

METRANS NEWS

National Center for Metropolitan Transportation Research
University of Southern California / California State University, Long Beach

Research Profile: Petros Ioannou, EE Systems

LOS ANGELES IS A LIVING LABORATORY FOR PETROS IOANNOU'S TRANSPORTATION RESEARCH

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METRANS, a partnership of the University of Southern California and California State University, Long Beach, is a U.S. Department of Transportation designated University Transportation Center. Its mission is to solve transportation problems of large metropolitan areas through research, education and outreach.

When Petros Ioannou was growing up on the island of Cyprus in the Eastern Mediterranean, performing high-impact research on urgent transportation issues was not a thought he entertained. Now, as an Electrical Engineering professor at the University of Southern California, Director of the Center for Advanced Transportation Technology, and frequent contributor of research projects investigating technologies applied to all modes of transportation, solving transportation problems in large cities is his career focus.

In fact, Ioannou is considered an expert in vehicle dynamics and control and traffic flow control. His studies began at the University of London where he earned a B.S. in Mechanical Engineering. He immigrated to the United States in 1978 to work on his Master's in Mechanical Engineering at the University of Illinois, Urbana/Champaign. He then began

to study automatic control systems, earning his Ph.D. in Electrical Engineering. His first exposure to the transportation industry was during a brief stint at Ford Motor Company working on maximizing the combustion process to improve fuel economy and reduce pollution. After he joined the USC faculty in 1982, the contacts he made at Ford and other automotive manufacturers became useful to him when he sought their support as research sponsors. His interactions with those companies resulted in the development of technologies such as cruise control, vehicle dynamics, steering-by-wire and other concepts that are finding applications now.

"By 1990, USC had research contracts with Caltrans to study transportation. Caltrans became interested in the work I had done with Ford and GM," said Ioannou. "They were interested in vehicle information and auto-



Professor Petros Ioannou

mated highway systems. So, we created the Center for Advanced Transportation Technology with a goal of getting others interested in solving transportation problems."

After funding became available through California PATH (Partners for Advanced Transit and Highways), the USC team joined with California State University, Long Beach to establish the two schools as a University Transportation Center with further funding from the Department of Transportation. "As a result, METRANS was created in 1998 to examine solutions to transportation problems

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TRANSPORTATION RESEARCH BOARD MEETS IN WASHINGTON, D.C.

Some 9,000 transportation professionals from government, industry and the academic community attended the Transportation Research Board (TRB) 82nd annual meeting in Washington, D.C. in January. The meeting included more than 500 sessions, 40 workshops and 350 TRB committee meetings covering all aspects of transportation.

The mission of the TRB is to promote innovation and progress in transportation through research. In an objective and interdisciplinary setting, The Board facilitates the sharing of information on transportation practice and policy by researchers and practitioners; stimulates research and offers research management services that promote technical excellence; provides expert advice on transportation policy and programs; and

disseminates research results broadly and encourages their implementation. As a major focal point of the Board's activities, the annual meeting provides an opportunity for transportation professionals from all over the world to exchange information of common interest.

Organized in 1920, TRB is a division of the National Academies, which include the National Academy of Sciences, National Academy of Engineering, Institute of Medicine and National Research Council. The nation turns to the National Academies for independent, objective advice on issues that affect people's lives worldwide.

Audio, visual and written transcripts of key sessions and presentations are available on the website, www.trb.org.

METRANS DIRECTOR GENEVIEVE GIULIANO TO CHAIR TRB EXECUTIVE COMMITTEE

Genevieve Giuliano, Director of METRANS joint University of Southern California and California State University, Long Beach, Transportation Center and Professor in the School of Policy, Planning and Development at USC, has been named



chair of the Transportation Research Board Executive Committee for 2003. She took office Jan. 15, 2003 at the Board's 82nd annual meeting in Washington, D.C.

Giuliano received her Ph.D. in Social Sciences from the University of California, Irvine, and conducted research at the UC Irvine Institute of Transportation Studies before joining USC in 1988. Her research interests include the relationships between transportation and land use, transportation policy evaluation and the impacts of information technology on transportation and travel behavior.

The author of nearly 100 publications, Giuliano is a member of the editorial boards of *Urban Studies* and the *Journal of Transportation Statistics*. She is a former faculty fellow of the Lincoln Institute of Land Policy. Giuliano has participated in a number of TRB studies, including the Committee for the Evaluation of Congestion Mitigation and Air Quality Improvement and the Committee for International Comparison of Policies and Expectations Affecting Public Transit.

IOANNOU

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of major metropolitan areas using a multi-disciplinary approach," he said.

Ioannou is the author of four books on control systems and has published over 200

papers in the area of controls and transportation. Along with his colleague Anastasios Chassiakos, CSULB professor of engineering technology, Ioannou has completed three research projects focusing on goods movement for METRANS: Dynamic Optimization of Cargo Movement by

Trucks in Metropolitan Areas with Adjacent Ports; Automated Trucks on Dedicated Lanes for Cargo Movement; and Modeling and Route Guidance of Trucks in Metropolitan Areas. Abstracts of these and other research projects can be found on the METRANS website.

"The Los Angeles region is a living laboratory for the study of transportation. All of the problems of transportation exist here," Ioannou said. "If problems like emissions, congestion and goods movement can be solved here, they can be solved anywhere in the United States."

MERRILL WEIDNER WINS UTC OUTSTANDING STUDENT AWARD

Each year the Department of Transportation honors the most outstanding student from each participating University Transportation Center for her/his achievements and promise for future contributions to the transportation field. Students of the Year are selected based on their accomplishments in such areas as technical merit and research, academic performance, professionalism and leadership.

At this year's Transportation Research Board annual meeting, Merrill J. Weidner,

a Ph.D. candidate in the Industrial and Systems Engineering Department at the University of Southern California, was honored as the 2002 METRANS Outstanding Student of the Year.

Weidner is a doctoral fellow in NSF/USC Environmental Science, Policy and Engineering Sustainable Cities program, an integrated, cross-disciplinary doctoral-level training and research program designed to prepare students for environment-related leadership roles in public and private

sectors as well as academia. He has demonstrated academic excellence in all of his graduate-level pursuits, achieving 4.0 GPAs in his M.S. and Ph.D. programs. He is also a recipient of the USC Dean's Merit Scholarship.

Weidner's primary research interest is the application of environment life-cycle analysis methods to transportation system design and operation to achieve the reduction of transportation environmental impacts. His METRANS research, based on demand-responsive trans-

portation systems, has shown that, under certain conditions, significant reductions in transit environmental impacts can be achieved through the vehicle routing and scheduling process with minimal increases in cost and service delays.

Weidner is planning a career in the public sector that addresses public policy, environmental impacts of transportation and the development of more environmentally sustainable transportation systems.

METRANS Outreach

FIFTH ANNUAL CITT STATE OF THE TRADE AND TRANSPORTATION INDUSTRY TOWN HALL MEETING SET FOR MARCH 26

Arguably, the most critical issue facing the trade and transportation industry is the pres-

ent and long-term state of California's infrastructure. What is the projected impact of continued unchecked growth in trade to our community? How big is the infrastructure gap? What options are under consideration to improve and expand the system? What funding options are available in these days of budget-tightening? What can the industry do to contribute to a solution? What if nothing is done to solve the infrastructure problem?



With sponsorship from METRANS, the Center for International Trade and Transportation

's (CITT) Fifth Annual State of the Trade and Transportation Industry Town Hall Meeting is slated for Wednesday, March 26 to address these and other related issues. Titled "What's in It for Me? Collaborative Strategies for New Transportation Infrastructure in California," the Town Hall Meeting is expected to attract a near capacity crowd to the Carpenter Performing Arts Center on the California State University, Long Beach campus. The event is set for

6 – 8:30 p.m. and is open and free to the public.

The focus of the event is to bring together the full spectrum of industry stakeholders, including organized labor, port authorities, industry representatives, and a noteworthy assortment of public officials to discuss a collaborative plan to deal with the projected exponential growth in containerized goods volume and its effects on California's infrastructure. Setting the stage for the Town Hall will be a video examination of the current situation on California's freeways, highways, bridges and marine terminals.

The first Town Hall, held on



The impact of increased trade on California's infrastructure to be discussed at Town Hall Meeting.

Feb. 4, 1999, was labeled a milestone of cooperation among union, industry and the Southern California business community. This year marks the fifth consecutive year for the history-making, educational outreach event.

METRANS, AASHTO Co-HOST CONFERENCE HIGHLIGHTING THE SIGNIFICANCE OF TRANSPORTATION IN THE NATIONAL ECONOMY

METRANS teamed with the American Association of State Highway and Transportation Officials (AASHTO) to host the National Symposium on Transportation, International Trade and Economic Competitiveness in October of last year. The one-day conference, funded by the National Cooperative Highway Research Program, was one of four conferences being held around the U.S. to highlight various aspects of the U.S. transportation system and the significance of transportation in the national economy.

Restructuring of the world economy and increasing globalization has fueled rapid growth in international trade. In 2000, the combined value of all U.S. imports and exports was close to \$2.5 billion. Estimates place international trade at 27% of the U.S. GNP. Even conservative forecasts indicate continued significant increases in international trade. The purpose of the conference was to explore the relationship between transportation and international trade. The conference included the following topics:

- Description of the scope and impact of trade on the national economy
- Description of the state of the national goods movement transport system and

projections for future goods movement demand

- Discussion of major problems associated with the goods movement transport system
- Reflections on problems from various stakeholder perspectives
- Suggestions for solving these problems

Conference presenters included academics, industry representatives (port authorities, trucking, shipping, labor), public agency representatives (federal, state, local), and elected officials (federal and state). Conference attendees included faculty and graduate students as well as a wide range of industry stakeholders, both public and private.

Conference presenters argued that the existing port and highway capacity is insufficient to meet present and future demands of intermodal goods movement. Large ports are nearly built out and have little or no land for further expansion. The national stock of transportation infrastructure (highways and railroads) is aging and requires significant capital investment for its maintenance, repair and construction of any additional capacity. The shortfall in funding to maintain and expand



Conference reviewed ways to improve transportation productivity.

transportation infrastructure was a big concern at the conference. It was observed that the demands for homeland security make public funding more difficult for infrastructure improvement projects.

The major problem areas discussed included congestion and reliability, financing and pricing, safety and security, and the lack of adequate data and modeling capability to monitor and forecast freight flows. Industry stakeholders also identified the impacts of goods movement on local populations and the environment, as well as the absence of a comprehensive "supply chain" perspective as significant problems.

The conference discussed several ways to address the funding shortfall. Policy changes to encourage private participation and to make private and joint venture intermodal goods movement projects eligible for federal funding were pro-

posed. AASHTO President John Horsely proposed broadening eligibility for the TIFIA program and establishing state infrastructure banks in all states. James Preusch suggested a new fee on all U.S. imports and exports, levied at the point of border crossing, which would be collected by customs. This fee would be based on goods' value and CPI adjusted every year. A "National Freight Security and Infrastructure Bank" would be set up with contributions from federal and state governments and U.S. customs. It would be dedicated to finance infrastructure projects.

The conference also discussed causes of inefficiency and ways to improve productivity of intermodal transport. Trucking was critical of the time-consuming paperwork at the ports and limited working hours of ports and warehouses, which forced truck trips during working hours when highways are already congested. Port authorities blamed inconsistent format of papers from different ports for delays in processing of paperwork.

All agreed that the productivity of existing infrastructure could be significantly improved with advanced man-

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*METRANS Education and Training***GLOBAL LOGISTICS TRAINING EXPANDING**

No one would have expected the Global Logistics certificate program, begun in 1997, to yield nearly 500 students to date with a professional designation as a Global Logistics Specialist. But as the logistics community moves towards the complete integration of the supply cycle, the need for understanding the whole process continues to grow.

The Center for International Trade and Transportation (CITT), a university center at CSULB and the technology transfer arm of METRANS, recognized the growing demand for strategic logistics providers who are global, multi-skilled and capable of taking on responsibilities that range far beyond traditional services. By combining the analytical skills of an MBA program with a strong emphasis on logistics in a global setting, an interdisciplinary, 30 unit Master of Arts in Global Logistics de-



gree program was launched in March, 2002. The first class of 23 students has completed about half of the requirements leading to their Master's Degree, and a second class is set to begin in March of this year.

The program draws on CSULB faculty from the departments of Economics, Civil Engineering, Management and Human Resources and Public Policy and Administration. It is designed to prepare professionals to deal with the complexities of supplier rela-

tions, supplier selection, purchasing negotiations, operations, transportation, inventory, warehousing, third-party vendors, electronic commerce and customer relations. It is unique in that it is the only program of its kind in the Western United States.

* * *

Through Gateway Cities Partnership, Inc. and in conjunction with the Southeast Los Angeles County Workforce Investment Board and Long Beach City Col-

lege, CSULB has developed an additional level of global logistics training for the entry level or displaced worker and those eligible to receive unemployment benefits or who have exhausted their benefits.

The program consists of four weeks of industry specific/driven training leading to certification as a Global Logistics Employee (GLE™). The training not only benefits those looking for an entry level position, but also those are seeking career opportunities in the international trade and transportation industry.

"Through the three levels of global logistics education and training, we are able to provide skills and knowledge in this industry that was not previously available," said Marianne Venieris, Director of CSULB's transportation programs. "We are very pleased with the response."

CONFERENCE

(Continued from page 4)

agement techniques and use of modern technological tools like GPS. A coordinated effort by port authorities, trucking and warehousing to increase work hours would disperse freight traffic

over time and reduce traffic congestion. Trucking would have the option of driving in low traffic hours. A moratorium on the maximum period a container could remain on port after being unloaded from ocean-carrier would increase productivity of limited port capacity.

The issue of underutilization of railroads was also brought up at the conference. Railroads could be more efficient than trucks in carrying freight on long haul routes. Railroads are already in the process of integrating advanced communication technology, presently for security

reasons, but it could also be used for better coordination with trucking to provide efficient and seamless freight transport.

Conference proceedings will be distributed by NCHRP and AASHTO, and will be placed on the METRANS website, www.mettrans.org.

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METRANS RESEARCH PROJECTS AND PUBLICATIONS

COMPLETED PROJECTS

A Task Decomposition Model for Dispatchers in Dynamic Scheduling of Demand Responsive Transit Systems	M. Dessouky & M. Rahimi/99-3
Improving Fuel Economy & Emissions Performance Of Commercial Goods Transportation & Mass Transit Vehicle Using Throttleless Engines	P. Ronney/99-5
Modeling & Route Guidance of Trucks in Metropolitan Areas	P. Ioannou & A. Chassiakos/99-7
Implementing a Statewide Goods Movement Strategy & Performance Measurement of Goods in California	D. Barber & L. Grobar/99-10
The Role of Public Transit in Mobility of Low Income Households	G. Giuliano/99-11
2D Virtual & Physical Simulation of Automated Container Terminal Facilities & Analysis of Impact on In-Land Transportation	B. Khoshnevis/99-14
Identification & Analysis of Local Agency Transit	J. Kuprenas/99-18
Solid State Sorption Air Conditioner System for Containership and Vehicles	R. Toosi/99-19
Highway Oriented Transit System (HOTS): A Comprehensive Land Use-Transportation Strategy to Improve Transit Service Delivery	T. Banerjee/99-22
Non-Invasive Means of Investigating Container For Customs Agents at Ports	K. James/99-23
Assembling & Processing Freight Shipment Data: Developing a GIS-based Origin-Destination Matrix for Southern California Freight Flows	P. Gordon/99-25
Dynamic coordination Framework for Resource Allocation in Trucking Operations	Bukkapatnam/99-27
Alternative Access & Locations for Air Cargo	R. Hall/00-3
Developing Risk Model for Commercial Goods Transport	E. Parentela/00-5
Assessment of Hybrid Vehicle Control Strategies in Planning Future Metropolitan/Urban Transit Systems	R. Toosi/00-6
Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Areas with Adjacent Ports	P. Ioannou & A. Chassiakos/00-15

COMPLETED PROJECTS, Continued

Design & Optimization of a Conceptual Automated Yard Using Overhead Grid Rail System	Kosmatopoulos/00-16
Integrated Approach to Managing Local Container Traffic Growth in the Long Beach/ Los Angeles Ports	J. Magaddino/00-17

DRAFT REPORTS IN FINAL REVISION (Review Complete)

Travel Patterns of the Elderly	G. Giuliano/00-8
Reengineering the Logistics of Empty Cargo Containers in the SCAG Region	L.D. Hanh/01-5
Solid State Sorption Air Conditioner System for Containerships & Vehicles – Phase II	R. Toosi/00-7

DRAFT REPORTS RECEIVED (Under Review)

Use of Robotics & Expert Systems in Improving The Handling of Containers at Port Terminals	T. Jordanides/99-20
Freeway Bus Station Area Development: Critical Evaluation & Design Guidelines	T. Banerjee/00-12
A Methodology for Joint Optimization of Service and Life-Cycle Environmental Impact Assessment of Transportation Systems	M. Rahimi & M. Dessouky/01-6
Distributed Architecture for Real-time Coordination in Transit Networks	S. Bukkapatnam & M. Dessouky/00-13

PROJECTS IN PROGRESS

Investigating the Role of Driver Decision Styles In Highway-Rail Crossing Accidents	N. Meshkati, M. Rahimi & M. Driver/00-11
Reducing Pollutants from Mobile Sources	H. Rahai/01-2
Analysis of Vibrations & Infrastructure Deterioration Caused by High-speed Rail Transit Bridge Structures	H.L. Wong/01-3
Smart Damping for Monitoring the Health of Bridge Structures	E. Johnson/01-10
Developing & Testing Methodologies for the Evaluation of Highway Widening Plans to Facilitate Freight Flows Throughout a Major Metropolitan Area	P. Gordon & C. Williamson/01-14
Automated Trucks on Dedicated Lanes for Cargo Movement	P. Ioannou & A. Chassiakos/01-16

Final Reports Available on the METRANS website: www.metrans.org



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Dear Reader:

Welcome to the first edition of *METRANS News*. This newsletter will report on METRANS activities, feature our faculty researchers and describe our various education, outreach and information dissemination programs. After just four years of operation, METRANS has become a successful and growing University Transportation Research Center, taking full advantage of the resources of two major universities. We look forward to sharing our accomplishments with our many friends through this newsletter. As with all of our publications, you will also see *METRANS News* on our website, www.metrans.org.

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