



## The First 20 Years of the Puerto Rico Transportation Technology Transfer Center in the Training of Engineers and Transportation Officials

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ICEE 2007 Coimbra, Portugal



## Presentation Highlights



- An Overview of Puerto Rico
  - San Juan Metropolitan Area (SJMA)
  - Our challenges
- An Overview of Puerto Rico T<sup>2</sup> Center (LTAP)
- New Education Initiatives to Increase Workforce
  - UPR/MIT/Tren Urbano
  - UPR/PUPR/ATI
  - Dwight David Eisenhower Transportation Fellowship Program
  - ETTAP
  - EPICS
  - URI Summer Internship Program
  - International Collaboration
- Key Elements for Success
- The Future...



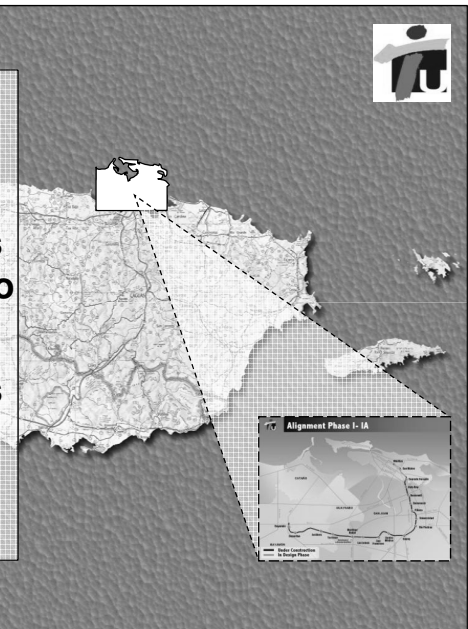
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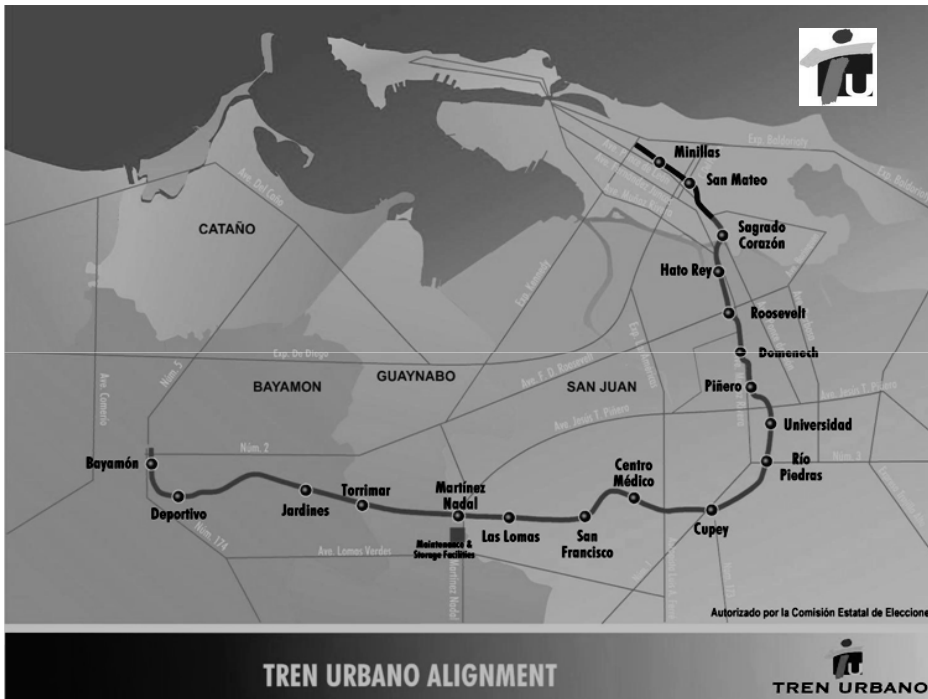
## San Juan Metropolitan Area (SJMA)



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- 37% of the Puerto Rico population lives in the San Juan Metro area (1.2 million)
- Metro area generates 3.2 million daily trips





## Tren Urbano Facts



1. Located in San Juan Metropolitan Area (SJMA)
2. Design Build Operate Maintain (DBOM) Demonstration Project
3. 16 stations, 17.2 km. heavy rail system
4. Siemens Technology
5. Design Stage: 1993
6. FTA (USDOT) Matching Fund Approval: February 1994
7. Construction begins: 1996
8. Inauguration of first line: June 6, 2005



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## Our Challenge



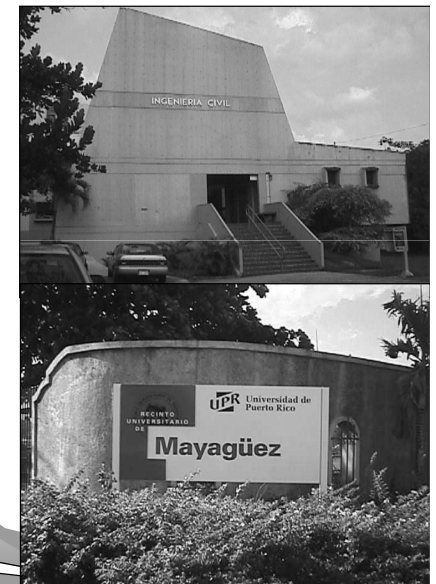
- No recent experience with heavy rail service
- Current public transportation service (AMA, Metrobus, Públicos, Acuaexpreso) has negative public perception
- Initially, all technical expertise had to be imported



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## Our Center

- Established in 1986
- Department of Civil Engineering, University of Puerto Rico at Mayagüez
- Funding sources:
  - Local Technical Assistance Program (LTAP)
  - Puerto Rico Department of Transportation and Public Works (DTPW)
  - US Virgin Islands Department of Public Works



# LTAP - Local Technical Assistance Program, USA

- 1981 → initiated as Rural Technical Assistance Program RTAP
- 1991 → expanded to include urban areas and tribal communities (ISTEA)
- Currently → 57 LTAP Centers in the United States, including Puerto Rico

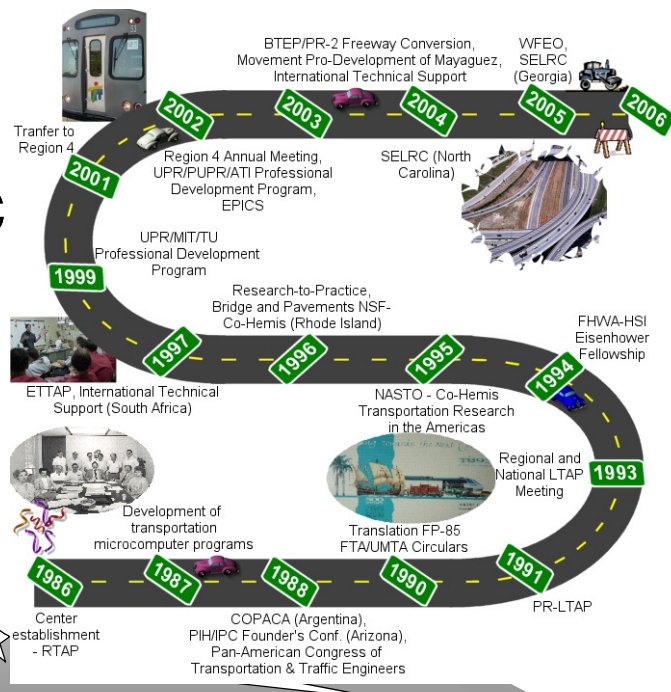


# PR Transportation Technology Transfer Center Objectives:

- Provide technical assistance to municipalities and local transportation agencies
- Provide information regarding planning, design, construction, maintenance and operation of transportation facilities



# PR-TTTC History



# Education Initiatives to Increase Transportation Workforce

1. UPR / MIT / Tren Urbano
2. UPR / PUPR / ATI
3. Dwight David Eisenhower Transportation Fellowship Program
4. Entrepreneurial Training and Technical Assistance Program (ETTAP)
5. Engineering Projects in Community Service (EPICS)
6. URI Summer Internship Program
7. International Collaboration



# 1. UPR/MIT/Tren Urbano Professional Development Program (1994-2004)



# 1. UPR/MIT/Tren Urbano Professional Development Program: 1994-2004



## Program Objectives

- a. Develop young professionals with expertise in transit planning, design, construction, operations & maintenance.
- b. Strengthen transit applied research and interdisciplinary education.
- c. Provide balance of theory and practice.

# 1. UPR/MIT/ Tren Urbano Professional Development Program



- Multidisciplinary
  - Engineering
  - Architecture
  - Planning
  - Management
  - Social Sciences
- Multicampus
- Multicultural



# Program Components



1. Project Orientation
2. Two special short courses
  - Summer Course at MIT
  - January Course in San Juan, Puerto Rico
3. Site visit to international transit Student Research Projects
4. Summer Internships



# Component 1 Tren Urbano Orientation

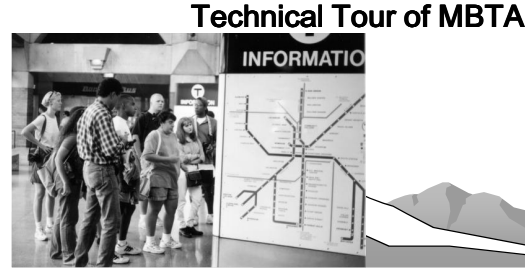


For UPR students in June & MIT students in September

# Component 2 Short Course on Public Transportation at MIT



Presentations on Public Transportation



Technical Tour of MBTA



# Component 2 Short Course on Public Transportation at MIT



Team projects: Best & worst of Boston



# Component 2 January Short Course in San Juan



Presentations, consultations & dialogue



## Component 2

### January Short Course in San Juan



Experiencing public transit in San Juan Metro Area



Aerial tour of Tren Urbano Alignment



## Component 3

### Site Visit to International Transit System



Bilbao Metro, Spain



Other systems visited: Medellín, Colombia; Caracas, Venezuela; Miami-Dade, Florida, New York City, NY

## Component 4

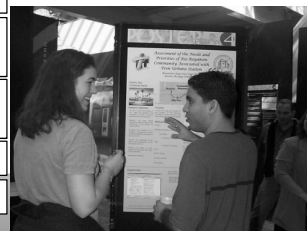
### Student Research Areas



Airport Planning		
Architecture	Finance	
Construction Management	Geotechnical	
Controls	Intermodal Integration	Parking
Engineering Design	Economic Development	Urban Planning
Environmental Issues	Land use / zoning	Project Management
Fare Policy & Structure	Marketing / Customer Information	Seaport Planning
	Operations	Traffic Engineering
		Transportation Planning
		Urban Design
		Vehicles



Research Project Poster Exhibits



## Component 5

### Summer Internships

- Full-time / part-time
- Summer / Academic year
- Placements with TU contractors & consultants
- In Puerto Rico, US-mainland & Europe
- Benefits for students, project and companies





## 2. UPR/PUPR/ATI Professional Development Program (2004-Present)



## Program Benefits *Short-term*



1. Over 270 participants in the UPR/MIT/Tren Urbano and UPR/PUPR/ATI Professional Development Programs
2. Over 210 students have completed summer internships
3. Program deliverables:
  - a. Project proposals
  - b. Posters
  - c. Final reports and Theses
  - d. Electronic distribution



All activities are documented at our web sites:

<http://uprati.uprm.edu> ; [www.trenurbanoupr.net](http://www.trenurbanoupr.net) ;  
[www.uprm.edu/prt2](http://www.uprm.edu/prt2)

## Program Benefits *Short-term*



### Participation in Professional Development Programs: 1994-Present

Gender	UPR [RP + RUM]	MIT	HTA	PUPR	Total
Male	75	62	10	4	151
Female	62	41	4	0	107
Total	137	103	14	4	258

## Program Benefits *Long-term*



1. An available pool of young professionals to respond to the transportation challenges of 21<sup>st</sup> century
2. Strengthened teaching and research programs related to transit
3. Development of human resources in architecture, planning, engineering, social sciences, business administration & related disciplines with public transportation focus



# Program Benefits Success Stories



- Five students have received American Public Transportation Foundation scholarships (APTA)
- Many students employed by
  - Tren Urbano and ATI after summer internships
  - Transportation workforce (FHWA, CST, PRHTA, CTA)
- Others are pursuing graduate studies (our new generation of faculty mentors)



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# Elements of San Juan experience that contributed to the success of the program



- Vision and commitment of leadership
- Faculty experience and credibility
- Direct involvement of project consultants
- Student dedication and enthusiasm
- Real teamwork ...and
- Sustained funding



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## 3. Dwight David Eisenhower Transportation Fellowship Program



## 3. Dwight David Eisenhower Transportation Fellowship Program

- Established by the Intermodal Efficiency Act (ISTEA) in 1991
- Offered in the University of Puerto Rico at Mayagüez since 1994
- Hispanic Serving Institutions

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## Objectives

- Attract the nation's brightest minds to the field of transportation
- Enhance the careers of transportation professionals by encouraging them to seek advanced degrees
- Retain top talent in the transportation industry



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## DDETFP Program Components

- Student Research Projects
- Participation in the Transportation Research Board Annual Meeting
  - Presentations
  - Poster Exhibit



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## DDETFP Research Topics

- traffic safety
- human factors
- crash data analysis
- roadside safety
- interaction of safety and the environment
- safety information systems
- safety enforcement
- countermeasure selection
- safety conscious planning
- safety administration
- safer designs & traffic control
- roadway safety improvement programs
- safety software and models



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## 4. Entrepreneurial Training and Technical Assistance Program (ETTAP)



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- Since 1997 with the collaboration of the Office of Small and Disadvantaged Business Utilization
- Provide transportation-related assistance and procurement information to small, women owned and disadvantaged business
- Transportation-related student internships to support the US-DOT Garrett A. Morgan Technology and Transportation Future Programs



#### 5. Engineering Projects in Community Service (EPICS)



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#### 5. Engineering Projects in Community Service (EPICS)

- Collaboration with Purdue University and the University Institute for the Development of Communities (Prof. Luisa Seijo – Director)
- Engineering students collaborate in team work with students from the Department of Social Sciences, Humanities and other disciplines from UPR-Mayagüez and UPR-Aguadilla, and with the University Institute for the Development of the Communities



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#### Sample Engineering Projects

1. Pavement Evaluation and Inspection
2. Utility Evaluation
3. Road Safety Audit
4. Highway Infrastructure Survey
5. Speed Reduction Techniques
6. Improvement in Highway Signs and Markings
7. Identifying Hazardous Road Locations



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## 6. UPRM-URI Summer Internship Program



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- Summer Exchange Internship Experience between UPRM and the University of Rhode Island
- Three years (2004-present)
- Sources of Funding
  - FHWA-Eisenhower Fellowship
  - URITC
- Faculty Mentorship at UPRM (Ad-honorem and soft match)



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## UPRM-URI Summer Internship Program: Benefits

- Faculty mentorship with a different perspective on common transportation problems
- Bilingual experience
- Cultural exchange



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## URI-UPRM Research Areas

- Vehicle-pedestrian crashes/highway safety
- Fiber reinforced material
- Landslide
- Computer and vehicle simulation/variable message sign
- Geotechnical engineering/material characterization



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## 7. International Collaboration



## 7. International Collaboration

- Congreso Panamericano de Carreteras (COPACA), Buenos Aires, Argentina – RTAP Experience in the US and Puerto Rico – 1988
- Evaluation of the kombi system in South Africa and recommendations of the Público System of Puerto Rico, FTA funded – 1990
- Asociación Latinoamericana de Metros y Subterráneos (ALAMYS) participation in the annual conference in cities in Latin America: 1996-present
- Border Technology Exchange Program (BTEP), Monterrey, Mexico, assisting Mexican States in the border with US States in Technology sharing/LTAP success story: 2003-2005



*Every engineering construction project is a unique opportunity for student professional development*



## The Future : Window of Opportunities

- *Las Americas* Transshipment Port at Ponce, Puerto Rico
- Facilities for 2010 Central American and Caribbean Games at Mayagüez, Puerto Rico



Acknowledgments: Felipe Luyanda, Gisela  
González and the new generation of professionals



Thank you  
for the opportunity!

