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# Annual Report

**Leonard Transportation Center**

Decision Making and Management of Transportation Systems

FY 2007-2008

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↘ Somewhere,  
something incredible  
is waiting to be known.

Dr. Carl Sagan

# **William and Barbara Leonard Transportation Center**

**Decision Making and Management of Transportation Systems**  
California State University, San Bernardino



**Annual Report FY 2007/2008**



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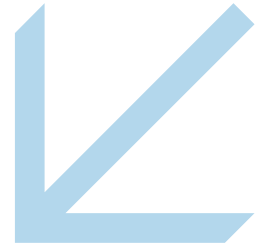


## Where are we located?

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# In Memory of William Leonard



## William E. Leonard, Sr. 1923-2008

San Bernardino County business and transportation icon and long-time Cal State San Bernardino supporter William E. Leonard Sr. died Thursday, June 5, in San Bernardino. Leonard, 85, was the owner of Leonard Realty and Building Company, which his grandfather began in 1905. He was a major player in California transportation and building issues, serving on the California Transportation Commission from 1985 to 1993. Leonard's long term interest and influence in regional and state transportation issues led to the State of California honoring him in 1998 by naming the interchange at the Interstate 15 and Route 210 freeways the "William E. Leonard Interchange." Leonard was also a proponent of higher education for the Inland region and was a principal advocate involved in the early negotiations that led to the campus of Cal State San Bernardino being built in the north part of the city. His continuing support led CSUSB to honor him and his wife by naming the university's new federally funded center the "William and Barbara Leonard University Transportation Center" in 2006. Last year, Cal State San Bernardino paid tribute to Leonard by bestowing him with an honorary doctorate in humane letters during the commencement ceremony of the university's College of Business and Public Administration.



# Message from the Director

I am glad to report that the state of the Leonard Transportation Center is strong. Built on the solid foundation laid by the visionary Bill Leonard and founding director Norm King, the center is moving quickly ahead to become a major knowledge base for transportation and logistics research and education in the Inland Empire area and beyond. Our mission, Decision Making and Management in Transportation Systems, examines the effectiveness of policy analysis, planning, decision making and implementation processes in both public and private sectors. We continue to develop programs, hold meetings, fund research and support professional organizations to advance the frontiers of research and education in transportation and logistics. Below are a few highlights of what we have accomplished in 2007-8:

- We held the second annual Leonard Transportation Center forum on toll road operations on May 2. A full slate of nationally recognized speakers and panelists discussed the relevant issues that would affect millions of drivers in Southern California and nationwide. The meeting drew close to 200 policy makers, transportation planners, educators, and other professionals.
- We initiated a speaker series featuring prominent scholars and decision makers in transportation and logistics, providing students and faculty with policy and strategy aspects of current and future transportation and logistics issues. The inaugural speaker was Julie Nelson, deputy maritime administrator at the U.S. Department of Transportation, who talked about national maritime policy as well as career opportunities in transportation. The second speaker, Steve Dunn of the University of Wisconsin, led the audience on a path to environmentally responsible management practices in transportation and logistics. Both speeches were received well on campus. Monthly speakers are planned for the future.
- We met with Cal Poly Pomona and Cal Poly San Luis Obispo faculty to discuss research direction and future funding opportunities. We focused on research projects that would be more relevant to practitioners and have a greater impact on local transportation systems. We have also decided to expand funding eligibility to include faculty from more CSU campuses in research grant applications.
- We proposed and held a series of meetings with California State University, San Bernardino faculty to discuss reviews and revisions for the transportation and logistics curriculum. The faculty, mostly from the Department of Information and Decision Systems at the College of Business and Public Administration, were eager to benchmark the best practices and identify major players in transportation and logistics for future student employment.
- We received the Department of Transportation (DOT) officials in June for their first site visit. We were excited to host the DOT officials as they toured the campus and attended student presentations on biofuel research, one of the projects funded by the center's seed grants last year. This was also the first time we were able to bring researchers from Cal Poly Pomona and Cal Poly San Luis Obispo to campus for a tour and a discussion of future opportunities. I am pleased to say that the DOT officials were impressed by the programs we have put together as a new member of the University Transportation Centers.
- We finished the first round of funding for the needs-based grants. Four outstanding research projects were selected during a very competitive double-blind review process that involved Caltrans and advisory board members. We also finished the second round of funding for the seed grants; a total of ten were selected. The awarded faculty have begun their research projects and will have one year to complete them.
- I attended a few meetings in spring and summer, including Transportation Research Forum, TRB Summer Meetings, and the Council of University Transportation Centers meeting. I was able to discuss some hot transportation topics with leading scholars and policy makers and identify a few key issues for the center to pursue. The presence of the Leonard Transportation Center is making inroads into the community of transportation professionals.

While we celebrate the many accomplishments that the center has achieved this past year, I am sad to report that the center's inspirational leader and namesake, Bill Leonard, passed away on June 5, 2008. Bill was a true visionary in transportation, having served in various leadership roles in local and statewide capacities including eight years on the California Transportation Commission. He was a true gentleman and a good friend of our staff. He will be dearly missed!

We still have a lot of challenges ahead. But as we build on last year's achievements, we are confident that we can capitalize on future challenges and opportunities and further the transportation and logistics industry through research, education and technology transfer. Stay tuned.

## Director Haw-Jan "John" Wu

**First began as  
director in 2008**

### Educational Background

- Pennsylvania State University (Ph.D.)
- University of Texas (M.A.)
- National Cheng Kung University (BBA, MBA)

### Achievements

- Wang Family Research Scholar
- Instructional Innovation Award

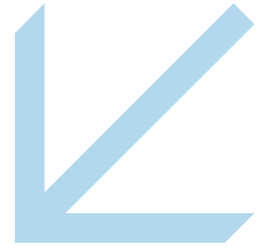
The theme of this center is Decision Making and Management of Transportation Systems. It reflects the commitment to confer local, state and federal transportation providers with increased capability for improved transportation decisions, while also imparting a methodology to better manage transportation systems and transportation investments through focused research and increased educational opportunities.

The Inland Empire is one of the fastest growing areas of the country, consisting primarily of Riverside and San Bernardino counties – the two largest counties in the country. With a combined population of 4 million people, the area is experiencing severe transportation challenges. In addition to dealing with rapid population and job growth, Southern California and in particular the Inland Empire must deal with the rapidly expanding growth of port-related cargo that traverses the area. More than two-thirds of the total volume of containers imported through the Port of Los Angeles and Port of Long Beach (40% of all container movements in the United States) leave Southern California to be consumed in other states. The air pollution, congestion, maintenance and capacity impacts on the area's transportation system are profound. On the positive side, the logistics industry is providing many new jobs in the Inland Empire and Southern California.

Considerable transportation infrastructure is under construction with project management provided by a combination of agencies, most particularly the California Department of Transportation (Caltrans) and, in the Inland Empire, regional transportation agencies such as the San Bernardino Associated Governments (SANBAG) and the Riverside County Transportation Commission (RCTC). Funding for such projects comes from state and federal funding allocations (including portions of the state and federal gas tax) and increasingly from a local county half-cent sales tax imposed by the voters in both counties. There are seven bus transit agencies operating in the Inland Empire and a commuter rail system (Metrolink) which is operated by a five-county joint powers agency. In this context the Inland Empire is an ideal laboratory for the Leonard Transportation Center to build upon its educational resources in transportation and to study and analyze the processes of decision making and management of transportation systems.

→ **Decision Making:** The present mix of decision-making authority among the key institutions is not always clear and includes Caltrans, California Transportation Commission (CTC), Southern California Association of Governments (SCAG) the Metropolitan Planning Organization for Southern California, the regional authorities RCTC, SANBAG, Orange County Transportation Commission (OCTC), the Los Angeles Metropolitan Transportation Commission (Metro) and the public transit agencies. Resolution of goods movement issues is also elusive, because decisions made by private-sector users, such as the shippers and railroads, have a critical impact on the efficiency of

## Theme and Vision



the public transportation system. There is not an adequate institution encompassing all relevant public and private interests that acts as a focal point for negotiation and decision-making. In addition, various state and federal planning, funding and operational regulations, and legislation add complexity and often confusion.

→ TRB's "Critical Issues in Transportation," 2005 highlights the need to expedite "a decision-making process that has become slow and cumbersome" and goes on to state, "fragmented authorities and structures for decision making and regulation inhibit the ability to address problems in highways, waterways, public transit, railroads, air transportation and pipelines from a systems. It is envisioned that the theme Decision Making and Management of Transportation Systems will facilitate a disciplined focus on an array of local and national issues, many of which have not received much attention from the academic community."

For all of these reasons a focus on transportation decision making with an emphasis on documenting present shortcomings and making suggestions for changes is a priority, not only for the Inland Empire, but in all likelihood for most other urban and urbanizing areas throughout the country.

→ **Management:** With declining transportation resources, the efficient management of the transportation system and transportation construction projects becomes even more critical. New wireless information sensors and systems such as GIS (Geographic Information Systems) could be used to a greater extent to manage transportation facilities and operations. Accelerated design and construction concepts, such as design-sequencing and design-build, have often met resistance. Operational issues, such as security, routing, congestion and air pollution concerning the flow of goods after leaving the air and sea ports are becoming more critical. The role and impact of public transit merits attention as a possible way to reduce congestion. Time-of-day-priced toll lanes have shown promise to increase traffic through-put, and other market-based management tools may be appropriate.

With transportation employment increasing in Southern California, developing more undergraduate and graduate educational opportunities is imperative. Research in various aspects of transportation decision-making and management is clearly needed, and equally an aggressive program to increase the ability of the stakeholder agencies and companies to make use of this information is essential.

Though the Inland Empire is our natural laboratory, the issues we address affect many other parts of the state and nation. The Leonard Transportation Center addresses Decision Making and Management of Transportation Systems from a local, regional, state and national perspective.



# Key Center Personnel



**Dr. Haw-Jan "John" Wu**  
Director

Dr. Haw-Jan "John" Wu joins CSU San Bernardino as Director of Leonard Transportation Center in 2008 from CSU Monterey Bay where he has been a tenured professor of Operations Management and Marketing since 2002. He had previously taught at Whittier College and Penn State for 12 years. Dr. Wu specializes in operational efficiency, supply chain integration, outsourcing, and Asian management styles. Dr. Wu has background and rich experiences in international business, including, most recently, a position as Resident Director in China for the CSU International Programs.

Dr. Wu received his Ph.D. in Business Logistics and Marketing from the Pennsylvania State University and an M.A. in International Management from the University of Texas. He also has undergraduate and graduate degrees in transportation and communications management from National Cheng Kung University in Taiwan. Dr. Wu has keen interest and experience in transportation, having worked in Taiwan Railroad Bureau and served as transportation officer in the Taiwanese Marine Corps. He has also worked with companies such as Merck, Conrail, Compaq, and Payless Shoesource on their logistics issues. His research in supply chain integration, international business, and management education has been published in a number of journals including JBL, IJPDLM, and TRF. He has made over 100 presentations in professional conferences and appeared in news programs in the U.S. and Asia.

Professor Wu frequently interacts with executives at large companies. He has worked with global companies such as HSBC and McCormick in the U.S.; Sony in Mexico; DTG, ZPMC, China Unicom, and Siemens in China; and TSMC, Citibank, Taiwan

Cellular and Chung-Hwa Telecom in Taiwan. He has trained numerous Chinese government officials and managers since 1997 in private and UN-sponsored programs. His entrepreneurial talents have helped American universities develop undergraduate and graduate degree programs in the U.S. and China. He has also introduced Chinese business practices and opportunities to American managers through the workshops and business tours to China that he developed. He is founder of a consulting company that helps American dental labs outsource to China.

Dr. Wu is a dynamic speaker frequently invited to address in events held by private companies and professional organizations. He has lectured at many universities, too, including University of Wisconsin, Idaho State, University of Southern California, Peking University, Tsinghua University, Shanghai Jiao-Tong University, Keio University, HKUST, Hong Kong Polytech, University de Macau and National Taiwan University. Recently, he spoke at the International Education conference at Waseda University in Japan and was a keynote speaker at national and regional dental lab conferences in the U. S. and Canada.

Professor Wu's achievements have won him many awards and scholarships. He was the Wang Family Research Scholar, a designation for outstanding research professors at the California State University system. Earlier in his career, he won an Instructional Innovation Award from Decision Sciences Institute and a "Best Paper" award from Britain's MCB Press. Moreover, he has received grants or scholarships from Irvine Foundation, Union Bank of California, San Diego Community Foundation (twice), and USC Center for International Business Education and Research (CIBEAR). He also successfully secured funding to develop new interdisciplinary curricula and exchange programs from major foundations such as the Henry Luce Foundation, the Ford Foundation, and the Japan Foundation.

Dr. Wu is an active member in many organizations. Most recently, he was President of the California State University Production and Operations Management Faculty Association (CSU-POM) for 2005-6, and President of Chinese American Faculty Association in Southern California for 1999-2000.

Professor Wu speaks fluent English, Mandarin Chinese and Taiwanese. He lives in Claremont and enjoys traveling, reading, hiking, golfing, running, and motorcycling. He is a long time track enthusiast as he was a collegiate athlete in Taiwan where he won a gold medal in high hurdles and a silver medal in decathlon in the Intercollegiate Games in 1984.

## Contact Information

### Dr. Haw-Jan "John" Wu

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### Jennifer Loveless

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**G.C. "Rusty" Thornton**  
Program Manager

Rusty Thornton joined Cal State San Bernardino after serving 24 years at the California Department of Transportation (Caltrans), most recently as associate transportation planner with District 8 in San Bernardino. His experience at Caltrans includes highway maintenance, program and project management, State and Local highway funding programs, and transportation planning. He has worked for Caltrans Districts 5, 7, 8 and HQ in Sacramento.

Thornton is a Cal State San Bernardino alumnus with a bachelor's degree in anthropology. He is currently working on his master's degree in visual anthropology and performance studies at the university. He is an experienced photographer and videographer.



**Zina Amir Moafi**  
Student Assistant

Zina Amir Moafi is currently attending CSUSB in pursute of an MBA in Supply Chain Management. She recieved her BA in Econonmics at Arak Univeristy in Iran. She hopes to pursue a job in the field of Supply Chain in either the US or Iran. As a student assistant, she is responsible for assisting in Research Coordination.



**Jennifer Loveless**  
Student Assistant

Jennifer Loveless is currently in her Junior year here at CSUSB. She is pursuing a BA in Business Administration with a concentration in Entrepreneurial Management.

Jennifer has worked at various organizations on campus once as the Catering Coordinator and Green Campus Intern but will now be assisting the Leonard Transportation Center with Budget Up-Keep, Billing and Event Coordination.



**The LTC staff**  
2007-2008.



**Norm King**  
Consultant  
Founding Director (2006-08)

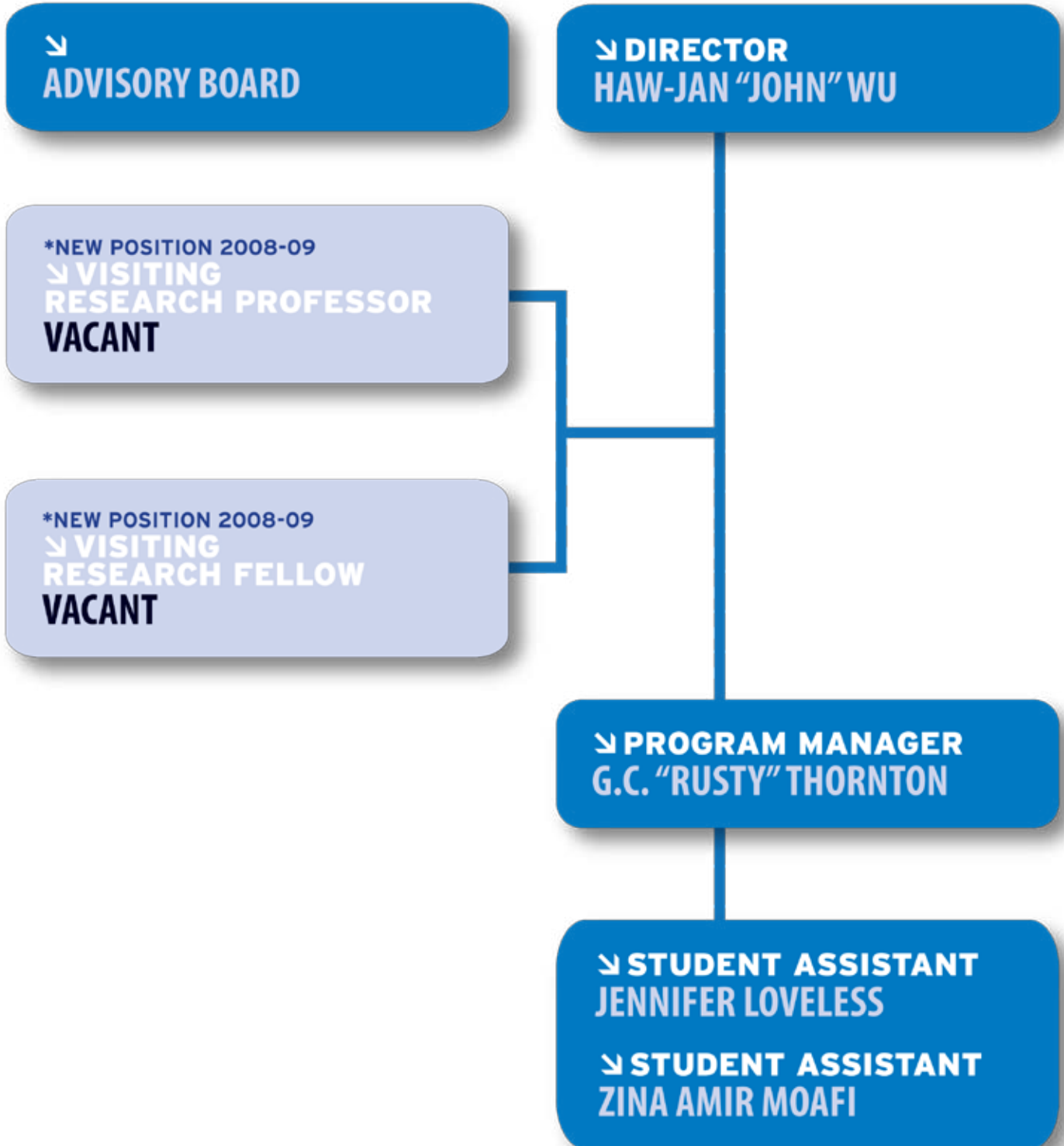
Norm King, the longtime Executive Director of San Bernardino Associated Governments (SANBAG), was the center's Founding Director. King was appointed director of SANBAG in August 1996, and has overseen numerous major transportation projects, including the construction of Route 210 and Route 71 and the widening of Interstate 10 and Route 60. Previously, he served as the city manager of Moreno Valley (1991-1996), Palm Springs (1979-1990) and Claremont (1974-1979). He was a visiting lecturer at Claremont McKenna College from 1991-2002.

King currently serves as chairman of the International City/County Management Association Retirement Corporation, a financial services firm that provides deferred compensation to state and local government employees. He is also a member of the Advisory Council of the Public Policy Institute of California. Most recently he was appointed to the Palm Springs Airport Commission.

Norm continues to help the center acting as consultant on several projects including the May 2008 Transportation Forum.

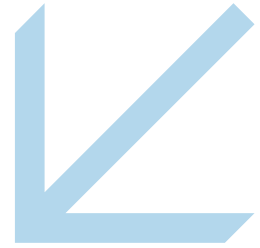


# Management Structure





# Advisory Board



**Judith Battey**

Advisory Board - Leonard Transportation Center  
California State University, San Bernardino

**Dan Beal**

Advisory Board - American Automobile Association  
(Retired)

**Robert Brendza**

Director of Facility Development - BNSF Railway

**Donald P. Coduto**

Chair/Professor - Department of Civil Engineering  
California State Polytechnic University, Pomona

**Karen Dill-Bowerman**

Dean - College of Business and Public Administration  
California State University, San Bernardino

**Malcolm Driggs**

Coordinator - Operating Engineers Training Trust

**Steve Harrington**

Vice President - Economic and Workforce Development  
Inland Empire Economic Partnership, Riverside

**Frederick Hebein**

Professor - Department of Marketing, College of  
Business and Public Administration  
California State University, San Bernardino

**Hasan Ikhata**

Director of Planning & Policy - Southern California  
Association of Governments

**Albert K. Karnig**

President - California State University, San Bernardino

**Anne Mayer**

Executive Director - Riverside County Transportation  
Commission

**Michael Miles**

Deputy Directory - Maintenance and Operations,  
State of California, Department of Transportation

**April Morris**

President - Associated Engineers, Inc.

**Henry A. Nejako, Jr.**

Program Management Officer  
Federal Transit Administration, Office of Technology,

**Craig Neustaedter**

Principal Engineer - Transportation Engineering &  
Planning, Inc.

**Mary Jane Olhasso**

Economic Development Director - City of Ontario

**Michael Perovich**

District Director - District 8, California Department of  
Transportation

**Steve PonTell**

Germania Corporation

**Lisa Reece**

Vice President - HDR Engineering, Inc.

**Don Rogers**

Executive Director - Inland Valley Development Agency

**William "Ty" Schuiling**

Director of Planning and Programming - San  
Bernardino Associated Governments

**Larry Sharp**

President and CEO - Arrowhead Credit Union

**Cliff Simental**

Senior Vice President - David Evans and Associates,  
Inc.

**Edward Sullivan**

Associate Dean of Engineering for Research & Graduate  
Programs

**Matthew Webb**

President - Albert A. Webb Associates

**Robert Wolf**

President Emeritus - Germania Corporation



## Education Program

The rapid increase of logistics employment in the Inland Empire requires the development of a transportation curriculum that is responsive to this increased demand for logistics and transportation skills from the public and private sectors. Reflecting the center's theme the courses emphasize a management approach to transportation. Such emphasis is in context to multidisciplinary course work, including economics, public finance, environmental analysis, urban planning and information systems.

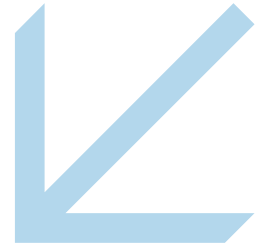
A sample of degrees offered by CSUSB:

### College of Business and Public Administration

- B.A. in Administration with Transportation and Logistics Concentration
- B.A. in Administration with Public Administration Concentration
- B.A. in Administration with Environmental Management Concentration
- B.S. in Administration with Information Management Concentration
- M.P.A. Master of Public Administration
- M.B.A. Master of Business Administration



# Research Program



The center's goal is to produce high quality research that is relevant and practical to solving real transportation problems and are understandable to a variety of user groups. Through the needs-based research program, we fund research projects which are responsive to the needs of the region's and state's public and private transportation and transit agencies, USDOT, businesses, and practitioners. Through the smaller seeds grants, we encourage faculty to innovate and explore certain areas of interest in transportation and logistics to advance the knowledge frontiers. Currently, only researchers who are affiliated with CSU are eligible to apply.



## LTC Completed Research Projects | FY 06/07

### **Assessment & Development of Biodiesel Instructional Techniques**

2007-SGP-1002 CSUSB

2006-7 AMT/Total: 5000

Melchiorre, Erik | emelch@csusb.edu

### **Tertiary Disaster Response in the Inland Empire: Operationalizing Supply Chain Restoration, Phase 1**

2007-SGP-1004 CSUSB

2006-7 AMT/Total: 5000

McInturff, Pat | mcinturff@earthlink.net

### **Use of GIS Technology to Facilitate the Transportation Project Programming Process**

2007-SGP-1013 Cal Poly Pomona / CSUSB

2006-7 AMT/Total: 5000

Jia, Xudong | xjia@csupomona.edu

### **Electrification of the Freight Train Network from the Ports of Los Angeles and Long Beach to the Inland Empire**

2007-SGP-1014 Cal Poly Pomona / CSUSB

2006-2007 AMT / Total: 5000

Smith, R Frank | rfsmith@csupomona.edu

Jia, Xudong | xjia@csupomona.edu

Jawaharlal, Mariappan | jmariappan@csupomona.edu



## LTC Approved Research Proposals | FY 07/08

### **A Decision Support Tool for Locating an Inland Port in Inland Empire**

2008-SGP-1030 CSU Northridge

2007-8 AMT / Total: 5000

Vaziri, Ardavan Asef | ardavan.asef-vaziri@csun.edu

The purpose of this research project is to develop a decision support tool to identify the optimal location of the Inland Empire inland port. The decision support tool will take advantage of the mathematical models available for single facility location problems. Given the daily origin destination (O/D) data from SPB ports to the distribution centers and processing centers (DC/PCs) in the Inland Empire, the model identifies the optimal location of an inland port. Due to environmental, legal, land availability, and economical concerns, it may not be feasible to locate an inland port on the theoretical optimal site. The decision support tool will also provide a set of contour lines showing the total TMT for the sites other than the theoretical optimal site. All the nodes on the same contour line have the same transportation and environmental costs. The computational capabilities and graphical interface of the decision support tool are especially valuable because the O/D data between SPB ports and Inland Empire DC/PCs are not reliable. The decision support tool makes it possible to conduct a sensitivity analysis of the impact evaluation of changes in O/D data on the optimal location and contour lines. Moreover, as the available data from diverse resources are integrated, and more reliable estimates on container flows in the Inland Empire are available, the model could quickly reflect the impact of the more accurate data. More accurate data may gradually become available using the ports truck driver surveys, ports Truck Trip Reduction Program data, Caltrans truck counts, SCAG heavy-duty truck model output, and MTA Comprehensive Truck/Freight Modeling effort. Furthermore, it is straightforward to use the decision support tool to evaluate the impact of O/D data aggregation on the optimal location and the contour lines. In addition, the software can also evaluate the tradeoff between train trips and truck trips. Finally, by defining a set of weights as the negative environmental impact of one mile of travel, the objective function could be entirely transformed into emissions minimization.

### **Transportation Decision-Making in San Bernardino County**

2008-SGP-1031 CSUSB

2007-8 AMT / Total: 5000

Bockman, Shel | sbockman@csusb.edu

The purpose of this proposed pilot study is to describe and analyze how current transportation planners in San Bernardino County make decisions on prioritizing transportation issues and deciding where limited funds are to be spent. Specifically, this research project will employ a telephone survey of key Transportation Planners, City Engineers, Transportation Managers, and/or Traffic Engineers at the city, county, and regional levels to shed light on sources of information and procedures used by planners when making decisions concerning the relative importance and funding of potential and competing transportation projects. In addition to surveys of “technical” people, selected elected officials will be interviewed for their political observations. It is the intention of the Principal Investigators to use the data collected to write at least one article for publication in a refereed journal. But perhaps a more important outcome is that it is anticipated that data gathered from this pilot study (and future “full-blown” studies) will be used by CSUSB’s Leonard Transportation Center to enhance its presence as a major source of transportation data/information to be used by Transportation Planners, Engineers, and policy-makers in the two-county area.

### **Transportation Decision-Making in Riverside County**

2008-SGP-1032 CSUSB

2007-8 AMT / Total: 5000

Sirotnik, Barbara | bsirotni@csusb.edu

The purpose of this proposed pilot study is to describe and analyze how current transportation planners in Riverside County make decisions on prioritizing transportation issues and deciding where limited funds are to be spent. Specifically, this research project will employ a telephone survey of key Transportation Planners, City Engineers, Transportation Managers, and/or Traffic Engineers at the city, county, and regional levels to shed light on sources of information and procedures used by planners when making decisions concerning the relative importance and funding of potential and competing transportation projects. In addition to surveys of “technical” people, selected elected officials will be interviewed for their political observations. It is the intention of the Principal Investigators to use the data collected to write at least one article for publication in a refereed journal. But perhaps a more important outcome is that it is anticipated that data gathered from this pilot study (and future “full-blown” studies) will be used by CSUSB’s Leonard Transportation Center to enhance its presence as a major source of transportation data/information to be used by Transportation Planners, Engineers, and policy-makers in the two-county area.

## **Transportation and Distribution Systems in the Inland Empire: The Impact of the Port Ensenada Proposals**

2008-SGP-1033

2007-8 AMT / Total: 5000

McInturff, Pat | mcinturff@earthlink.net

Over the last decades the Inland Empire has emerged as a global distribution center with over 700 million square feet of distribution and warehouses under roof. Along with this phenomenal growth, the transportation infrastructure of the region has become over burdened and highly congested. Adding to the growth and an infrastructure stretched thin is the ongoing arrival of super container ships at the ports of Long Beach and Los Angeles. One proposal to lessen the pressure on the Southern California ports has been the expansion and redevelopment of Port Ensenada, Baja California, Mexico. Once a favored port of cruise ships the port has embarked on moving from principally a passenger destination to becoming a global port facility. The focus of this study is to analyze the impact of Port Ensenada upon the Inland Empire by addressing identifiable consequences upon the transportation infrastructure including highway, rail and shipping utilization and the flow of goods in relation to existing and expected warehouses and distribution centers.

## **Evaluating Service Effectiveness of Bus Lines:**

### **A Combined Approach Using Geographic Information Systems (GIS) and Data Analysis (DEA)**

2008-SGP-1034 CSUMB

2007-8 AMT / Total: 5000

Lao, Yong | yong\_lao@csumb.edu

Public transit is an integral and important component of regional transportation systems. Currently many public transit agencies are under increasing pressure to operate more efficiently as the level of government funding reduces, or as a result of changing ownerships or regulations (Tsamboulas, 2006). Therefore, it is necessary to examine the performance of public transit systems from the geographical perspective. It is against this background that this study is proposed. The goal is to develop a scientific approach to evaluate the service effectiveness of bus lines, taking into account critical elements in the operational environment. Methodologically, this project aims to integrate geographic information systems (GIS) and data envelopment analysis (DEA). The project will mainly address the following three questions: How to identify the service corridor and estimate the potential passenger demand associated with a bus line? How to measure and compare the service effectiveness of bus lines? How to plan transit routes and stops based on the evaluation of bus lines? The research will be based on a case study of Monterey-Salinas Transit (MST), a public transit bus system in Monterey County, California. MST has been a vital part of the central coast community since its establishment in 1981. Currently the MST transit system serves a 275 square-mile area of Monterey County and Southern Santa Cruz County. With an annual budget of \$20.2 million, MST employs more than 2100 people, operating 86 vehicles and 33 routes. The outcome of this project includes: A series of maps that show the service corridor of each fixed bus line, estimated passenger demand for each bus line based on the demographic profiles in its service corridor, measures of bus line service effectiveness based on the DEA model, and recommendations for bus route and bus stop planning.

## **Preliminaries to a Feasibility Analysis of Southern California Association of Governments Maglev Proposal for the Region**

2008-SGP-1035 Cal Poly San Luis Obispo

2007-8 AMT / Total: 4999

Nuworsoo, Cornelius | cnuworso@calpoly.edu

With a rapidly increasing population, economic expansion, and high levels of roadway and air traffic congestion, the Southern California Association of Government's (SCAG) envisions the use of maglev (a variant of high speed rail) to connect the region's airports and augment the transportation infrastructure. This request is for funding to research background to the issue, identify sources factors and beneficiaries of costs and benefits and design a study to address the feasibility of a "Decentralized High Speed-Connected Airport System" in Southern California. The anticipated product of this study will include documentation of: highlights of the SCAG maglev proposal; components and generalized unit costs of "high speed rail" and bus rapid transit systems; identification of potential sources of funding the connection; and an outline of key elements of a detailed study for the conduct of a feasibility analysis of the proposal. Other outcomes may include a TRB paper and presentation and materials to respond to requests for proposal at the state and national levels for feasibility studies of high speed rail in this era of high fuel costs.



### **Development of a Real Time Crash Risk Model based on Microscopic Traffic Data**

2008-SGP-1036 Cal Poly San Luis Obispo

2007-8 AMT / Total: 5046

Mitra, Sudeshna | grants@csupomona.edu

In this research, a real time crash risk model will be developed using microscopic traffic data. Unlike the conventional approaches, which employ field-aggregated data over long periods of time, this proposed research is based on microscopic real-time data (obtained from a previous project funded by Caltrans). Binary logistic regression models will be developed to identify the relationship between various traffic flow factors and the probability of traffic disturbances. An alternative approach employing a multi-layer artificial neural network will also be investigated to characterize different crash types. The results will provide insights into various microscopic traffic flow variables that could be used as crash precursors. Also, based on the findings of this preliminary study, a full grant proposal will be prepared and submitted to Federal and/or State agencies. Our ultimate goal is to develop a metric that is expected to provide a much improved real-time indicator of the instantaneous safety of highway traffic, for both analysis and real-time warning purposes.

### **Chinese Economic Growth and its Implications for the Goods Movement Industry in California and the Inland Empire**

2008-SGP-1037 Cal Poly San Luis Obispo

2007-8 AMT / Total: 5000

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China's recent economic development and growth are impressive. It is and for the foreseeable future will remain, the factory of the world. Its government and business culture remain a mystery to most Americans, even to those living on the Pacific Rim. Further, while its infrastructure continues to develop and improve, on other fronts its infrastructure remains a labyrinth to Western firms; and this is one of the reasons companies that specialize in the movement of goods will remain important to the myriad of other firms who do business in or with the Chinese. In summary, China is an important topic, both for those in the goods movement industry and other, to monitor and study. Said firms must study and understand critical areas of transportation and the supply chain as: Seaport transportation and security, Air transportation and security, China's own transportation system & developments thereto, increased off-shoring, the use of logistics and supply chain support firms, the changing value of the RMB in relation to the US dollar, payment and debt collection, recent supply chain liability legal developments, the legal resolution of inevitable business disputes arising from these areas and said activities. This paper will explore and discuss these areas and their implications, and others. Conversely, there are several items where the Chinese might learn from California and the Inland Empire in further developing their infrastructure and transportation system. This paper will explore and discuss several best practices/knowledge transfer issues in this regard.

### **Transportation-Related Collaborations**

2008-SGP-1038 CSUSB

2007-8 AMT / Total: 3500

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With limited personnel and resources the center staff cannot be as available or involved in transportation issues equal to the requests for assistance, presentations and other involvement. I am proposing to be available to participate in various transportation related events and workshops as a representative of the Director, as speaker or as a participant in various transportation-related collaborations, and available for class room lectures and presentations. Though I would seek no compensation the proposed budget would provide reimbursement for various travel expenses and for attendance at the UCLA Arrowhead Transportation Symposium (at which I would likely speak) and possibly the TRB meeting in Washington DC.



## **Managing Public Private Partnerships in Transportation: Lessons learned from California SR-91**

2008-SGP-1039 CSUSB

2007-8 AMT / Total: 5000

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Compelled by the wide-spread fiscal stress, governments at both state and federal levels have growing interest in public-private partnerships (PPPs) for transportation projects and legislatures are moving forward to open the door to many more such arrangements. Adopting the lens of a principal-agent theorist, this research will trace the evolution of a key California PPP in transportation – the SR91 project – and discuss the potential pitfalls and challenges that can occur from such arrangements. Through in-depth investigation of the SR91 case, this research aims at providing lessons for both public and private managers who might at one time or another be involved with PPP agreements. The proposed research will investigate a single pioneering case of PPP which has significant impact to the transportation development of California state as well as nationwide. The study is envisioned as 1) a historical documentation of the evolution of the SR91 PPP, especially its evolution in recent years; 2) the development of lessons learned from the case that will provide guidance to future PPP transportation projects; and 3) a projection of future trend of using PPP for the development and management of transportation infrastructure and services. The study will involve reviewing the literature on PPPs and transportation development in order to fully investigate the SR91 PPP. Data collection methods include related existing documents and interviewing key players in the PPP arrangement. The analysis will employ qualitative data documentation and analysis tools. From these analyses, recommendations will be made for public as well as business managers who engage in the practice of PPP.

## **Providing Senior Citizen Mobility at Minimum Public Cost**

2008-NBG-1021 Cal Poly Pomona

2007-8 AMT / Total: 64,315

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Demographic trends in the US indicate significant increases in the number of people aged 65 years and over (seniors) and underscore the need to expand senior services. These services will include assisted transportation for older citizens who would no longer drive. Increases in senior demand for demand-responsive services, which tend to be very expensive to provide, will aggravate the financial situation of transit agencies, which already must rely on subsidies to maintain operations. There is the need therefore to devise and adopt innovative mobility services as well as methods of payment to meet the inevitable increase in the needs of seniors. The objective of this study is to examine ways of accomplishing this. This project is proposed as an investigation of ways to provide mobility for Senior Citizens at minimum cost to both the public and beneficiaries. The study will involve selection of a case study location on the Central Coast, where seniors are known to relocate upon retirement. Surveys of senior activities and mobility needs will be conducted and combined with existing regional travel surveys and census data in the analysis and development of the transferable procedure. The analysis will employ data analysis tools, including GIS, in the identification of origins, destinations, routes and gaps in existing services relative to need. Cost effectiveness (in terms of users per unit cost) and benefit-cost estimations will be used in comparative analysis of various mobility and payment programs. From these analyses, recommendations will be made on senior mobility and funding mechanisms.

## **GIS Best Practices for Transportation Agencies in the Inland Empire of Southern California**

2008-NBG-1024 Cal Poly Pomona

2007-8 AMT / Total: 73,609

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The project has the straightforward goal of adding value to the use of Geographic Information Systems (hereafter GIS) by public and quasi-public transportation agencies in the Inland Empire region, defined for these purposes as San Bernardino and Riverside Counties. Despite evidence of dramatic improvements from the application of GIS in both the operations and efficiency of transportation agencies, the transportation community nationwide has been a late (and as yet partial) adopter of GIS technology. Moreover, there have been no systematic studies of actual transportation agency uses of GIS, or of best practices in transportation agency use of GIS. Two important steps toward achieving the project's goal are to determine current GIS practices by the region's transportation agencies and to establish the state of knowledge regarding best practices for transportation agency use of GIS. A comparison of the two will reveal potential GIS service extensions – a universal wish list of possible GIS applications in transportation. From the potential extensions the research team will recommend a prioritized sequence of GIS service extensions for various agency types and sizes, with an eye toward helping agencies get the most out of their GIS systems given real budget constraints. The final report will be targeted to the regional community of transportation agencies and local policy makers, with an express focus on recommended GIS practices for agencies of varying size and type. The project will also benefit significantly from the GIS and regional research capabilities resident at Cal Poly Pomona. In particular, deliverables will include two products that capitalize on these opportunities. The first is a special workshop on GIS for transportation agencies, sponsored by the Center for the Study of the Inland Empire and targeted to the region's transportation agency professionals and policy makers. The second is a featured content channel on the Regional Research Portal, a web-based geospatial metadata portal currently under construction at the Cal Poly Pomona Center for GIS Research. Accordingly, an important secondary goal of the project is to build lasting links between transportation agencies and professionals in the region and the University's GIS faculty, staff and resources.



# Research Program

## **Interdisciplinary Study of Fuel Cell Technologies (stewardship)**

2008-NBG-1026 CSUSB

2007-8 AMT / Total: 80,000

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Degradation mechanisms in proton exchange membrane fuel cells (PEMFC) will be identified and products quantified using an interdisciplinary approach involving a range of experimental techniques including ion chromatography (IC), gas chromatography/mass spectrometry (GC/MS), electron paramagnetic resonance (EPR), nuclear magnetic resonance (NMR), x-ray diffraction (XRD), polarization curves, and cyclic voltammetry. Increasing the lifetime and performance of fuel cells is a critical research area for alternative energy sources. Two components are of importance in these considerations: the polyelectrolyte membrane and the catalyst. Degradation of membranes is known to limit fuel cell lifetimes; however the mechanism(s) of this degradation isn't known exactly. We propose to study these mechanisms by quantifying the degradation products obtained from ordinary, variable-load operation in a durability test; the products obtained from accelerated degradation using Fenton's reagent; and that obtained from exposure to ionizing radiation such as X-rays. IC will be used to measure fluoride and sulfate in Nafion-type perfluorinated polymers, GC/MS and NMR will be used to identify organic products, and EPR will be utilized to identify radical intermediates. The performance of the fuel cells will be checked with polarization curves. In addition, platinum-based catalyst material will be synthesized and incorporated into fuel cells to observe the effect of catalysis on the degradation products. As an interdisciplinary effort between faculty and students in the departments of chemistry and physics, this project provides invaluable experience and education for students in a future technology area, intimately showing how fundamental research provides advances for society at large. We propose to make the project even more interdisciplinary by adding a M. S. Environmental Studies student to our group. She/he would make a life cycle assessment of fuel cell technology: overall, how much does it cost to implement fuel cells in comparison to conventional power technology?

## **Foundation for Efficient and Effective Decision Making on Environmental and Logistical Concerns: The Development of a GIS Database and Web Portal**

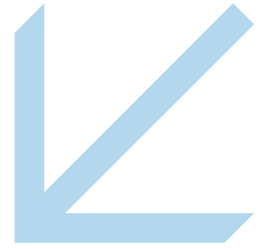
2008-NBG-1027 CSUSB

2007-8 AMT / Total: 79,080

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Approximately 40% of the goods that come into the United States come through the ports of Los Angeles and Long Beach. Given a dearth of available building sites close to the harbors, the Inland Empire with its cheap (Schrader, 2007; Sadovi, 2008), available land has become a major inland global port. In order for decision makers, policy analysts, and other stake holders to begin the process of implementing curative strategies, there needs to be available accessible databases that provide the foundational information necessary for the process to move forward. A pilot project funded by the Leonard Transportation Center entitled, "Inland Empire Logistics GIS Mapping Project" (Rohm, 2008) during the last funding cycle revealed that there was no one specific database for warehousing and distribution facilities information. Further, these Inland Empire facilities were located in 41 distinct municipal districts with major variances in recognition and understanding of logistic activities. Thus, strategic decision makers at the commercial, governmental and military level can only piece the information together from various sources. This proposed project would build on the Rohm (2008) pilot project. Using the project's findings of 41 cities with its specific information and the identification of a questionnaire, this project will be three fold: 1) It will send the questionnaire to the various warehousing and distribution facilities which will include a follow-up interview to obtain the necessary information; 2) The information will be coded into a database which can be accessed by a GIS program; and 3) A web portal will be designed and built which will allow for the GIS program to be accessed.

# Technology Transfer Program



**The 2nd Annual Transportation Forum at Ontario Hilton in Ontario, Calif.**

On May 2, 2008, the center held its second forum on Transportation. The event opened with a presentation by Alan Pisarski, a nationally renowned transportation expert. Alan discussed the issues of congestion, horrendous economic costs, and the role of transit. Following Alan was an expert panel discussing “Why Toll Roads?” The panel included: Kathleen Brown, Goldman Sachs; Asha Weinstein Agrawal, San Jose State University; and Hasan Ikhata, Southern California Association of Governments. The panelists discussed the importance of infrastructure finance, the results of California voter surveys, and why toll roads are necessary in solving congestion problems. The forum continued with two more panels which included Bob Poole, Reason Foundation; Steve Finnegan, Automobile Club of Southern California; Kent Olson, Parsons Brinkerhoff; Brennan Kidd, Lee Engineering; David Fleming, LACMTA; Barney Allison, Nossaman Guthner Knox and Elliot; Mark Watts, and Jim Bourgart, Deputy Secretary for Transportation and Infrastructure in the Business, Transportation and Housing Agency. Their discussions covered what other states and regions are doing, the Auto Club’s take on toll roads, the basics on Public Private Partnerships, and the cost effectiveness of HOT lanes. The panelists also offered an action plan of mobilizing the business community, enabling legislation in order to compete with other states, and what the states need from the legislature and the regional agencies. The luncheon speaker was Martin Wachs of RAND who spoke on the importance of user-pays principle for highway finance, how tolling historically was first choice and should be again, and the equity issues surrounding toll roads.



## **Julie Nelson on U.S. Maritime Policy**

Julie Nelson, Deputy Maritime Administrator of the Department of Transportation, spoke at Cal State San Bernardino as the inaugural speaker of the Leonard Transportation Center Speaker Series. Ms. Nelson discussed her work and career paths with students along with the U.S. Maritime policy and the nation’s competitive strengths.



## **Steve Dunn on Green Logistics**

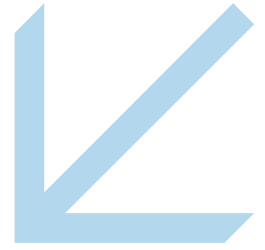
Steve Dunn, Chair of Supply Chain and Operations Management at the University of Wisconsin Oshkosh, spoke on how firms can start on a path to what has been called “sustainability.” He traced the evolving concept of green transportation and illustrated with real-world cases of how companies can be both green and profitable.

# RITA Site Visit

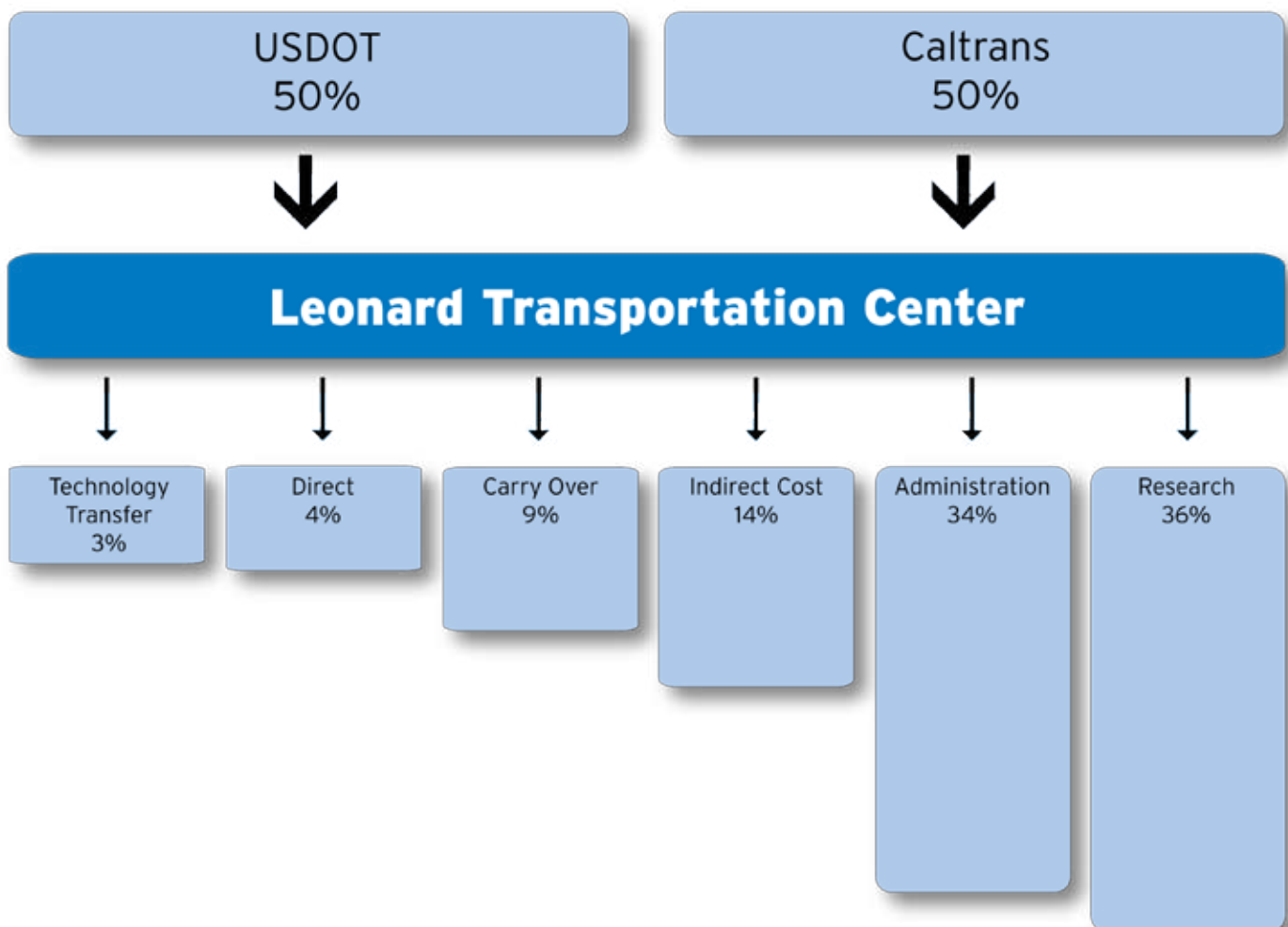


On June 23, 2008, U.S. Department of Transportation officials, Lydia Mercado, Robin Kline, and Amy Stearns, made their first visit to the Leonard Transportation Center. The day began with a campus tour that concluded with a presentation by student researchers from physics and chemical sciences hosted by Dr. Tim Usher. Center director Dr. John Wu provided an update of the center's past successes and the exciting plans for the future. Following Dr. Wu were presentations on current research by faculty from Cal Poly Pomona, Cal Poly San Luis Obispo, and Cal State San Bernardino. The site visit concluded with discussions on budgeting and reporting procedures. The center would like to thank Lydia, Robin, Amy and all the site visit participants for making RITA's visit such a success.

# Funding Sources and Expenditures



In 2007-08, the Leonard Transportation Center received a total of \$816,600 in grant funding.





## Forward Looking

With the rising energy costs and increasing demand from the citizens to be more environmentally responsible, the transportation industry is faced with many challenges. The Leonard Transportation Center is at a strategic junction where our work and efforts can really make a difference. The effectiveness and efficiency of decision making and management of transportation systems does not just affect how people commute and goods move, it drives the economy and is an important part of the nation's competitive strength. Transportation decisions we make today will also change the way we live and whether future generations can enjoy a comfortable and sustainable lifestyle. We have planned, along the main focus of the center, some major programs that are undergoing or being developed:

### → Education:

We will continue to work with CSUSB faculty to strengthen course offerings in transportation and logistics. Once the benchmarking study is completed, we should be able to propose the changes to faculty for approval. A new series of career planning and collaborations with community colleges have also been proposed to recruit more students into transportation and logistics. The center is also looking to fill the two visiting scholar positions in the coming year to strengthen the curriculum.

### → Research:

We plan to start a Fall Research Conference that showcases faculty achievements and generates future research ideas. The focus is to connect policy makers with researchers for a dialog of what's been done and what needs to be addressed. This conference will help set the research directions of the center.

We will have an additional funding cycle for the Seeds Grants to be more responsive to research needs. We will receive applications on a continuous basis and review and fund Seeds Grants twice a year rather than once a year. The reviews

and decisions will be completed every May and December. The quicker turn around will help faculty carry out research to address current issues in a more timely fashion. The Needs Based Grants will still be reviewed on a yearly basis.

### → Outreach:

We are at the planning stage for the Transportation Summary Initiative that would read and summarize cutting edge transportation and logistics articles for decision makers. Each summary will be written in plain English in one page, and available in various Word, Powerpoint, PDF, and MP3 formats. The idea is to make research results easier to understand and more readily accessible to lay people.

We will continue to host the annual Leonard Transportation Center forum in May as a major platform for public discourse on transportation and logistics topics relevant to our region and country. We will also expand the Speaker Series to provide constant exchanges of ideas in transportation and logistics. In addition, we will work closely with local organizations for opportunities to co-host or sponsor their programs.

We will involve Advisory Board members with semi-annual and frequent individual meetings. The Advisory Board membership will be expanded to represent voices from policy makers, transportation system suppliers, professional organizations, logistics service providers, and transportation users in the private sector.

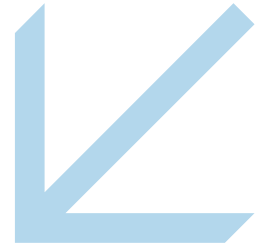
We will continue our efforts to digitize contents we produce, including posting conference presentations online and making speaker series available in podcasts. Eventually, we'd like to have an iTunes Store presence.

We have developed a working relationship with Elsevier Publications and will host their newly developed service, Scirus Transportation Topics. Dr. John Wu will be the editor who oversees the development of a worldwide scholarly community of transportation and logistics experts. These people will constantly post definitions, best practices, and theory and practice of relevant transportation topics online for students and other researchers to use. The LTC will be the center of this online service in transportation.

With the anticipated hiring of two new scholars, our lean organization of two full time staff and two student assistants should be able to implement the tasks outlined above. We are excited to have worked with many community members in the past years and we certainly look forward to more opportunities to serve the transportation and logistics community in the years to come!



# Leonard Transportation Center



Founded in 2006, the center was created through a multi-year grant from the U.S. Department of Transportation and the California Department of Transportation. The center's national and regional objectives are threefold research, education and technology transfer. The theme of the center is "Decision Making and Mangement of Transportation Systems," with particular focus on policies and practices that impact effective movements of people and goods within and throughout the Inland Empire.

## Map to Cal State San Bernardino





FY 2007-2008 Annual Report  
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