

**V Encuentro UPR/MIT sobre el Tren Urbano
7-15 de enero de 1999**

**5th UPR/MIT Conference on Tren Urbano
January 7 - 15, 1999**

Martes, 12 de enero de 1999 Coordinador	Prof. José Pérez Berenguer	Tuesday, January 12, 1999 Coordinator
Presentación sobre el diseño y la construcción del túnel y las estaciones de Río Piedras Ingenieros de Kiewit/Kenny/Zachry	9:00 - 10:00	Presentation on the design and construction of the tunnel and stations in Río Piedras Engineers from Kiewit/Kenny/Zachry
Receso	10:00-10:30	Break
Visita a la obra de construcción en Río Piedras <i>(traslado en las vanes)</i>	10:30-12:30	Site Tour of Río Piedras Construction <i>(transfer in vans)</i>
Almuerzo	12:30-1:30	Lunch
Presentación sobre los programas en las universidades de Boston y Northeastern Profs. Bill Anderson y Peter Furth	1:30 - 2:00	Presentation on Boston University & Northeastern University Programs Profs. Bill Anderson & Peter Furth
3^{era} sesión de posters <i>(ver itinerario aparte para los posters del día)</i>	2:00-3:00	3rd Poster Session <i>(see separate schedule for featured posters)</i>
Consulta con profesionales del Tren Urbano Facilitadora: Lydia E. Mercado <i>(refrigerios disponibles a partir de las 3:30 PM)</i>	3:00 - 5:00	Consultation with Tren Urbano Professionals Facilitator: Lydia E. Mercado <i>(break snacks available after 3:30 PM)</i>

Please remember to wear boots and long pants for the site tour of the Río Piedras construction area today and tomorrow for the site tour of Martínez Nadal.



Department of Geography

Programs of Study The Department of Geography offers Master of Arts (M.A.) and Doctor of Philosophy (Ph.D.) degrees which provide strong basic training emphasizing traditional geographic theory, quantitative techniques, and environmental policy studies. Analytical rigor combined with training in social theory and in behavioral and policy analysis provides graduates with flexible preparation for choosing a career in teaching or in government agencies, research institutes, consulting firms, or international organizations in the areas of urban, regional, environmental, economic, and resource analysis. The department places special emphasis on four subfields within the discipline: energy-environment systems and resource analysis; geography of development; remote sensing and geographic information systems (GIS); and biogeography. The Center for Energy and Environmental Studies, directed by a geographer and staffed by several geographers, offers a Master of the Arts degree in energy and environmental studies. Opportunities exist in the department for graduate students to participate in various applied research projects. Faculty members have engaged in research sponsored by such agencies as the National Science Foundation; NASA; the U.S. Geological Survey; the U.S. Department of Energy; the U.S. Environmental Protection Agency; the U.S. Department of Health, Education and Welfare; the U.S. Maritime Administration; the First National Bank of Boston; the U.S. National Park Service; U.S. Forest Service; the World Bank; the U.S. Department of Transportation; the U.S. Army Corps of Engineers; and the United Nations.

The department offers two programs leading to the Master of the Arts—one requiring course work, a research paper, and a written examination and the other requiring course work and a thesis. Regardless of which option is selected by a student, at least eight semester courses (32 credits) constitute the minimum requirement.

The doctoral program is designed for students with interests in and capabilities for advanced studies in specialized aspects of the above-noted four subfields. The post-master's Ph.D. program requires at least eight semester courses (32 credits); the post-bachelor's Ph.D. requires sixteen courses (64 credits).

Financial Aid The department provides partial and full support to qualified master's and doctoral applicants. Stipends are available in the form of competitive Presidential University Graduate Fellowships (PUGF) and departmental teaching fellowships. The PUGF provides a stipend of \$12,000 for four years plus remission of tuition and fees for eight courses. The teaching fellowship provides a stipend of \$9,500 for the 1997/98 year plus remission of tuition and fees for eight courses. Research assistantships are also available for qualified applicants who assist faculty members in their funded research. These provide stipends and tuition support. In addition, graduate scholarships for tuition and fees are available.

Cost of Study Graduate tuition is \$10,985 per semester in 1997/98 for full-time study (12 to 18 hours). Students enrolled for up to 11 hours of course credits pay \$687 per credit. An additional \$138 is assessed for the Student Union. Awards of financial aid by either the University or the Department usually cover the Student Union fee.

Cost of Living Graduate students can be housed in University housing or in the adjacent residential areas in apartments and rooms within walking or commuting distance. Further information can be obtained from the University Housing Office, 985 Commonwealth Avenue, Boston, MA 02215, 617-353-4101.

Student Group The total enrollment of the University is approximately 25,000, of whom more than 3,000 are foreign students. About 2,000 graduate students occupy the Charles River campus.

Location Boston, the state capital and New England's largest city (population 500,000), is well known for its role in the history of the United States and for its Old World ambience. The Greater Boston area (population 3 million) is unsurpassed in the world in its number of major universities and colleges.

The University From its origins in 1863, when a group of lay and ministerial delegates of the Methodist Episcopal Church began a school for the improvement of theological training, Boston University has grown to be an independent, coeducational, nonsectarian university that has more than 2,500 faculty members. Incorporated by the Commonwealth of Massachusetts in 1869, the institution has established itself as a progressive university that provides educational opportunities for all people. The Charles River campus comprises 64 acres on which older Gothic buildings and bowfront town houses of Boston's Back Bay are comfortably situated between newer contemporary structures containing science centers, classrooms and laboratories.

Applying Most students are admitted to the fall term. Applications for admission in the spring term are considered, but opportunity for financial aid is considerably lessened. Complete applications contain three letters of recommendation, a brief biological sketch including a statement of purpose and goals, academic transcript(s), and GRE General Test scores which are mandatory, no exceptions will be made. Prospective applicants are encouraged to visit the department. For financial aid consideration for fall admission, all credentials should be submitted no later than January. Fall applications should be submitted by June, and Spring applications should be submitted by November.

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e-mail: geog@crea.bu.edu

Boston University
Department of Geography

THE FACULTY AND THEIR RESEARCH

- **Alan H. Strahler**, Professor and Chairman, Ph.D., Johns Hopkins University, 1969. Biogeography, remote sensing, geographic information systems (GIS).
- **Robert B. Batchelder**, Professor Emeritus; Ph.D., Northwestern University, 1951. Environmental analysis and policy, climatology, physical oceanography.
- **Lata Chatterjee**, Professor; Ph.D., Johns Hopkins University, 1973. Urban and environmental analysis, housing, geography of development.
- **Cutler J. Cleveland**, Associate Professor and Director of the Center for Energy and Environmental Studies; Ph.D., University of Illinois at Urbana-Champaign, 1988. Ecological economics; environmental science; the oil and natural gas industry; alternative energy; energy and environmental policy; natural resources and sustainable development; environmental economics.
- **Raymond Dezzani**, Assistant Professor; Ph.D., University of California at Riverside, 1996. Regional economic development; spatial classification for regionalization; spatial analysis; geographic information systems (GIS); regional interests include Europe, Africa, Near East and Central Asia.
- **Dennis Dye**, Assistant Professor; Ph.D., University of Maryland, 1992. Biogeography and global ecology; biophysical remote sensing; vegetation-climate relations; East and Southeast Asian environments; geographic information systems (GIS).
- **Mark Friedl**, Assistant Professor; Ph.D., University of California, Santa Barbara, 1992. Remote Sensing, micrometeorology and climatology, geographic information systems (GIS).
- **Sucharita Gopal**, Associate Professor; Ph.D., University of California, Santa Barbara, 1988. Human behavioral geography, artificial intelligence, geographic information systems (GIS), neural network applications, fuzzy sets.
- **Syed A. Hasnath**, Adjunct Assistant Professor; Ph.D., Boston University, 1989. Political Geography, urban planning.
- **Robert K. Kaufmann**, Associate Professor; Ph.D., University of Pennsylvania, 1988. World oil markets, global climate change, and ecological economics.
- **Jeffrey Key**, Associate Professor; Ph.D. University of Colorado, 1988. Climatology, remote sensing of the atmosphere.
- **T. R. Lakshmanan**, Professor and Executive Director of the Center for Energy and Environmental Studies; Ph.D., Ohio State, 1965. Urbanization and regional development, environmental and energy modeling and policy, geography of development.
- **George K. Lewis**, Professor Emeritus; Ph.D. Harvard, 1956. Urban environmental quality, New England, regional policy.
- **Ranga Myneni**, Associate Professor; Ph.D. University of Antwerp, 1984. Terrestrial ecology –biophysics and biogeochemistry), optical remote sensing, transport theory (radiative transfer), micrometeorology.
- **Matthias Ruth**, Assistant Professor; Ph.D. University of Illinois, 1992. Environmental economics, ecological economics, physical resource theory, dynamic computer modeling, complex systems analysis.
- **Guido Salvucci**, Assistant Professor; Ph.D. MIT, 1994. Hydrology, climatology, remote sensing, applied mathematics, statistics, water resources.
- **Curtis E Woodcock**, Associate Professor and Chairman; Ph.D., University of California, Santa Barbara, 1986. Remote sensing, geographic information systems (GIS), biogeography.

Research Faculty 1996-97

- **Xiaowen Li**, Research Professor; Ph.D., University of California, Santa Barbara. Chinese Academy of Science, Remote sensing, geographic information systems (GIS).
- **Douglas Muchoney**, Research Assistant Professor; M.S., George Mason University, 1990. Remote sensing, digital image processing, change detection, biodiversity, geographic information systems (GIS), ecology, landscape ecology, habitat, land cover.
- **Crystal Schaaf**, Research Assistant Professor; Ph.D. Boston University, 1994. Remote sensing, GIS, meteorology, atmospheric, geophysics.
- **Wolfgang Wanner**, Research Associate; Ph.D., Christian-Albrechts-University at Kiel, Germany, 1993. Theoretical modeling of the bidirectional reflectance of vegetation and applications of these models to remote sensing; development and maintenance of algorithms for operational global processing of the EOS-MODIS BRDF/Albedo product. Theory of cosmic ray transport.

Boston University

Center for Transportation Studies
675 Commonwealth Avenue
Boston, Massachusetts 02215



Graduate Studies in Transportation at Boston University

The *Boston University Center for Transportation Studies* (BUCTS) was established in 1999. It's founder and first director is Professor T.R. Lakshmanan. Professor Lakshmanan's experience in transportation spans four decades, and he was most recently Director of the Bureau of Transportation Statistics in the U.S. Department of Transportation.

Affiliated faculty in BTS are drawn from various colleges of Boston University. (See faculty list below.) Areas in which they have either continuing or new research include the following:

- *Greenhouse Gas Emissions from the Transportation Sector.* Following up on earlier work by Lakshmanan, we have initiated a study to decompose growth in greenhouse gas emissions from US transportation into a number of components including change in vehicle technology, population growth, and change in the average propensity to travel. Our main focus is on the propensity to travel and how that is related to changes in demographic and economic structure.
- *Freight Transportation and the Regional Distribution of Economic Activities.* Anderson has just finished a study based on data from the 1993 Commodity Flow Survey that relates the spatial distribution of production to various measures of freight accessibility. We plan to extend this in a number of directions, including a study linking domestic freight shipments data with export data.
- *Long Distance Passenger Travel.* We have initiated a statistical analysis of the 1995 American Travel Survey which seeks to explain variations in long distance travel behavior among the US population. (The project will be led by Ray Dezzani.)
- *Economic and Social Impacts of Transportation.* Several members of CTS have experience in this field extending over the past twenty years. We take a broad approach to impact analysis, ranging all the way from Lakshmanan's work on macroeconomic impacts of infrastructure investments at the national and regional levels to impacts at the local level. The latter often incorporate environmental and distributional impacts as well. We expect to begin work shortly on development of an economic impacts model based on detailed materials purchase data from federally funded infrastructure projects.

- *Transportation Planning in Developing Countries.* We have a good deal of experience looking at how transportation and other infrastructure affects development. Current initiatives include a project on the future structure of the transportation system in Mauritius.
- *Urban Transportation and the Environment.* Topics of interest include emissions modeling, the link between road infrastructure and land development patterns, and application of remote sensing technology. A major research objective is to develop models that can be interfaced with Geographical Information Systems technology.
- *Transportation Safety Issues.* Professor Ralph Hingson, one of our charter members from the School of Public Health, has extensive experience in the analysis of safety issues, receiving support from NHTSA and elsewhere.
- *Environmental Impacts of Transportation Sector Manufacturing Industries.* Matthias Ruth is conducting a major study from the perspective of industrial ecology.
- *Logistics.* Venkatraman, from the Boston University School of Management, is an expert in business logistics.

A number of new research initiatives are planned in the areas of assessing economic benefits of transportation infrastructure and addressing equity issues in urban transportation planning.

Graduate education in transportation studies must be done under the auspices of one of Boston University's academic departments – in most cases this will be the Department of Geography. Student's interested in undertaking graduate work should contact

Bill Anderson
Center for Transportation Studies
Boston University
675 Commonwealth Avenue
Boston MA 02215
Ph. (617) 358-0208
Email bander@bu.edu

He will put you in touch with an appropriate faculty member associated with BUCTS and advise you on the steps to take in making an application.

Faculty affiliated with Boston University Center for Transportation Studies

William P. Anderson, Professor
Department of Geography
Urban transportation, economic and environmental impacts

Lata Chatterjee, Professor
Department of Geography
Transportation and development, distributional issues

Raymond Dezzani, Assistant Professor
Department of Geography
Geographical information systems, spatial statistics

Ralph Hingson, Professor and Chair
Department of Social and Behavioral Science
School of Public Health
Transportation safety, alcohol and traffic safety

T.R. Lakshmanan, Professor
Department of Geography
Director, Center for Transportation Studies
Economic and environmental aspects of transportation, transportation statistics

Matthias Ruth, Associate Professor
Department of Geography and
Center for Energy and Environmental Studies
Industrial ecology

N. Venkatraman, Associate Professor
Department of Management Information Systems
School of Management
Business logistics

Tren Urbano UPR-MIT Professional Development Program
Staff Consultant Roster

This roster is a partial listing of the staff resources of the Tren Urbano Project, its consultants and contractors. Both UPR & MIT have specialists in these and other transportation / construction related areas. Additional experts are available and can be contacted for assistance in student research. Unless otherwise noted, the telephone area code is 787.

Staff Consultant	Specialty	Contact Information
1. Altshuler, Randy	GMAEC Project Manager; Procurement, Operations & Maintenance, Systems	TUO - 765-0927 x200
2. Aue, Gerhard	Systems	STT - 641-7947
3. Barber, John	Systems	TUO - 765-0927 x323
4. Canino, Carmen	Community Relations & Participation	TUO - 765-0927 x307
5. Colón de Armas, Carlos	Finance, Procurement, Project Management	HTA - 729-1538
6. Corchado, Fernando	Geotechnical Engineering	TUO - 765-0927 x 274
7. Craven, Bill	Patronage projections, demand modeling	Cambridge Systematics - 617-354-0167
8. Cruz, Miguel	Transportation Planning	GMAEC - 765-0927 x279
9. De Lemos, Manuel	Architecture, Joint Development	De Lemos & Assoc. 721-5166
10. Desai, Dru	Tunneling, Rio Piedras Contract	TUO - 765-0927 x249
11. Dixon, Chris	Implementation Director, construction management	TUO - 765-0927 x325
12. Ferretti, Joe	Operations & Maintenance	Siemens/ ACI -641-7939
13. Fonta, Chris	Vehicles	Siemens - 641- 7900
14. Garbesi, Vinton	Rio Piedras Contract Manager	TUO - 759-0180
15. González, Américo	STTT contract architect	GMAEC - 765-0927 x324
16. Hoar, Richard	Project controls, estimating, construction management	GMAEC - 765-0927 x327
17. Issacson, Ava	Project controls management	TUO - 765-0927 x361
18. Kruckemeyer, Ken	Transportation planning, architecture, urban design	MIT - 617-253-8003
19. McKay, Ron	Operations & Maintenance	Alternate Concepts, Inc. - 617-951-0509
20. Mirandés, Javier	Minillas extension, station planning & design	TUO - 765-0927 x331
21. Ortiz, Elmo	Urban Design	GMAEC - 765-0927 x235
22. Pérez, Lourdes	Communications & transportation, public	DTOP - 729-1504

Staff Consultant	Specialty	Contact Information
	relations	
23. Puls, Carsten	Systems - communications	STT - 641-7900
24. Rodríguez, Marisol	Transportation planning, GIS, land use, zoning	TUO - 765-0927 x295
25. Rodríguez, Gabriel	Transportation planning	HTA - 728-8192
26. Rojas, Fernando	Station architecture	TUO - 765-0927 x250
27. Salvucci, Fred	Transportation policy, planning	MIT - 617-253-5378
28. Sepúlveda, Aníbal	Urban planning, transportation planning	UPR - 763-7590, 764-0000 x2623
29. Silva, Roberto	Traffic analysis, engineering	HTA - 729-1534
30. Simard, Peter	Change Controls	TUO - 765-0925 x289
31. Squires, Jeff	Transportation planning	TUO - 765-0927 x202
32. Toledo, Freya	Transportation planning, intermodal integration	HTA - 723-3760
33. Viera, Amarylis	Public relations & community participation	STT - 641-7915
34. Wensley, Jim	Intermodal integration, bus service	Multisystems - 617-864-5810
35. Wilson, Nigel	Transportation systems, operations planning, etc.	MIT - 617-253-5046

Other professionals: All faculty involved in the program from MIT & UPR are very interested in assisting all students. Please consult the faculty directory for a listing of the disciplines and specialties.

UPR-MIT Student Research Projects 1998-99

Research Topic	Student	University	Research Facilitator(s)
FARE COLLECTION, POLICY, STRUCTURE			
Evaluation of Fare Collection System	Centeno Calero, Carmen	UPR	Jeff Squires Joe Ferretti Randy Altshuler
Fare Collection Integration	Gracia, Sharleen	UPR	Joe Ferretti Jeff Squires Freya Toledo
Price Elasticities and Alternative Fare Strategies in San Juan	Moreira, Joana	MIT	Jim Wensley Jeff Squires Freya Toledo
Fare Integration Plan for the Públicos and Tren Urbano	Vargas Gonzalez, Jessica	UPR	Jeff Squires Joe Ferretti Freya Toledo Carmen González* Randy Altshuler
INTERMODAL INTEGRATION			
Hato Rey Nuevo Centro Station : Intermodal Integration Study	Correa Lafuente, Carmen	UPR	Joe Ferretti
The Intermodal Connection: Integrating San Juan's Bus and Público Network with Tren Urbano	Lee, Jason	MIT	Jeff Squires Freya Toledo Gabriel Rodríguez Carmen González* AMA contact Jim Wensley
Analysis of Intermodal Transfer Facilities for Some Stations of Tren Urbano	Martínez Vega, Joel	UPR	Jeff Squires Rosana Correa Elmo Ortiz Bobby Silva

* Currently works at City of San Juan Planning Department. Contact to be made individually.

MARKETING / PUBLIC INFORMATION			
Best Marketing Practices for Integrated Public Transportation System	Acevedo Martinez, Douglas	UPR	Lourdes Pérez Carmen Canino Amarylis Viera
Development of Successful Public Transit Marketing Strategies for the Tren Urbano	Goyco de Vera, Libby	UPR	
Determining Relationships and Policies that Transit Properties Have with Employers to Encourage Ridership	Parikh, Ami	MIT	Carmen Canino
CONSTRUCTION MANAGEMENT			
Análisis de Las Cláusulas de Penalidades e Incentivos del Contrato de KKZ/CMA	Avilés Hernández, Víctor	UPR	Vinton Garbesi Chris Dixon Richard Hoar Peter Simard Ava Issacson
Análisis de los retrasos en el proceso de reclamaciones en un contrato "diseño-construcción"	Rawls, Carmen	UPR	
Web Integrated Project Management Environment: Incorporating Information Technology in Tren Urbano Project Management Process to Improve Efficiency and Productivity	Li, Tong	MIT	Peter Simard Richard Hoar Ava Issacson
TRAFFIC ENGINEERING			
Design of Passenger Car Interface Areas for Tren Urbano	Barreto Acobe, Clary	UPR	Jeff Squires Elmo Ortiz Javier Mirandés Ken Kruckemeyer
Traffic Calming: A Study of Its application to the Tren Urbano	Mendoza Zayas, Nahir	UPR	Rosana Correa Ken Kruckemeyer
TRANSPORTATION PLANNING			
Next Stop Tren Urbano: Establishing Criteria for Adding Transit Stations Along Partially Defined Alignments	Berger, Noah	MIT	Carmen Canino Jeff Squires
Transit Access to San Juan	Lin, Elton	MIT	Jeff Squires Joe Ferretti

JOINT DEVELOPMENT / ECONOMIC DEVELOPMENT			
Development in Support of Transit: Land Use Incentives and Regulation for Fostering Transit-Oriented Development	Deeming, Eryn	MIT	Carlos Colón Manuel De Lemos Al Raine Aníbal Sepúlveda Carmen Canino Gabriel Rodríguez Centro Unido de Detallistas* Homebuilders Assoc.* Chamber of Commerce*
The Spatial and Business Evolution of Retailing in San Juan: Implications for Tren Urbano	Knapick, Randy	MIT	
PRHTA and Station Area Development: The Role of a Transit Agency within a Dynamic Planning Environment	Park, Munsun	MIT	
GEOTECHNICAL			
Geotechnical Conditions Along Future Extension of the Tren Urbano System.	Pérez Merced, Maribell	UPR	Fernando Corchado Dru Desai
Río Piedras Geotechnical Analysis	Hsieh, Yo-Ming Kim, Yun Pinto, Federico Zhang, Guoping Rosado, Alexis Urquiza, Luis	MIT & UPR	Vinton Garbesi Dru Desai
OPERATIONS & MAINTENANCE			
Evaluación Cuantitativa y Cualitativa del Sistema de Transportación	Marcano Rivera, Abigail	UPR	Randy Altshuler Joe Ferretti Jeff Squires Gabriel Rodríguez
Tool Design for the Operations Workforce Planning and Budget Analysis	Rivera Ortiz, Damary	UPR	Joe Ferretti Randy Altshuler Nigel Wilson
Analysis of Real Time Control Strategies for Tren Urbano	Ortiz, Iris	MIT	John Barber Gerhard Aue Carsten Puls Ron McKay

* Contact to be made during week of Jan. 18.

URBAN DESIGN / ARCHITECTURE			
Designing a Neighborhood with Emphasis on City life and Pedestrian Access	Miranda Palacios, Sonia	MIT	Javier Mirandés Elmo Ortiz Jeff Squires
Train Road Environmental Exchange Plan Tren Urbano Puerto Rico	Rodriguez, Carlos	UPR	Elmo Ortiz Fernando Rojas Ken Kruckemeyer
Desarrollo e implementación de los medios de orientación en el Tren Urbano	Roman, Tanya Vicens, Miguel	UPR	Fernando Rojas Américo González Ken Kruckemeyer
ENVIRONMENTAL / VIBRATION			
Techniques for Prediction of Ground-Borne Vibrations Caused by Subway Trains.	Montalvo Torres, Tomás	UPR	Carl Hanson David Veights
VEHICLES			
Anti-Slip/Slide Break Control System for Tren Urbano	Ortiz Rivera, Eduardo	UPR	John Barber Christian Fonta Other contacts at TS5
Transportation Options of Finished Vehicles	Pujols Aguayo, Sergio Toledo García, Gustavo	UPR	Christian Fonta John Barber Gerhard Aue
PORT AUTHORITY			
The New Port of San Juan de Puerto Rico: Preliminary Research and Proposals	Parmegiani, Sebastiano	MIT	Port Authority Contacts (to be arranged separately)
PLANNING			
Rehabilitación y desarrollo de vivienda en las comunidades Minillas, Campo Alegre, Hipódromo y Figueroa en el casco urbano de Santurce	Fernández Rosselli, Liza	UPR	Elmo Ortiz Ken Kruckemeyer Manuel De Lemos
Un sistema de transportación colectiva intermodal e integrado como alternativa al deterioro de las primeras comunidades suburbanas del Municipio de Bayamón Centro y Complejo Deportivo del Tren Urbano y el nuevo expreso Río Hondo sobre la rehabilitación de su entorno	Navarro Díaz, Criseida	UPR	Ken Kruckemeyer Elmo Ortiz
Proyecto de planificación que incorpora mecanismos fiscales y esquemas financieros para darle un uso eficiente a los terrenos aledaños a la estación del Tren Urbano de Bayamón Central	Viqueira, Emilie	UPR	Byron Gilchrest Ken Kruckemeyer Manuel De Lemos