johnson: Innovative Bridge Structural Health Monitoring Using Variable Stiffness and Damping Devices (02/03)
- Ordonez: Robust Investment Decisions for Highway Capacity Expansion
- Wong: Analysis of Vibrations as Infrastructure Caused by High-speed Rail Transit (01/02)
- Johnson: Smart Damping Devices for Monitoring the Health of Bridge Structures (01/02)
- Banerjee: Freeway Bus Station Area Development: Critical Evaluation and Design Guidelines (00/01)
- Banerjee: Highway Oriented Transit System (HOTS): A Comprehensive Land Use-Transportation Strategy to Improve Transit Service Delivery (99/00)
- Kuprenas: Identification and Analysis of Local Agency Transit Project Performance Criteria (99/00)

Smart Vehicles and Operators

- Grote: Evolution of Collective Sensory Systems for Intelligent Vehicles (03/04)
- Giuliano and Heidemann: SURE-SE: Sensors for Unexpected Roadway Events: Simulation and Evaluation (03/04)
- Parentela: Development of an Artificial Intelligence Based Traffic Simulation Model Using the Discrete Element Method (02/03)
- Ioannou and Chassiakos: Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Areas (01/02)
- Bukkapatnam and Dessouky: Distributed Architecture for Real-time Coordination in Transit Networks (00/01)
- Meshkati, Rahimi and Driver: Investigating the Role of Driver Decision Styles in Highway-Rail Crossing Accidents (00/01)

METRANS has the goal of supporting cooperative research that involves transportation agencies and meets the transportation needs of metropolitan agencies. Nearly all projects have received financial support from Caltrans, and many others have cooperated with local and regional agencies. Cooperating agencies are shown below for the 02-03 and 03-04 projects :

Banerjee, Myers, and Irazabal
Increasing Bus Transit Ridership, Dynamics in Density, Land Use, and Population Growth
Los Angeles County Metropolitan Transportation Authority

Giuliano and Heidemann
SURE-SE: Sensors for Unexpected Roadway Events: Simulation and Evaluation
Los Angeles Department of Transportation, University of Southern California

Giuliano and Magaddino
Evaluation of the Terminal Gate Appointment System at the Los Angeles/Long Beach Ports
Port of Long Beach, Port of Los Angeles, Pacific Merchant Shipping Association

Hall
Freight Routing and Containerization
United Parcel Service

Ioannou and Chassiakos
Cooperative Optimum Time Window Generation for Cargo Delivery and Pick-up with Application to Container Terminals
Port of Long Beach

Ioannou and Chassiakos
Development of Methods for Handling Empty Containers with Applications in the Los Angeles/Long Beach Port Areas
Port of Long Beach

Kuprenas
Reduction of Construction Project Risk to Pedestrians, Drivers and Transit Passengers through Analysis of Historical Accident Records
California State Highway Patrol

Moore
Improved Modeling of Transportation Network Flows Including Land Use Transportation Interactions: A Research Collaboration between METRANS and Caltrans District 7
District 7, California Department of Transportation

Richardson and Gordon
What Can We Learn from CTPP 2000?
Southern California Association of Governments

Richardson, Gordon and Moore
Measuring California's Rose in Supporting Interstate Goods Movement: Comprehensive Assessment of Interstate Freight Flows
California Department of Transportation

Selection Process

METRANS follows a peer-reviewed proposal selection process in which each proposal is submitted to a minimum of five people for review, drawn from the following groups:

- University expert (usually two people in category)
- Local transportation agency expert or private practitioner expert
- Caltrans expert
- US DOT expert

In the most recent RFP (02/03), the following DOT employees (or their designated representatives) reviewed proposals:

- Steve Ernst, FHWA
- Matthew Rabkin, USDOT
- Elaine Murakami, FHWA
- Sherry B. Ways, FHWA

These DOT representatives were selected because of their expertise and leadership in goods movement, transit, policy, advanced technology, or infrastructure.

We used an outside review process in order to assure neutral evaluation of all proposals; with few exceptions, academic reviewers were from outside USC or CSULB. We also used a mix of public and private sector local experts. The outside review process is more time consuming, but we feel it is worth the effort. A total of 50 reviewers participated in the process (not counting reviewers within Caltrans or USDOT). Summarized results of the evaluations are presented to the METRANS Executive Committee, which makes final selections.

As noted earlier, the schedule for METRANS research activities has shifted as a result of funding delays in prior years. The 03-04 round of projects was awarded in January 2004. These will be completed sometime between January and June 2005. Because of the current uncertainties regarding federal reauthorization of the UTC program, METRANS is taking a conservative approach and not issuing RFPs until sufficient funds are assured. As of this writing, federal continuation resolutions have assured about 2/3 of our current funding level; we therefore plan to issue a Year 7 RFP at a substantially reduced funding level in Fall 2004 with a project start date of January 2005. Any additional funds that materialize between now and the fall semester will increase the size of the research program. METRANS has reserved one year of operating funds for both universities in case of funding interruptions or loss of our UTC designation.

Research Results

As of this writing, 24 research projects have been completed (3 this year), and 5 more are in the peer review/revision process. Twenty-two projects are in progress, including the new 2003-04 projects and the additional 2002-03 projects. One project from 1998-99 has been cancelled for lack of completion.

We have found that the final report peer review process is often a bottleneck to project completion. Final report reviews are apparently a low priority for most people. Reviewers may take months to return comments, and often comments are never received. In view of this problem, and since the primary venues for disseminating research results are conferences and peer-reviewed publications, we have decided to eliminate outside review of final reports. The Director reviews all final reports and manages the revision process. In cases of research outside the Director's area of expertise, another member of the USC or CSULB faculty is asked to review the report. Per Caltrans request, we continue to send final reports to Caltrans for review, but we limit the time allowed for comments to two months. Final report abstracts are provided below for all projects completed this year.

00-11 Investigating the Role of Driver Decision Styles in Highway-Rail Crossing Accidents
Najmedin Meshkati, Mansour Rahimi, Michael Driver

This research was designed to take a closer look at the ways by which driver decision-making styles affect highway-rail crossing (HRC) accidents. That is, a simplistic

approach of portraying human error, as the cause of most HRC accidents, needs to be augmented with a more complex theory of human decision-making process while performing driving tasks before and during a highway-rail intersection. Video and still photos were taken to identify the intersections appropriate for this study. The intersections were among many in the Los Angeles metro area with crossings that demanded certain driver maneuvers with potential accident consequences. Based on these selections, both field and laboratory experimental sessions were designed to study three sets of variables: driver decision styles, conditions in the intersection environment that could influence these decisions (environmental complexity) and the driver maneuvers to cross the intersection. The variable of distraction inside the crossing intersection was also studied using recall versus recognition tests. The parametric tests (analysis of variance) showed significant differences in the drivers' scores for the decision style variable. However, other variables showed no significant results. The same results were shown using the chi-square nonparametric test. These results showed that driver decision style is an important factor in the way drivers perceive and behave in highway-rail crossings. Further research was recommended to study the effect of each intersection design feature on driver behavior.

01-2 Reducing Pollutants from Mobile Sources
Hamid R. Rahai

Results of experimental investigations of using a coil-shaped injector for reducing NOx emissions from a diesel engine are presented. The study involved the effects of coil length and its mixing effectiveness and the development of the injector system for after treatment of diesel exhausts.

Results indicate that the coil-shaped injector system with the ratios of length, pitch and wire diameter to the exhaust pipe diameter, L/D, p/D, d/D, of respectively 1.25, 1.0, and 0.13 can reduce the NOx emissions of the diesel engine by more than 10% when diesel oil is used as the treatment agent.

01-6 *GREEN TRANSIT SCHEDULER*: A Methodology For Jointly Optimizing Cost, Service, And Environ-Mental Performance In Demand-Responsive Transit Scheduling
Mansour Rahimi, Maged Dessouky, Merrill Weidner

Many types of transportation systems, for example, public transit and commercial freight hauling and package delivery, may be categorized as being fleet operations. The environmental impacts of fleet operations such as these are affected by factors including the initial choice and selection of vehicles (types) comprising the fleet, vehicle age and maintenance, and the modal conditions under which the vehicles are operated including. And, the environmental impacts are even more significant when examined on a life-cycle basis. When examined on this basis, it is clear that "cleaner" fuels, alone, do not provide an environmental panacea or eliminate all of the environmental impacts of transportation. Moreover, many of the life-cycle impacts can be directly or indirectly attributed to vehicle operation. Controllable life-cycle impacts may also be affected by vehicle

routing and scheduling decisions, in particular, in the case of a heterogeneous fleet. And, these other controllable environmental impacts of transportation systems and operation must also be considered if the overall impacts are truly to be minimized.

There has been little prior work that has considered environmental impacts in fleet vehicle routing and scheduling optimization, in particular, where the impacts were assessed systematically utilizing life-cycle impact assessment (LCIA) methodologies such as those described by SETAC (1993, 1991) and in current ISO standards (ISO 14040). In this report, we present a methodology and algorithm for the joint optimization of cost, service, and life-cycle environmental consequences in vehicle routing and scheduling, which we develop for a demand-responsive (paratransit or "dial-a-ride") transit system. Importantly, as a prerequisite to accomplishing this, we develop a decision-theoretic-based model for combining the results of multiple, current LCIA methods, as suggested by Bare, et al. (2000). And, we use the results of this model as the basis for specifying necessary weighting constants in the vehicle routing and scheduling objective function. We demonstrate through simulation that, as a result of our methodology, it is possible to reduce environmental impacts substantially (up to 25 percent or more) while increasing operating costs only slightly (about two to four percent). These results are predicated upon situational factors such as fleet composition, system loading, and vehicle-specific costs and environmental parameters. We felt the need to produce a large amount of empirical data in preparation to prove our concept. We feel that the results presented in this report are adequate to demonstrate the potential benefits of the methodology.

Applied Research Program

To both address the continuing challenge of involving CSULB faculty in METRANS research and better support our outreach efforts, we launched an experimental applied research program, *Monitoring the Ports*. It is directly linked to our goods movement and international trade outreach activities, and is under the management of the Deputy Director. The program has the following objectives: 1) provide a means for promoting CSULB faculty research, 2) build an empirical base of information that can be used to inform future research and outreach activities, 3) increase METRANS' visibility as a center for research and outreach on goods movement and international trade.

In order to achieve the first objective, the *Monitoring the Ports* program funds small-scale projects that do not go through a formal peer review process. Faculty are asked to write short pre-proposals. The METRANS Executive Committee reviews the pre-proposals and selects the most promising. Faculty are then asked to write a full, detailed proposal. Upon approval of the proposal by the METRANS Director, the project is funded. In addition, a part-time (25% time) research project manager was hired to introduce the program to CSULB faculty throughout the university, to solicit proposals, and to manage day to day operation of the program.

In order to achieve the second objective, the *Monitoring the Ports* program is highly focused on port operations and management, policies aimed at regulating port operations, and the local impacts of port operations.

In August 2003, after meetings with CSULB faculty, short pre-proposals were solicited. Seven were received, and the METRANS Executive Committee selected two for possible funding. Full proposals were received and approved in Fall 2003. It should be noted that the applied research projects are not included in the research reporting statistics. This is an experimental program; if results are favorable, the applied research program will be fully incorporated into the METRANS research program. The two projects are described below:

AR04-01 Labor at the Ports: Comparing Work Rules and Working Conditions of the ILA and ILWU

Kristen Monaco

Labor issues play a major role in efficient goods movement for ports. Longshoremen are organized by one of two primary unions: the International Longshoremen's Association (ILA), largely in operation on the east coast, and the International Longshore and Warehouse Union (ILWU) on the west coast. Ports have coordination problems due to holdup points created by these unions. The purpose of this study is to examine the role of unions in promoting or hindering efficient use of labor at the ports.

The research focuses on comparing current and historical work rules of both the ILA and ILWU to examine potential gains from better implementation of existing work rules and to identify sources of inefficiency stemming from the same. The result will be a detailed contract analysis for both the ILA and ILWU, clarifying work rules and changes over a 20-year period. This project will update wage chronologies that the Bureau of Labor Statistics stopped reporting in 1980. Wages and hours for longshore workers will be compared to others engaged in transportation operations.

AR04-02 Examining the Effects of the Lowenthal Bill on Port Congestion

Lisa Grobar

Nearly one-half of all loaded containers entering the US come through the ports of Long Beach, Los Angeles, and Oakland. Congestion at the ports is a pressing issue for effective goods movement. The combined burden of inefficiencies due to traffic congestion and pollution from trucks idling at ports led to the passage of California Assembly Bill 2650 (the Lowenthal Bill, named after its sponsor) in August of 2002. The bill fines marine terminals for each truck waiting at the terminal in excess of 30 minutes. In response to the implementation of this Bill, a scheduling system has been implemented at the Port of Long Beach to minimize truck waiting times.

The research assesses the impact of the Lowenthal Bill on key aspects of port operations and goods movement, including harbor drayage, extended gate hours and gate appointments. Using survey results from 60 drayage firms and drivers at the port, the

analysis will include use of the appointment system by truckers and trends in wages and working conditions.

Other Research Activities

- **Research Conference**: This year we joined forces with a new USC institute, the Keston Institute for Infrastructure, to host a conference, "Alameda Corridor: A Blueprint for the Future?" The Keston Institute, part of the USC Lusk Center for Real Estate, is aimed at raising awareness of infrastructure problems in California. In their first year of operation, they sought out METRANS to organize a conference on a topic of mutual interest. We selected the Alameda Corridor, one of the largest recent infrastructure investments in the US, unique for its public/private partnership and complex financing package. The conference was held on the USC campus in February 2004. Panelists included the key actors involved in creating the project and obtaining the financing, current users of the Alameda Corridor, and other stakeholders. With attendance of about 200, the conference was a resounding success. A Conference White Paper summarizes what we know about the Alameda Corridor, and a Conference Summary offers reflections on lessons learned. Both publications are available at www.metrans.org. For further details, see Section E.

- **Publications and Presentations:** An important measure of the quality of the METRANS research program is the number of peer-reviewed publications generated. As more research projects are completed, academic publications follow. This year 13 of our METRANS faculty presented their research results at 19 conferences and have 47 articles published or forthcoming in refereed journals. In addition, Genevieve Giuliano has with colleague Susan Hanson edited *The Geography of Urban Transportation, third edition* (2004).

- **Leveraging METRANS Funds**: Additional transportation funding generated by METRANS research is another important measure of quality. Last year the Los Angeles Metropolitan Transportation Authority funded two research projects totaling $323,000; these were two year projects that were completed in June 2004. These are the outcome of several METRANS transit research projects and the growing recognition of METRANS research expertise.

- The METRANS Administrator continues to identify transportation funding sources, and has advertised these to faculty at CSULB and USC. In addition, the METRANS web page has been designed to link to 24 agencies that fund transportation research.

D. DESCRIPTION OF EDUCATION ACCOMPLISHMENTS

The METRANS education program emphasizes student involvement in research projects. METRANS continues to make graduate student involvement an explicit criterion in making research awards in our RFP. Involvement of undergraduate students in METRANS funded research is encouraged. As a result, all projects have had significant student participation (some undergraduate, some graduate, and some both). Investigators are strongly encouraged to budget for student presentations at conferences, such as the Transportation Research Board annual meeting.

National Student Competitions

In 2003, METRANS again participated in the USDOT UTC "Outstanding Student Award" program. The METRANS student of the 2003-04 academic year is **Ms. Jennifer Russell**, PhD student in the Department of Industrial and Systems Engineering, USC. She is currently developing her dissertation proposal, and expects to conduct research on design and throughput of airport security systems, considering limits on human cognition and vigilance.

Ms. Russell is a graduate of West Point, and served in the US Army for 8 years before seeking her Masters Degree at USC. She has accumulated an impressive list of awards, including a University Provost Fellowship, Teaching Assistant of the Year (2003), and most recently, an Eno Foundation Fellowship award for the Leadership Conference. Ms. Russell is also an active participant in the Transportation Research Board, and was recently named a member of the Vehicle Users Characteristics Committee.

University of Southern California transportation students participated actively in other national competitions, including the Council of University Transportation Centers (CUTC) dissertation awards and the Association of Collegiate Schools of Planning outstanding paper awards.

State and Local Student Competitions

Ms. Ying Chen, USC Master of Planning student, won the Helen M. Overly Memorial Scholarship award from the Los Angeles Chapter of the Women's Transportation Seminar. Ms. Chen also received an Academic Achievement Award from the USC Office of International Services for excellent academic performance.

Internal and External Graduation Awards

The following USC students received awards:

- **Patrick Golier**, Master of Planning graduate, received the Gordon Whitnall Outstanding Academic Achievement in Planning award, and the Certificate of Merit for Outstanding Master;s Candidates.

- **Alex Kenefick**, Planning and Development undergraduate, received the Dean's Senior Letter of Merit award. Alex's Senior Seminar project was a photo essay of truck parking in Southern California; he presented his work at a METRANS Seminar in April 2004.

The following CSULB Master of Arts in Global Logistics graduates received awards:

- For outstanding academic achievement: **Gareth Osborn, Jason Blovad, Chris Dixon**

- For outstanding capstone projects: J**ason Blovad, Chris Dixon and Gareth Osborn** for "The future of foreign trade zones in and era of free trade;" **Fran Thompson, Scott Huntress**, and **Jean Lin** for "Logistics, infrastructure and the World Trade Organization: Implications for the development of China's inland regions."

The METRANS Administrator compiles opportunities for student competitions and advertises them both by email to identified students and by advertisement on the METRANS web site.

Student Conference Participation

California Transportation Foundation's Transportation Education Symposium

USC civil engineering and urban planning undergraduates consistently participate in the California Transportation Foundation's (CTF) annual Transportation Education Symposium. The symposium gives upper-division undergraduates a unique opportunity to collaborate with senior industry and agency professionals as they prepare competing team responses to a mock request for project proposals. The CFT makes this experience available to outstanding student participants at no cost to these students. Civil Engineering senior **Edwin Quinonez**, and Planning and Development seniors **Matthew Merrill** and **Alex Kenefick** attended the November 2003 Symposium at the Asilomar Conference Center in Monterey, California. Mr. Quinonez and Mr. Merrill's team won the 2003 competition. This is third year in a row that USC attendees were members of the winning team. METRANS provides the travel funding for symposium attendance.

University of California Transportation Center Conference

A small number of USC students have attended the annual UCTC student conferences in past years. We are working towards expanding USC student participation, as this conference provides an excellent opportunity for graduate students throughout California to share research interests. However, this year's conference was held at UC Davis and the call for presentations was issued quite late, making it difficult for USC students to attend. Mr. Afshin Masourad, Master of Engineering Management student, gave a presentation entitled, "Improved modeling of network transportation flows including land

use/transportation interactions," based on his work on the METRANS project of the same name.

Other Student Activities

Student Participation in Research

METRANS is committed to student involvement in research. It is the best way for students to acquire research skills, and it is an important source of student support. Students are often attracted to transportation as a result of working on a research project.

Student involvement in transportation research projects is difficult to compare across years. The number of students supported on METRANS research projects reflects year-to-year differences in the number of ongoing projects. METRANS student involvement also includes research projects funded from other sources and reflects the variability of university-wide extramural funding levels. The general trend is toward increased student support, as total research funding in transportation has significantly increased at USC.

With 21 new projects awarded in the past one and one half years, we are at a high point of student support. The current METRANS projects together are supporting 44 graduate students, and the budgeted student support represents 31 percent of the total project funding. METRANS projects account for only part of the funded research support of graduate students. At USC, funding from the National Science Foundation, federal, state and local government, and foundations and industry support a wide spectrum of transportation research.

Student and Faculty Transportation Field Experience

Field experiences are a routine part of transportation engineering courses offered at USC and CSULB. There are many opportunities for unique site visits in Southern California, including technology facilities such as Caltrans District 7's Transportation Management Center (TMC) and the Caltrans District 12 TMC; the Los Angeles County Department of Transportation (LADoT) Automated Traffic Surveillance and Control (ATSAC) Center; the Orange County Transportation Authority's (OCTA) fully electronic State Route 91 Express lanes and the Transportation Corridor Agencies' (TCA) system of Orange County toll roads; and the Partnership for Advanced Transit and Highways' (PATH) technology test bed facilities at UC Irvine, the City of Irvine, the City of Anaheim, and Santa Ana. Southern California also includes specialized transportation facilities such as commuter, heavy, and light rail systems; the El Monte busway and the Harbor transitway; the Ports of Los Angeles and Long Beach; and the Alameda corridor.

Opportunities to visit these facilities and to discuss problems and objectives with associated professionals and officials contribute considerable depth to transportation education and research. METRANS serves as clearinghouse for field experiences associated with USC and CSULB classes and research and local transportation organizations such as WTS, providing van transportation when demand justifies it. This

past year, student-centered field trips were organized to Caltrans District 7's Transportation Management Center (TMC) and the Los Angeles County Department of Transportation's (LADoT) Automated Traffic Surveillance and Control (ATSAC) Center, the Ports of Long Beach and Los Angeles, and one of the terminals at the Port of Long Beach.

Institute for Transportation Engineers Student Chapters

A student chapter of the Institute for Transportation Engineers (ITE) was formed at CSULB in 1997 during the final stages of the original METRANS proposal process. The chapter currently has approximately 20 student members, and is advised by Civil Engineering Associate Professor Emelinda Parentela campuses.

Holiday lunch with Prof. James Moore, transportation graduate students and research assistants from the USC School of Policy, Planning, and Development and the USC Viterbi School of Engineering

MERIT Research Program/McNair Scholars Program

Every year, a select group of promising incoming freshmen are invited by the USC School of Engineering faculty to work on projects in their research laboratories or in the field. These student researchers actively participate in the development of new technology throughout their undergraduate years. In addition to giving students excellent first-hand research experience, this program can help offset the cost of education. Each participant earns an annual stipend for their work. The School of Engineering currently provides a stipend of $2000; $1500 as wages and $500 for research expenditures. This renewable award is separate from other financial assistance offered by the University.

These undergraduate Merit Research Scholars are brought to the attention of USC faculty based on the student's interests and the faculty member's willingness to participate in the

Merit research program. USC engineering faculty funded by METRANS are encouraged to participate in the Merit Research Program. Funded METRANS projects and lists of investigators are forwarded to the Office of Student Affairs in the School of Engineering to ensure that prospective students know these research projects are available to them. Prof. James Moore acts as a liaison to encourage placement of MERIT Scholars in transportation projects, and for students participating in the McNair Scholars program.

Undergraduate Scholarships in 2003-04

Undergraduate McNair Scholars are part of a parallel University-wide program that focuses on research opportunities for students from groups that are under represented in graduate schools. This year one of the Mc Nair Scholars is **David Wesley Gerald**, undergraduate in Political Science. He is conducting research on improving public transit service in Los Angeles under the guidance of Prof. Genevieve Giuliano. His goal is to recommend a set of short-term strategies that would improve the quality and reliability of public transit service based on a survey of best practices and new technology innovations.

USC has a number of programs aimed at fostering interdisciplinary research. The Communications Critical Pathway provides research funding for undergraduates engaged in interdisciplinary research. **S. Tyler McHenry**, undergraduate in Computer Sciences, won a scholarship for his research project, "Remote reprogramming of sensor network communication devices." His work is related to a new Metrans research project aimed at using sensor networks for vehicle classification and other traffic monitoring applications. He is working under the guidance of Profs. John Heidemann and Genevieve Giuliano

Degree Programs, Courses, and Seminars

Student involvement in transportation education and research continues to be strong at both USC and CSULB. Ongoing changes in transportation-related course offerings make year-to-year comparisons difficult. Civil engineering enrollments (a large source of transportation-related course enrollments) at USC have remained steady over the past year, but transportation engineering enrollments have increased substantially, approximately doubling. Enrollment in the MPLremained steady after a large increase last year; other programs have remained stable. Graduate student numbers are growing at CSULB as a result of the MAGL degree program.

New Courses at USC

USC's curricular offerings in transportation continue to expand. Two new graduate transportation courses, CE 589: Port Engineering: Planning and Operations and CE 579: California Transportation Law were added to the Civil and Environmental Engineering curriculum in 2002-03, and offered in the 2003-04 school year. Both courses were offered on a special topics basis previously, but are now part of the permanent curriculum. An existing graduate course, CE 552: Managing and Financing Public Engineering Works, was offered for the first time in the Fall of 2003.

In Spring 2003 a graduate special topics course, "Coastal Zone Policy and Planning," was offered in the School of Policy, Planning and Development. This course addressed the problem of the coastal zone as scarce resource, discussing the various uses (ports, recreation, tourism, etc.) and examining strategies for planning and managing the urban coastline. It was taught again in 2004, and will now be submitted for approval as a regular elective course. These courses are serving a growing interest in goods movement and international trade and help to align our graduate programs with our research strengths.

Two new courses were added at CSULB. MAE 590D, Hybrid Electric Vehicle System Design was added in Mechanical and Aerospace Engineering. This graduate course examines the history, technology, and future of hybrid vehicles and the role they will play in the next century. EE 347, Microprocessor Based System Design was added in Electrical Engineering. This undergraduate course covers design and construction of microprocessor based systems and interfacing and control of external devices.

Changes in USC Graduate Programs

Changes within the School of Engineering have resulted in a consolidation of transportation faculty within the Department of Industrial and Systems Engineering. The PhD in Transportation Engineering within Civil and Environmental Engineering is being phased out. Prospective doctoral students indicating an interest in transportation engineering are being directed to the PhD program in Industrial and Systems Engineering. This is an appropriate match, and reflects a deliberate, strategic focus on applied mathematics and systems as opposed to materials and facilities.

The PhD program in the School of Policy, Planning, and Development is being consolidated into a single degree with field concentrations in public administration, public policy, urban planning and real estate development. This should not affect students seeking a concentration in transportation planning. At the Master's level, urban planning, public policy, and public administration now have a common set of electives for field concentrations. This allows students in any of the three degree programs to specialize in transportation.

USC Transportation Students

In the USC School of Policy, Planning, and Development (SPPD), 2 students completed the comprehensive examination in the Master of Planning "Transportation and Land Use" field specialization in 2003-04. This is no longer a good measure of students seeking careers in transportation; some take the "Land use and sustainable regional growth" comprehensive exam. There are currently about 10 Master of Planning, 2 Master of Public Administration, and 1 Master of Public Policy student in the transportation field concentration in SPPD Approximately 6 students are pursuing transportation-related dissertations in the doctoral program in Urban Planning.

In the USC School of Engineering, 6 students completed the MSCE – Transportation Engineering program. Twelve students were enrolled in the Fall of 2003. One student completed the PhD program in Transportation Engineering, and 4 students completed the PhD in Industrial and Systems Engineering.

Five new USC doctoral dissertations in transportation were either defended or filed by the Spring of 2004.

- " The Optimal Cluster Repair Sequence for a Transportation Network Following an Earth-quake," *Fahad Alrakabi*, Doctor of Philosophy, Civil Engineering
- " A Slot Model for Automated Highway Flow Optimization Through Entry, Exit, and Flow Control," *Chun-Ming Chang*, Doctor of Philosophy, Industrial and Systems Engineering
- "Integrated Model for Highway-based Travel Time Forecasting With Application for Truck Transportation," *Shih-Che Lo*, Doctor of Philosophy, Industrial and Systems Engineering,
- "The Holding Problem for Transit Systems," *Jiamin Zhao*, Doctor of Philosophy, Industrial and Systems Engineering
- "Heuristic Approaches for Integrated Inventory Distribution Problems,"Tamer *Abdel Maguid*, Doctor of Philosophy, Industrial and Systems Engineering

Dr. Alrakabi has joined the Civil Engineering Department at Kuwait University. Dr. Maguid joined the University of Cairo. Dr.. Zhao joined Oracle Corporation's Automated Planning Systems Group. Dr. Lo has joined National Taiwan University of Science and Technology.

Two PhD graduates from previous years have recently obtained university positions. Dr. Hossein Jula, PhD in Electrical Engineering, 2002, is joining Penn State University – Harrisburg in the School of Science, Engineering and Technology. Dr. Majid Aldaihani , ISE PhD 2003, has joined the faculty at Kuwait University.

CSULB Students

One new PhD was granted at CSULB:

- "Numerical and Experimental Investigations of Two Side-by-Side Round Turbulent Jets in a Cross Flow," *Carlos A. Orrala*, Doctor of Philosophy in Mechanical Engineering.

CSULB has a joint PhD program with Claremont Graduate University. Dr. Orrala is currently Senior Engineer and Research Associate, Center for Energy and Environmental Research and Services, CEERS, California State University, Long Beach

In 2003-04, 18 student completed the MSCE – Transportation Engineering program. CSULB's new Master of Arts in Global Logistics (MAGL) debuted in Spring 2002 with 23 students; 19 of them graduated in November 2003. The second cohort of 19 students

was admitted to the program in Spring 2003, and 12 are expected to complete the program in December 2004. The third cohort of 19 students was admitted in Spring 2004 and will complete the program in December 2005.

The MAGL degree is interdisciplinary, combining the analytical skills of a traditional MBA with a strong emphasis on logistics in a global setting. It is a 30-unit accelerated graduate program that can be completed in less than two years (21 months), and is offered through CSULB's Center for International Trade and Transportation (CITT) and the University College Extension Services. It developed in response to increasing demand for broad training in global logistics and supply chain management. The program prepares professionals to deal with the complexities of supplier relations/selection, purchasing negotiations, operations, e-commerce and many other dimensions of supply chain management.

In 2003-04, 68 students completed the CITT certificate program leading to the Professional Designation as a Global Logistics Specialist. This is a professional training program. See details in Section E.

Transportation and Location Research Seminar

This seminar series serves to 1) provide speaking experience for advanced graduate students, 2) remind faculty of interdisciplinary transportation research opportunities, 3) provide a focus for transportation teaching and research, 4) provide a speaking forum for external visitors, and 5) increase the visibility of transportation research at USC and CSULB. The seminars are typically scheduled on Fridays throughout the academic year. In some cases external visitors are jointly sponsored with other groups in order to provide wider opportunities for seminar participation. The seminar resulted in excellent cooperation between faculty and students in several USC departments. USC and CSULB faculty and graduate students, local alumni, and local agency representatives are invited to the the seminar. As a practical matter, the distance between USC and CSULB has proven to be a significant barrier to participation from CSULB. The 2003-04 seminars are listed below.

USC Transportation and Location Research Seminar
Fall 2003

Date	Speaker	Location	Topic
September 12	Amelia Regan Associate Professor Computer Science and Civil and Environmental Engineering, UC Irvine	RGL 219	Combinatorial Auctions for Freight Transportation Contract Procurement
October 13	John Fisher Los Angeles Department of Transportation	RGL 215	Managing Transportation in Los Angeles

October 31	Brian Taylor Director, UCLA Institute of Transportation Studies Associate Professor, Dept. of Urban Planning, UCLA	RGL 219	The Demographics of Public Transit Subsidies: A Case Study of Los Angeles
November 7	Anastasia Loukaitou-Sideris Chair, UCLA Department of Urban Planning	RGL 219	Protecting Against Transit Crime: The Importance of the Built Environment
November 14	Evelyn Blumenberg Associate Professor UCLA Department of Urban Planning	RGL 219	The Journey to Work: Transportation, Economic Opportunity and the Poor

USC Transportation and Location Research Seminar
Spring 2004

Date	**Speaker**	**Location**	**Topic**
February 3	William Millar President American Public Transit Association	RGL 150	METRANS/Urban Growth Joint Seminar Why is Transit Ridership Increasing?
February 6	Tour of LA DOT ATSAC		
February 27	Mei-Po Kwan Associate Professor Department of Geography Ohio State University	RGL 219	Gender Differences in Space-Time Accessibility in Urban Environments
March 26	Edna Bonacich Professor Sociology and Ethnic Studies UC Riverside Alex Kenefick Planning and Development SPPD	RGL 219	The Logistics Revolution: The ports of Los Angeles/Long Beach and the Rise of the Giant Retailers Truck Parking in the Los Angeles Region

Pre-College Events

In previous years METRANS held an art competition, "Transportation in the Future," in conjunction with the annual METRANS research conference. The art competition was open to all high schools in the region, and was a very popular event. The purpose of such

activities is to engage young people's interest in transportation. Although the art contest gets students to think about the future, a single exercise likely has limited impact. We have therefore been considering different ways to reach out to pre-college students. We have been in discussions with the Sea Grant Program at USC, and we are investigating opportunities to incorporate an educational segment on ports and goods movement in K-12 training materials. The Sea Grant Program provides K-12 training materials for teachers. By developing a training module on ports and goods movement, we could potentially reach many more students in a far more systematic way. We have reviewed the California K-12 requirements, and we have explored some possible topics. Unfortunately, however, the effort has proved quite challenging. The new student performance requirements have made curriculum very rigid, and it is difficult to develop materials that adequately "teach to the test." Teachers are resistant to adopting new materials, apparently feeling both overworked and under extreme pressure to focus on the test requirements.

Continuing Education Programs

These are described in the technology transfer section under technical training.

E. DESCRIPTION OF TECHNOLOGY TRANSFER ACCOMPLISHMENTS

METRANS technology transfer activities are conducted primarily at CSULB through the University College and Extension Services and the Center for International Trade and Transportation, under the direction of Marianne Venieris. The CITT has a Policy Committee that plans and approves all outreach events. The METRANS Director is a member of the CITT Policy Committee. Technology transfer at METRANS is more appropriately described as professional training and information dissemination. The topical focus of METRANS technology transfer is goods movement and international trade.

Professional Training

CSULB offers a series of industry driven training programs through the University College and Extension Services and the Center for International Trade and Transportation (CITT).

Global Logistics Specialist

The Global Logistics Specialist (GLS®) professional designation is the foundation of a spectrum of programs to cover the industry's training/education needs. It is designed to set a professional standard for the international trade logistics industry and, as such, is aimed at foreign traders and all stakeholders involved in the movement of cargo around the world. This includes both asset-based companies (ocean carriers, rail, trucking, and warehousing) and non-asset-based companies (freight forwarders, customs house broker, consolidators, etc.). In an industry/university partnership, the curriculum is designed to provide broad based, hands-on training for individuals involved in, or entering any part of the logistics chain. Carefully selected topics have been grouped into six core modules that are offered within a one-year time frame one night class per week. Each module contains up-to-date, practical information delivered through innovative hands-on instruction and site visits, making the program a unique training concept in this industry. After successfully completing all six modules and submission of a capstone project on integrated logistics planning, the participant will earn a professional designation and be a Global Logistics Specialist.

In 2003-2004, 68 students were awarded the Professional Designation as a Global Logistics Specialist (GLS®). Since its inauguration in January 1997, over 780 people attended classes in the program and to date over 460 have earn the GLS® professional designation.

GLS Online

Our highest priority technology transfer goal last year was the development of an online web-based version of the (GLS®) certificate program. Increased METRANS funding, together with a significant cost sharing commitment from CSULB made development of the online course possible. Development of an online version of GLS is a response to

increasing demand for the program; we are unaware of similar programs elsewhere, yet there is great demand for this type of training. The online version makes it possible to offer the course throughout the US.

The conversion of this rigorous, 118 hour program, taught by top practitioners from every facet of the industry, is now 50% complete. It has the same form as the regular program; it is organized in six modules, and students must work synchronically through each module. The structure of the program has been determined, beta testing has been completed, and enough of the curriculum has been developed in online form that we were able to launch the program in June 2004 with a first cohort of 12 students. A small initial cohort allows us to more easily solve any unanticipated problems with the course. The course has gone remarkably well, and feedback from this first class has been overwhelmingly positive. We are therefore starting a second class in July 2004. A brief introductory video and other information on the GLS program may be found at www.uces.csulb.edu/citt.

Outreach Events: CITT Activities

The port complex, like other major transportation complexes, generates significant public benefits but also significant localized costs. Increasingly communities bearing these costs are seeking to limit the growth of these transportation complexes. These efforts may limit overall economic growth of the region and the nation.

The region and the industry are deeply divided on how growth can be absorbed over the next several years. The I-710 expansion project, together with some high visibility lawsuits by environmental groups over port expansion projects, have placed increasing pressure on port and international trade interests to broaden their perspective. The Annual State of the Trade and Transportation Industry Town Hall Meetings, sponsored by METRANS over the past five years, have consequently evolved to focus more on the larger impacts and less on the operational issues of the ports. The challenge for METRANS and CITT is to maintain their role as neutral forum while fostering education, research and information exchange that positively contributes to resolution of these conflicts.

Town Hall Meeting

With sponsorship from METRANS, the CITT staged the sixth Annual State of the Trade and Transportation Industry Town Hall Meeting, titled “Quality of Life and Port Operations: Challenges, Successes and the Future” in March 2004 at the Carpenter Performing Arts Center, California State University, Long Beach, California. The event attracted about 400 industry stakeholders, including organized labor, port authorities, industry representatives, and public officials.

Tremendous port growth has been matched by both environmental consciousness and community success at challenging port expansion. These challenges underscore the responsibility of all parties to come to the debate well informed and willing to

compromise. Recent efforts by California State Assemblyman Alan Lowenthal to address quality of life issues via legislation have also moved the question to the forefront.

The 2004 Town Hall discussed the above issues in a way that respects the differences of the participants but encourages both mutual understanding and common ground. The objective is to bring together stakeholders to jointly explore options that mitigate environmental impacts while preserving the jobs and economic prosperity in Southern California. A major thrust of the meting is to encourage involvement of the ILWU membership in a proactive way on issues affecting members as both workers and residents of the community.

To set the stage, a video was produced to highlight the trends in both port operations and environmental quality. It further presented ongoing efforts, new technologies, and new regulatory efforts to mitigate impacts on local communities. Since its début at the Town Hall, the video has been used as an independent informational resource by governmental agencies and industry and community groups,

The event received support and financial sponsorships from the executive directors of the Ports of Los Angeles and Long Beach, the Pacific Maritime Association, International Longshore and Warehouse Union, Local 13 and 63, and the Gateway Cities Partnership, Inc. The event also received formal endorsement by the board of directors of 21 trade associations. The Town Hall was open to anyone and free of charge.

A VIP reception was held prior to the Town Hall in order to provide industry leaders an opportunity to communicate with the presenters. The event was webcasted; the webcast is available at www.uces.csulb.edu/citt.

The Annual Town Hall meetings have received wide recognition in the goods movement industry. They have been praised by union members, management, Long Beach and Los Angeles Port officials, and the public sector. The extent of local stakeholder support is demonstrated by the formal endorsements received, as well as by the nearly $20,000 in matching funds contributed to CITT in support of this event.

Sixth Annual Town Hall Meeting

White Paper

A main objective of the annual Town Hall meetings is to explore opportunities and policy options to further common goals, and to establish a means for on-going communication among port stakeholders. One of the ways of doing so is through a Town Hall White Paper.

The White Paper provides a context for the discussion and sets the stage for future steps to be taken by the participants. The White Paper considers three main options for balancing the environment and economic growth: regulatory responses, changes in port operations, and the use of new technologies.

Despite the differences expressed by members of the panel and the audience, there was general agreement on a number of issues raised in the Town Hall:

- Some of the forces dictating change at the port are external. These include federal regulators and a nationwide demand for consumer goods.
- The ports and trade account for both beneficial economic activity and costly environmental impacts. Improvements have been made, but more needs to be done, including replacing older trucks with newer models.
- Increases in both cargo throughput and quality of life will require more use of rail and more coordination along the goods movement chain to allow for changes like extended gate hours.
- Better coordination will allow stakeholders to identify other points of agreement and convey those points to Sacramento and Washington with a single unified voice.

Consensus on these matters does not guarantee agreement on next steps. Unbiased research will provide the valuable information needed by all stakeholders, including policy makers, to make effective decisions about balancing growth and the environment. CITT hopes to play a role in encouraging useful research so that the work of the Town Hall participants continues.

The White Paper recommends convening researchers and stakeholders. The purpose will be to discuss agreed-upon problems, possible researchable questions that address those problems, and determine how best to implement research as part of the METRANS applied research program. The discussion will include data availability possible funding sources.

The White Paper will be made available on the METRANS and CITT website and distributed to various stakeholders and organizations.

Applied Research Program

As noted in Section C, to both address the continuing challenge of involving CSULB faculty in METRANS research and better support our outreach efforts, we launched an experimental program in applied research, *Monitoring the Ports*. The applied research program is directly linked with our goods movement and international trade outreach activities, and is managed by the METRANS Deputy Director. A part-time (25%) project manager is responsible for day to day management and communication with CSULB faculty to solicit interest in the program. Two projects were funded this year:

- AR04-01 Labor at the Ports: Comparing Work Rules and Working Conditions of the ILA and ILWU, *Kristen Monaco*
- AR04-02 Examining the Effects of the Lowenthal Bill on Port Congestion, *Lisa Grobar*

The applied research effort is a key component for future outreach activities under the METRANS technology transfer/outreach program. There is a wealth of information on port operation and goods movement issue provided by industry stakeholders; however much of it is anecdotal. It has become clear that valid research and reliable data are needed to advance education, information dissemination, and informed decision-making. See Section C for more details.

Other Outreach Events

METRANS Annual Conference: *Alameda Corridor: Blueprint for the Future?*

In November, 2003, METRANS began planning for its next annual conference. Key meetings were held with USC's Keston Institute for Infrastructure to develop a program that addresses issues applicable to both centers.

"*Effective institutional arrangements don't happen by accident"*

--Richard Callahan, Director, State Capital and Leadership Programs, University of Southern California

"The Alameda Corridor would not have happened without the cities of Los Angeles and Long Beach, the ports and the railroads. They were the '800 pound gorillas' in the room."

--Richard Hollingsworth, President and CEO, Gateway Cities Partnership

The Alameda Corridor is one of the largest urban infrastructure projects ever completed. Extending 20 miles from the ports of Long Beach and Los Angeles to the intercontinental rail yards near downtown Los Angeles, the Alameda Corridor required the coordination of numerous local governments and agencies as well as a complex multi-billion dollar package of financing. Initially hailed as innovative and a model for future large urban projects, the corridor has recently come under some criticism as not having fulfilled its objectives and the Corridor's performance is now being questioned.

Because of its visibility, METRANS selected to focus on the Alameda Corridor for its annual conference. The objective was to examine both the Alameda Corridor's performance as well as its usefulness as a model for future projects. In particular, the conference convened principals from the Alameda Corridor development and operation, as well as from the industry groups that use the Corridor to address the success of its goods movement and financial objectives and the lessons it offers for future large-scale infrastructure projects.

The half-day conference was held on February 10, 2004 at USC's Davidson Conference Center. There were two consecutive panel sessions. The first session explored how the Corridor is performing, panelists addressed questions such as, does it do what it was supposed to do? Is it utilized as predicted? And, does it reduce truck traffic? The second panel explored whether the Alameda Corridor project can be replicated for other infrastructure projects. The conference was attended by researchers and representatives from the Alameda Corridor Transportation Authority (ACTA), Ports of Los Angeles and Long Beach, USDOT, state, regional and local public agencies, railroads, and academic institutions among others.

The Conference summary, a White Paper on the Alameda Corridor, and the conference PowerPoint presentations are posted on the METRANS website.

Other Outreach Activities

Members of the METRANS management team are active in a variety of outreach and professional service activities.

METRANS Director Genevieve Giuliano served as Chair of the Transportation Research Board Executive Committee for calendar year 2003. In that capacity she gave presentations and represented TRB at several events. Locally, she served as a member of

the Los Angeles Mayor's Transportation Task Force. The Task Force was charged with developing short and medium term solutions to the City's extensive transportation problems. As chair of the subcommittee for arterial operations, she proposed a new concept, "priority arterials", more aggressive parking management and enforcement, and guidelines for express bus services. Prof. Giuliano has also been appointed to the Southern California Automobile Association's Mobility Council, a group of state and local leaders who seek to increase public awareness of California's transportation needs.

METRANS Deputy Director Marianne Venieris is a member of several local business associations and serves on the Executive Board of the Gateway Cities Partnership, Inc. a regional, nonprofit comprised of economic collaborative comprised of twenty-seven cities in Los Angeles County. She has given speeches and moderated panels and meetings of the Los Angeles Air Cargo Association, Harbor Transportation Club, and the "One Global California" Conference. Ms Venieris also organized industry panels for a hearings on the I-710 freeway expansion for the Gateway Cities Council of Governments.

To meet the need for an entry-level training program, CITT developed a curriculum with funding from the James Irvine Foundation. This curriculum is based on the GLS® program. The entry-level program was trademarked GLE™ (Certified Global Logistics Employee) and training for the first four cohorts (100 students total) was funded thought the California Governor's Discretionary Fund. In November 2003 the James Irvine Foundation provided funds to train an additional 80 individuals 57 of these graduated and earned the GLE certificate.

Publications

Building Bridges

A bi-monthly newsletter, *Building Bridges*, began publication in January 2001. The newsletter is a briefing document to inform and promote dialogue within the maritime/logistics industry community. Three thousand hard copies and about 100 electronic versions of each issue are distributed to ILWU local members, industry leaders, government agencies, and METRANS Advisory Committee Members. In addition, the newsletters are made available at the Town Hall meetings, trade association meetings, and via the METRANS and CITT websites. As of June 2004, 13 issues have been published.

The objectives of *Building Bridges* are:

- To provide a neutral communications channel on industry issues
- To lead to fruitful and open dialogue
- To encourage closer cooperation among all industry stakeholders

The newsletter is formulated, edited, and distributed by an Editor-in-chief selected by the CITT Engagement Subcommittee. An Editorial Board that includes members of the subcommittee and the METRANS Director provides oversight.

METRANS News

The first issue of the *METRANS News* was published in February 2003. This newsletter summarizes METRANS research, education and information dissemination activities. It compliments the METRANS website and broadens our exposure to the research community, government, and industry. The newsletter features METRANS researchers, conferences and other events, recent publications, interviews with key individuals involved in METRANS, and other newsworthy activities and events. With a three issues per year publication schedule, it is distributed electronically to the national research community, federal, state and local leaders, industry leaders, and federal, state and local transportation agencies. Printed copies are distributed to the METRANS Advisory Committee, public agency managers, and elected officials. The newsletter is also available on the METRANS website. As of June 2004, four issues have been published.

Outreach - Website

The METRANS website is the primary source for dissemination of information on METRANS activities. The METRANS Strategic Plan, Annual Reports, and Semi-Annual Reports are available in downloadable form. All research project final reports, conference summaries, and technology transfer reports are also available. The *Building Bridges* newsletter and *Metrans NEWS* are available, as well as information on CSULB's Master of Arts in Global Logistics and the new GLS® Online. An in depth program description including a list of core courses and options of specialization courses is provided. The website also identifies educational programs in transportation and links to 120 sources of transportation information. In particular, we have sought out organizations that find funding for transportation research, student internships, student awards and professional organizations, and provided links to their webpages. The UTC search engine locates documents on all other UTC websites by keyword.

The website is continually updated to include the latest research project descriptions and reports. The website maintenance also includes updates to information on key personnel, past events, and changes to the METRANS Advisory Committee. Updated information was added for METRANS's conferences and presentations including the The Alameda Corridor Event Brochure, Invitation, Presentations, Conference Summary, and White Paper, order forms for Videos for the Sixth Annual Town Hall meeting, and the Port of Long Beach Scholarships (Part of Student Internship and Awards), As of June 2004, www.metrans.org had received more than 44,400 hits on the home page

Project Reports

Project reports are distributed through the METRANS website. The Research page of the site provides a convenient mechanism for downloading and viewing reports. All completed reports are available online. Last year we began making a limited number of printed copies of METRANS Final Reports available for distribution. All Final Reports completed after May 2003 are available in print form by request.

F. LIST OF PROJECTS

The following lists ongoing and completed research projects in METRANS. Complete project descriptions can be found on the METRANS web site at www.metrans.org.

ONGOING PROJECTS:

Draft Report Submitted

Project Number: 00-7
Research Project: Solid State Sorption Air Conditioner System for Containerships and Vehicles - II

Project Number: 00-12
Research Project: Freeway Bus Station Area Development: Critical Evaluation and Design Guidelines

Project Number: 01-10
Research Project: Smart Damping for Monitoring the Health of Bridge Structures

Project Number: 01-14
Research Project: Developing and Testing Methodologies for the Evaluation of Highway Widening Plans to Facilitate Freight Flows

Project Number: 01-16
Research Project: Automated Trucks on Dedicated Lanes for Cargo Movement

Research in Progress

Project Number 01-3
Research Project Analysis of Vibrations as Infrastructure Deterioration Caused by High-speed Rail Transit

Project Number 03-06
Research Project Robust Investment Decisions for Highway Capacity Expansions

Project Number 03-07
Research Project Freight Routing and Containerization

Project Number 03-13
Research Project Hydrogen Storage System for Transportation Applications

Project Number 03-17
Research Project Innovative Bridge Structural Health Monitoring Using Variable Stiffness and Damping Devices

Project Number 03-18
Research Project Cooperative Optimum Time Window Generation for Cargo Delivery/Pick Up with Application to Container Terminals

Project Number 03-19
Research Project Measuring California's Role in Supporting Interstate Goods Movement: Comprehensive Assessment of Interstate Freight Flows

Project Number 03-20
Research Project Neighborhood Attributes and Commuting Behavior: A Comparative Study of California's Major Metropolitan Areas

Project Number: 03-24
Research Project: Increasing Bus Transit Ridership: Dynamics of Density, Land Use and Population Growth

Project Number: 03-25
Research Project: Development of an Artificial Intelligence Based Traffic Simulation Model Using the Discrete Element Method

Project Number 04-03
Research Project Evolution of Collective Sensory Systems for Intelligent Vehicles

Project Number 04-04
Research Project Landside Surface Transportation Impact of Short Sea Shipping in Southern California

Project Number 04-05
Research Project Development of Methods for Handling Empty Containers with Applications in the Los Angeles/Long Beach Port Areas

Project Number 04-06
Research Project Evaluation of the Terminal Gate Appointment System at the Los Angeles/Long Beach Ports

Project Number 04-08
Research Project SURE-SE: Sensors for Unexpected Roadway Events: Simulation and Evaluation

Project Number 04-09
Research Project Reduction of Construction Project Risks to Pedestrians, Drivers, and Transit Passengers Through Analysis of Historical Accident Records

Project Number 04-13
Research Project What Can We Learn From CTPP 2000? Neighborhood Attributes, Commuting Behavior and Jobs-Housing Balance: A Comparative 1990-2000 Study Across California's Major Metropolitan Areas

Project Number 04-15
Research Project Confidence Intervals for Estimated Traffic Demand

Project Number 04-18
Research Project Transit Investment and the Capitalization of Access into Land Values

COMPLETED PROJECTS:

Project Number: 99-3
Research Project: A Task Decomposition Model for Dispatchers in Dynamic Scheduling of Demand Responsive Transit Systems

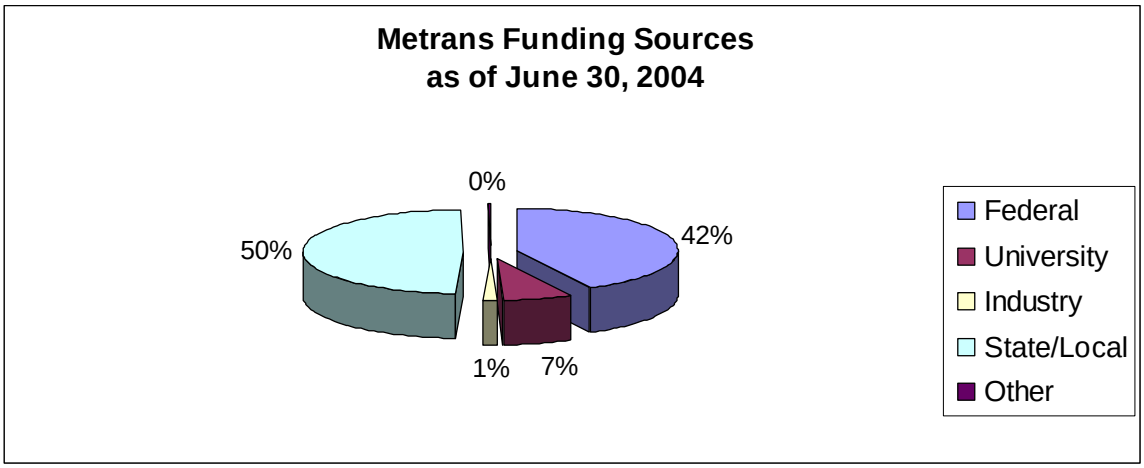
Project Number:	99-5
Research Project:	Improving Fuel Economy and Emissions Performance of Commercial Goods Transportation and Mass Transit Vehicles Using Throttleless Engines
Project Number:	99-7
Research Project:	Modeling and Route Guidance of Trucks in Metropolitan Area
Project Number:	99-10
Research Project:	Implementing a Statewide Goods Movement Strategy and Performance Measurement of Goods Movement in California
Project Number:	99-11
Research Project:	The Role of Public Transit in Mobility of Low Income Households
Project Number:	99-14
Research Project:	2D Virtual and Physical Simulation of Automated Container Terminal Facilities and Analysis of Impact on In-Land Transportation
Project Number:	99-18
Research Project:	Identification and Analysis of Local Agency Transit Project Performance Criteria
Project Number:	99-19
Research Project:	Solid State Sorption Air Condition System for Containerships and Vehicles – Phase I
Project Number:	99-22
Research Project:	Highway Oriented Transit System (HOTS): A Comprehensive Land Use-Transportation Strategy to Improve Transit Service Delivery
Project Number:	99-23
Research Project:	Non-Invasive Means of Investigating Container Contents for Customs Agents at Port
Project Number:	99-25
Research Project:	Assembling and Processing Freight Shipment Data: Developing a GIS-Based Origin-Destination Matrix for Southern California Freight Flows
Project Number:	99-27
Research Project:	Dynamic Coordination Framework for Resource Allocation in Trucking Operations
Project Number:	00-3
Research Project:	Alternative Access and Locations for Air Cargo
Project Number:	00-5
Research Project:	Developing Risk Model for Commercial Goods Transport
Project Number:	00-6
Research Project:	Assessment of Hybrid Vehicle Control Strategies in Planning Future Metropolitan/Urban Transit Systems
Project Number:	00-8
Research Project:	Travel Patterns of the Elderly

Project Number:	00-11
Research Project:	Investigating the Role of Driver Decision Styles in Highway-Rail Crossing Accidents
Project Number:	00-13
Research Project:	Distributed Architecture for Real-Time Coordination in Transit Networks
Project Number:	00-15
Research Project:	Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Area with Adjacent Ports
Project Number:	00-16
Research Project:	Design and Optimization of a Conceptual Automated Yard Using Overhead Grid Rail System
Project Number:	00-17
Research Project:	An Integrated Approach to Managing Local Container Traffic Growth in the Long Beach/Los Angeles Port Complex Phase II
Project Number:	01-2
Research Project:	Reducing Pollutants from Mobile Sources
Project Number	01-5
Research Project	Re-engineering the Logistics of Empty Cargo Containers in the SCAG Region
Project Number:	01-6
Research Project:	A Methodology for Joint Optimization of Service and Life Cycle Environment Impact Assessment of Transport Systems

G. FUNDING SOURCES AND USES

Funding Sources

This section reports on cumulative budgeted expenses and income for six years of METRANS' existence (1998-2004). METRANS received $7,596,344 in total funding during this period, an increase of nearly 40% over the previous year's total of $5,460,082. These numbers include matching funds from all sources. USDOT funds now account for 42% of the total. The largest portion (50%) comes from state and local sources: the full dollar-for-dollar match from the California Dept. of Transportation, plus additional contributions from state and local agencies. University matching funds account for 7%, with the remainder coming from private industry and other sources. Matching funds continue to increase; through 2004 $1.36 has been obtained for each dollar of federal funding, compared to $1.34 through 2003 and $1.32 for 2002.



Funding Uses

The primary use of METRANS funds is research, and its share has increased to 59% of total expenditures. Administrative expenses account for 22% of the total, and it includes administrative support for outreach events, information dissemination, and educational activities, as well as the general operation and management of the research center. Technology transfer accounts for 18%; it includes conferences and other events, publications, and training. The education share has increased slightly as a result of a new scholarship fund. However, the largest source of support for students is the research program. The new 2003-04 research projects include 33 student assistant positions.

Please refer to Section I of the financial section of the report for additional details on expenditures and income.