

**Annual Report  
for  
July 2004 – June 2005**



**Department of Civil and Environmental Engineering  
College of Engineering and Computing  
Florida International University  
Miami, FL**

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## 1. Introduction

*Civil engineering* is the oldest of engineering disciplines, and perhaps the broadest, as it constitutes a wide range of interwoven sub-disciplines, namely construction engineering, geotechnical engineering, environmental engineering, structural engineering, transportation engineering, and water resources engineering. At FIU too, civil was one of the first degree programs within the *School of Technology* that opened in 1974. The first civil engineering degrees offered included a Bachelor of Science and a Bachelor of Technology.

Today, our department offers the Bachelor of Science in Civil Engineering (BSCE), Master of Science in Civil Engineering (MSCE), Master of Science in Environmental Engineering (MSEE), Master of Science in Environmental and Urban Systems (MSEUS), and Doctor of Philosophy in Civil Engineering (PhD). The BSCE degree was first accredited by the Accreditation Board of Engineering and Technology (ABET) in 1987, with renewed accreditations in 1993, 1996, and most recently, 2002.

Our department's ten-year strategic goals are as follows (see [2003 Program Review](#)):

- To be among the top two departments in Florida;
- To improve our nationwide ranking from the current 85 to 45;
- To double our FTEs and student enrollments; and
- To double our per faculty external research funding.

Faculty and students are the two real assets of our department. Accomplished in their fields and committed to meeting the demands of the profession, our faculty members provide a challenging and rewarding environment for our undergraduate and graduate students. Our student body is diverse in its origins and motivated to achieve higher education. With the hiring of two new faculty members in water resources engineering and transportation engineering, our department has 16 faculty members. Our student body of 370 consists of 250 undergraduates, 80 masters and 40 doctoral students.

We are committed to providing a solid foundation for future engineers. With rapid technology advances, boundaries between traditional disciplines are vanishing, and engineers are increasingly faced with the challenge of solving complex multi-disciplinary problems. Our department is currently exploring a number of multidisciplinary initiatives.

This annual report provides a summary of the critical data for the Department of Civil and Environmental Engineering at the Florida International University in the areas of academics, research, training, fundraising, and future plans for the period of July 2004 – June 2005, which spans Summer 2004, Fall 2004, and Spring 2005.

## 2. Academics

### 2.1 Enrollments and FTEs

Both undergraduate and graduate enrollments continued to grow last year at an annual rate of about 15%. The FTEs are calculated as the fundable student credit hours divided by 40 or 32 credits for either the undergraduate or graduate students, respectively. The

total FTEs for the department rose by 25% in Spring 2005 over the similar period in 2004. During the last academic year, our overall student/faculty ratio was over 28:1, underscoring the urgent need for hiring new faculty to meet the student demand.

## 2.2 Florida Engineering Education Delivery System (FEEDS)

The enrollments in our FEEDS program increased significantly last year. However, the faculty passed a resolution to cease the offering of undergraduate courses on FEEDS for students who obtain their degrees from our program to avoid any potential problem with ABET. The department will continue to offer graduate courses on FEEDS.

Table 1. FEEDS Enrollment and Course Offering History

Semester	FEEDS Enrollment			FEEDS Courses		
	Undergraduate	Graduate	Total	Undergraduate	Graduate	Total
Spring 2002	6	11	17	2	3	5
Summer 2002	5	6	11	1	2	3
Fall 2002	15	10	25	3	3	6
Spring 2003	17	17	34	4	4	8
Summer 2003	3	2	5	1	1	2
Fall 2003	8	21	29	2	4	6
Spring 2004	1	9	10	1	3	4
Summer 2004	52	8	60	6	2	8
Fall 2004	81	9	90	8	4	12
Spring 2005	51	23	74	5	6	11

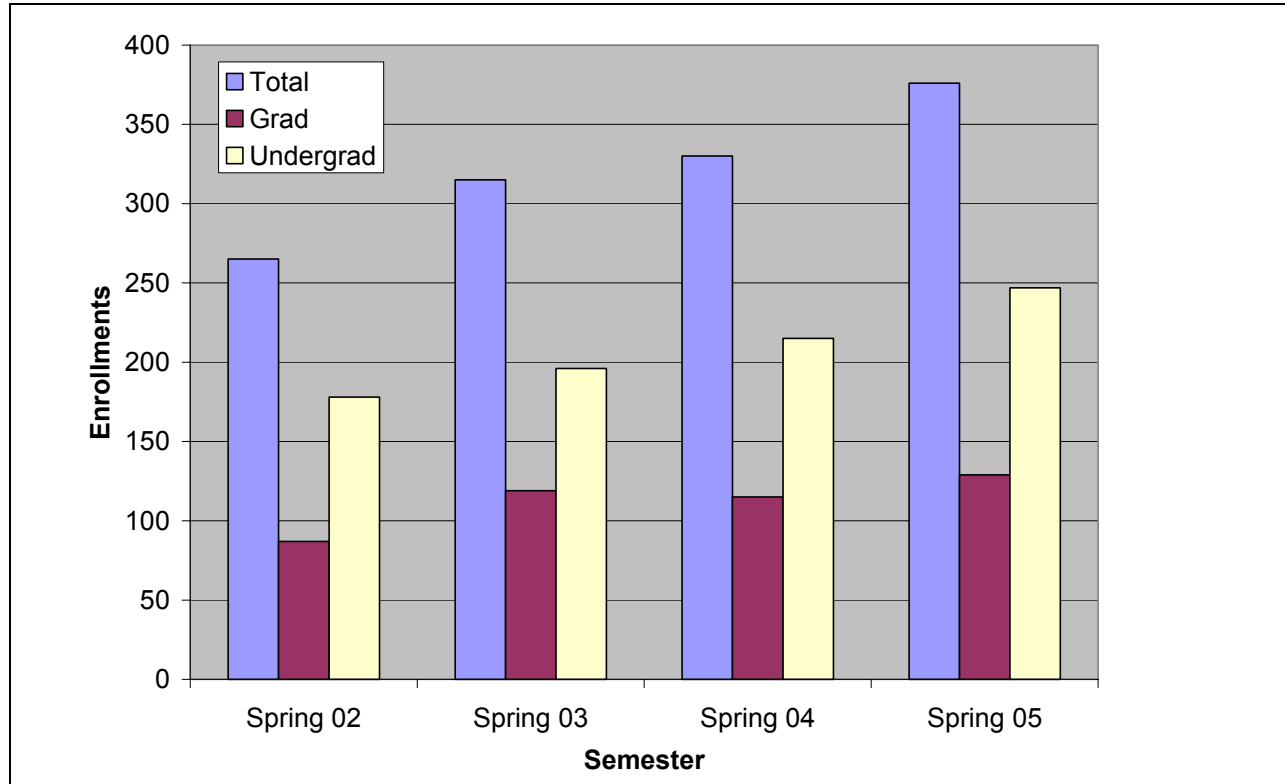


Figure 1. Undergraduate and Graduate Enrollments in the Last Three Years

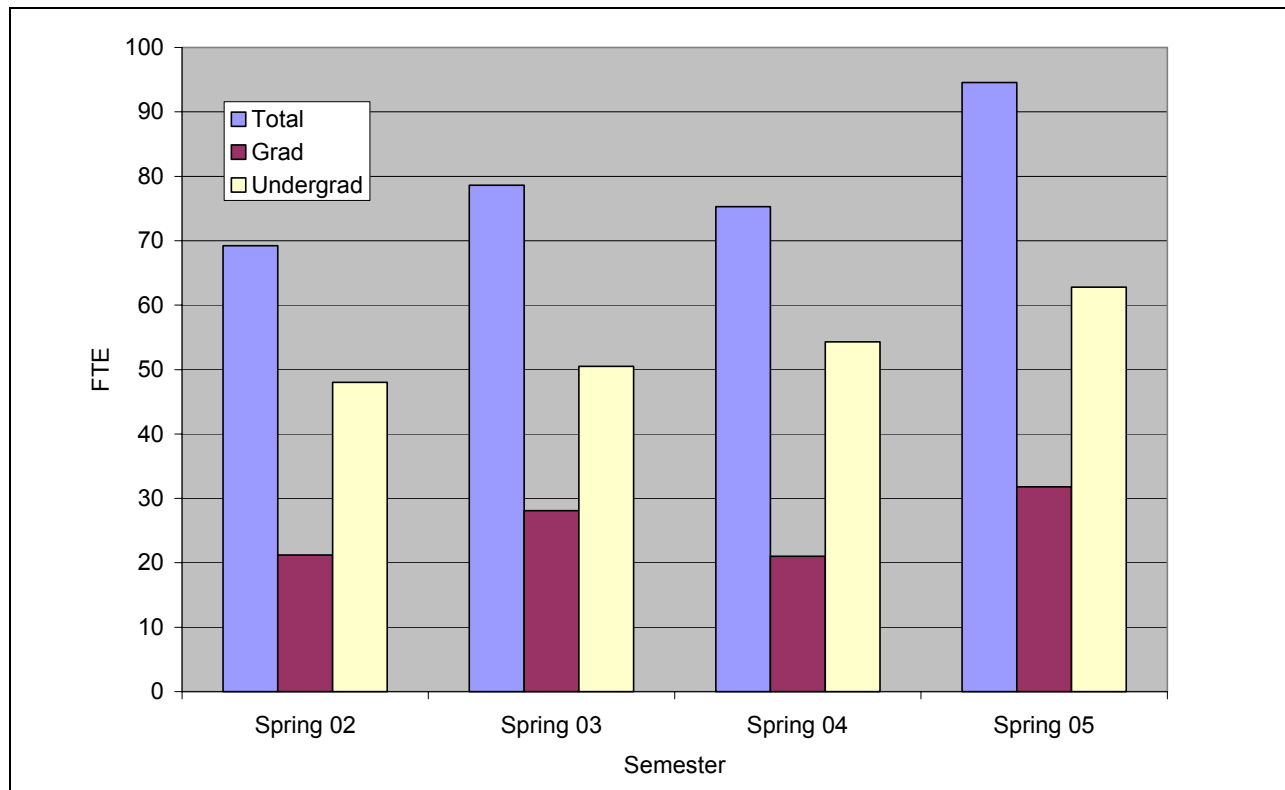


Figure 2. Undergraduate and Graduate FTEs in the Last Three Years

### 2.3 Degrees Awarded

During the last academic year, the department graduated a record high number of bachelors at 65. Figure 3 shows a historical perspective on the degrees granted for the last 15 years. The total number of degrees offered also passed a threshold of 100 for the first time ever. This would have not been possible without the efforts of our faculty who took great pride in teaching and advising these students so successfully. We also made a great stride in graduating 4 more PhD students, increasing the total number of PhD graduates to 18 in a span of only 5 years.

### 2.4 ABET Accreditation

The department had successfully received a six year accreditation in 2002. In preparation for the next visit in 2008, the department took on significant activities during last year, some of which are listed below:

*Educational laboratory space:* Obtained about 1,000 square feet of new space for Geotechnical Laboratory in the adjacent OU Building (OU 105). Also, obtained about 3,000 square feet of high-bay in the adjacent OU Building for the new Structures Laboratory.

*Educational equipment and upgrades:* Spent \$30,000 in revitalizing various labs, particularly Materials and Geotechnical Laboratories. Spent over \$100,000 of Dr.

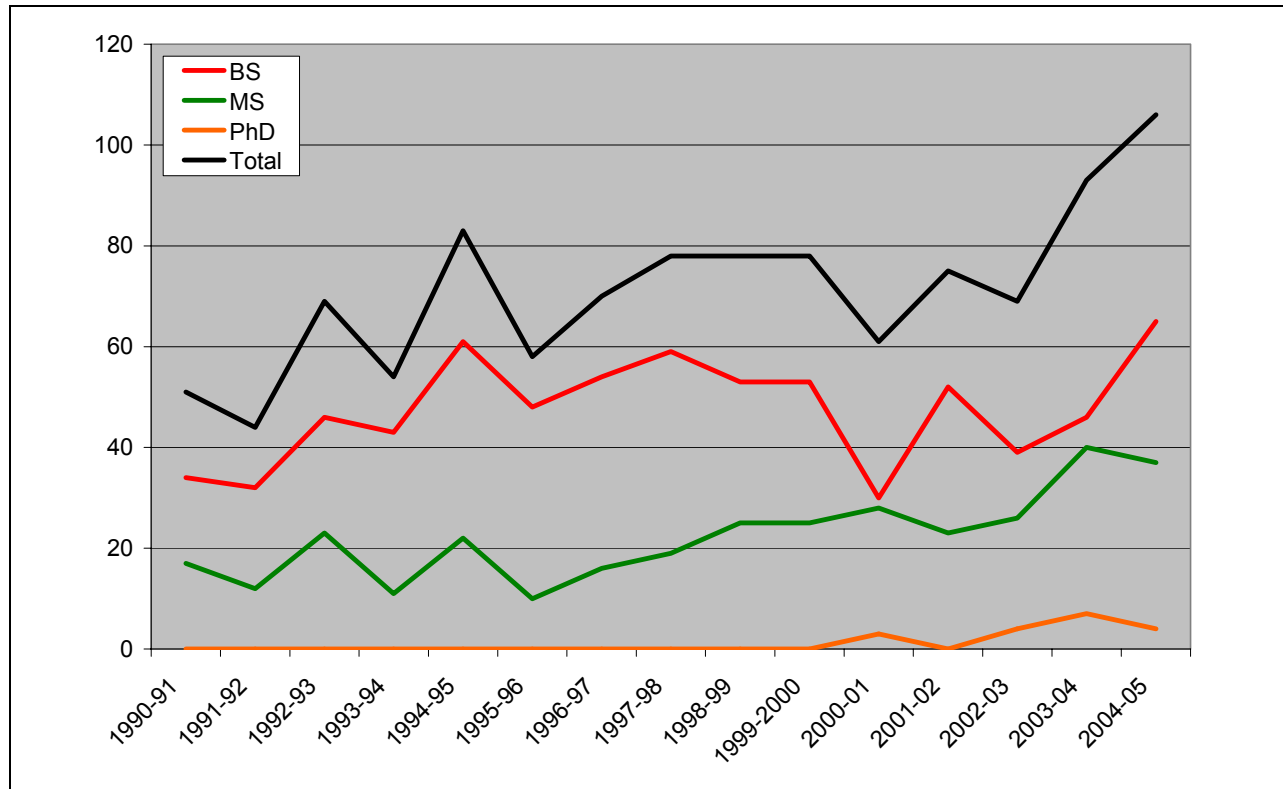


Figure 3. Degrees Granted – A Historical Perspective

Mirmiran's start-up funds to purchase hydraulic pump and actuator system for the new Structures Laboratory. Purchased 4 new computers for the Senior Design Laboratory, and purchased new multi-media equipment for Room 3665, which is used for some of our regular classes as well as training courses.

*Objectives, Outcomes and Assessments:* Communication was a major component of the ABET activities last year. ABET update and discussion were part of each monthly faculty meeting. A student forum was held in Spring 2005 to discuss the ABET objectives as well as other educational issues. The meeting initiated a number of changes and improvements in courses. Department Advisory Board (DAB) met twice last year to re-visit the objectives of the program. A faculty retreat is planned for Fall 2005. In preparation for the retreat, ABET-related data from transcripts and grades to surveys and course evaluations for the last three years have been collected, synthesized and distributed to the faculty so that they could be discussed for further improvement. The department is also in the process of hiring a new undergraduate advisor.

## 2.5 Student Chapter Activities

For the second year in a row, and the third time in five years, the Institute of Transportation Engineers (ITE) has awarded the Best Student Chapter Award to our ITE Student Chapter. ASCE Student Chapter has also been one of the most active chapters in the state, raising funds to take the students to various regional and state competitions and activities. From regional competitions to state forums, the ASCE

student chapter served as an ambassador for the department. Chi Epsilon, the Civil Engineering Honor Society at FIU, took great stride in its induction ceremonies and various campus-wide initiatives.

### 3. Research

#### 3.1 Research Areas of Faculty

The faculty members in our department are divided into three thrust areas, as follows:

1. Civil Infrastructure Engineering, including construction, foundations and geotechnical, pavement, structures and wind:

Forrest Masters	Wind Engineering
Amir Mirmiran	Structural Engineering
<i>Charles Nunoo</i>	<i>Pavement Engineering [Resigned Fall 2005]</i>
Luis Prieto-Portar	Geotechnical Engineering
Ton-Lo Wang	Structural Engineering
2. Environmental and Water Resources Engineering:

Hector R. Fuentes	Water Resources
Shonali Laha	Biosolids and Sludge
<i>Fernando Miralles-Wilhelm</i>	<i>Water Resources [from Summer 2005]</i>
Wolfgang F. Rogge	Air Pollution
Walter Tang	Water and Wastewater Treatment
Berrin Tansel	Solid and Hazardous Waste
3. Transportation Engineering:

Albert Gan	Traffic Engineering
<i>Mohammad Hadi</i>	<i>Intelligent Transportation System [from Fall 05]</i>
Sylvan Jolibois	Transportation Land Use
L. David Shen	Intermodal Transportation
Fang Zhao	Transportation Planning

#### 3.2 Research Proposal Activities

Research funding more than doubled compared to the previous year. Figure 4 shows a historical perspective on proposals and *new* research awards. Note that some of the awards of the faculty members on joint appointments were not credited to our department in the university database, hence not included in the graph. Last year, success rate for our proposals was 72%, more than double the rate of the previous year. On average, our faculty submitted 1.0 proposal at \$170,000 per full-time tenure-track faculty, and was awarded \$160,000 per full-time tenure-track faculty in new research funding. In the last National Science Foundation (NSF) ranking in 2001, our department was ranked 84<sup>th</sup>, based on R&D funding. Current level of funding is expected to place our department at about 65-70 together with Rutgers, Houston, and Arkansas. We are also expected to rank 4<sup>th</sup> in the State of Florida.

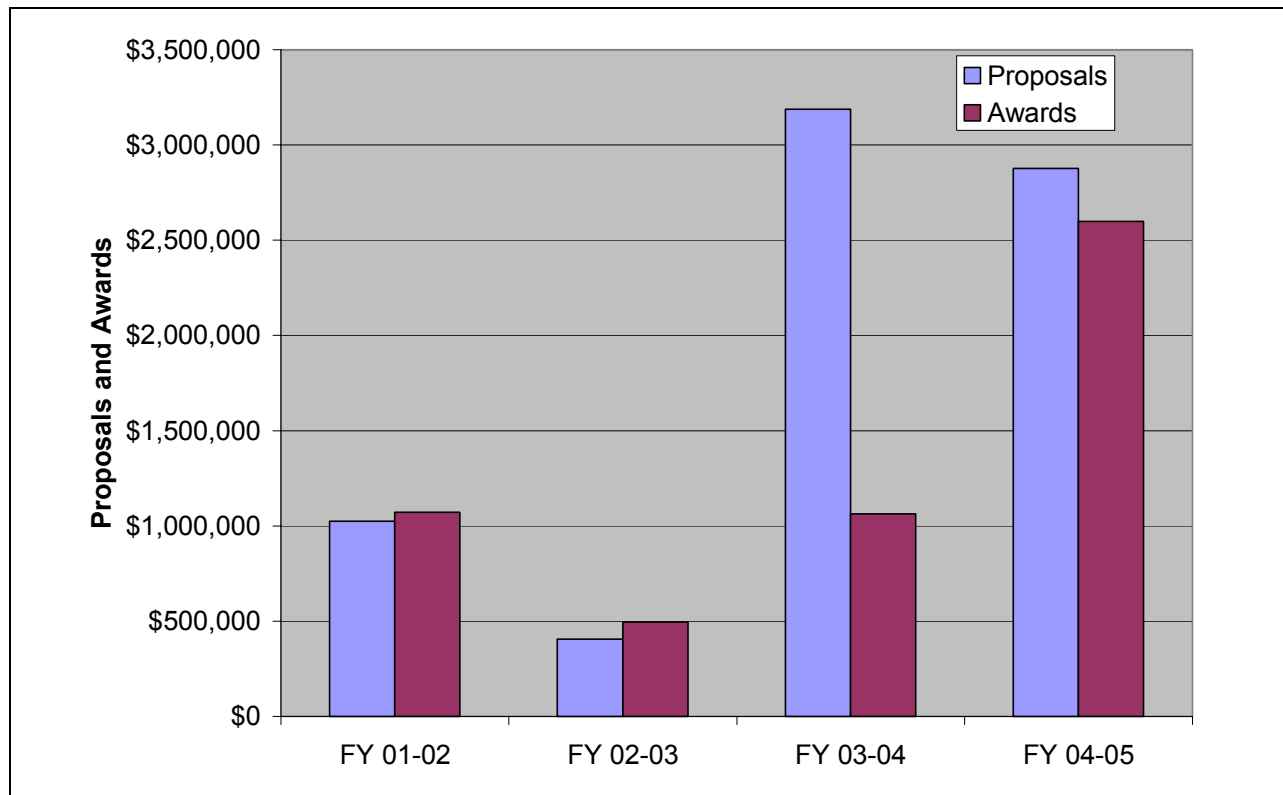


Figure 4. History of Proposal Activities and Research Awards

### 3.3 Externally Funded Research Projects

In this section, a listing of our faculty's externally funded research projects is compiled. On average, our faculty carried out a total of 40 projects at \$4,844,170 funding level, an equivalent of 3.1 research projects at \$372,630 per full-time tenure-track faculty during the last academic year. Note that some of these projects are multi-year.

1. **Gan, A., Wang, H., and Ding, S.,** "Web and Database Support for Resources for Advanced Public Transportation Systems (RAPTS)," *University of South Florida and Florida Department of Transportation, 2004-05, \$20,938.*
2. **Gan, A.,** "Design and Implementation of Sun-Guide Broward Regional Transportation Management Center (RTMC) Website," *Harris Corporation, 2004-05, \$30,000.*
3. **Gan, A., Liu, K., and Zheng, J.,** "Development of Florida Transit Information System (FTIS) Version 2005," *Florida Department of Transportation, Public Transit Office, 2005-06, \$160,000.*
4. **Gan, A., Li, M-T, and Jung, R.,** "Traffic Count Data Collection and Evaluation for Ramp Metering Modeling," *Florida Department of Transportation, District 6 Traffic Operations Office, 2005, \$55,229.*
5. **Gan, A., Li, M-T, and Jung, R.,** "Travel Time Data Collection for Ramp Metering Modeling," *Florida Department of Transportation, District 6 Traffic Operations Office, 2005, \$9,904.*

6. **Gan**, A., Li, M-T, and Jung, R., "Simulation Analysis of Ramp Metering Project on I-95 in Miami-Dade County," *Florida Department of Transportation, District 6 Traffic Operations Office*, 2005, \$43,626.
7. **Gan**, A., Liu, K., and Jung, R., "Development of an Automated Collection and Analysis System for Bus Stop Inventory," *Florida Department of Transportation, Public Transit Office*, 2004-05, \$130,000.
8. **Gan**, A., Jung, R., and Li, M-T, "Accuracy Standards for Transit Assignment," *University of Miami and Florida Department of Transportation*, 2004-05, \$50,000.
9. **Gan**, A., Juang, R., and Liu, K., "Vehicle Occupancy Data Collection Methods," *Florida Department of Transportation, Transportation Statistics Office*, 2003-04, \$99,500.
10. **Gan**, A., Liu, K., and Jung, R., "Development of Spatial Functions and Databases for the Design and Evaluation of Transit Routes and Stops," *Florida Department of Transportation, Public Transit Office*, 2003-04, \$140,000.
11. **Gan**, A., Chow, L-F, and **Shen**, L.D., "Updates of Florida Crash Reduction Factors and Countermeasures to Improve the Development of District Safety Improvement Projects," *Florida Department of Transportation, State Safety Office*, 2002-05, \$145,000.
12. **Gan**, A., Wang, H., and Ding, S., "District Four Miscellaneous ITS Research and Technical Support," *Florida Department of Transportation, District 4 ITS Office*, 2005-06, \$50,000.
13. **Gan**, A., Jung, R., and Liu, K., "Vehicle Occupancy Data Collection Methods (Phase II)," *Florida Department of Transportation, Transportation Statistics Office*, 2005-06, \$100,000.
14. **Gan**, A., Li, M-T, and Jung, R., "QA/QC Monitoring of Traveler Information Services," *Florida Department of Transportation, District 6*, 2004-05, \$12,653.
15. **Gan**, A., Jung, R., and Liu, K., "Development of Florida Transit Information System (FTIS) Version 2004," *Florida Department of Transportation, Public Transit Office*, 2004-05, \$160,000.
16. **Joilibois**, S.C., "Technical Support to Leadership Groups in the Overtown Community," *City of Miami*, 2004-06, \$57,000.
17. **Joilibois**, S.C., "Technical Civil Engineering Services," *EAC Consulting, Inc.*, 2004-05, \$21,395.
18. **Masters**, F., "Florida Hurricane Alliance Round I: Surface Wind Measurements," *National Oceanic and Atmospheric Administration*, 2004-06, \$93,323.
19. **Masters**, F., "Full-Scale Wind Load Testing Using the Wall of Wind," *Renaissance Reinsurance*, 2004-05, \$377,486.
20. **Masters**, F., "Florida Hurricane Alliance Round II: Monitoring Surface Level Winds in Real Time," *National Oceanic and Atmospheric Administration*, 2005-07, \$142,500.
21. **Masters**, F., "Post-Hurricane Field Surveys - An Evaluation of the Relative Performance of the Standard Building Code and the Florida Building Code," *Florida Department of Community Affairs*, 2004-05, \$10,000.

22. **Mirmiran, A.**, “NCHRP 10-59: Construction Specifications for Bonded Repair and Retrofit of Concrete Structures using FRP Composites,” *National Academy of Sciences, National Cooperative Highway Research Program (NCHRP)*, 2004-06, \$281,756.
23. **Mirmiran, A.**, “Seismic Performance of Bridge Systems with Conventional and Innovative Materials,” *National Science Foundation, Network for Earthquake Engineering Simulation Research (NEESR) Program, through University of Nevada-Reno*, 2004-07, \$134,108.
24. **Mirmiran, A.**, “NCHRP 12-64: Application of the LRFD Bridge Design Specifications to High-Strength Structural Concrete: Flexure and Compression Provisions,” *National Academy of Sciences, National Cooperative Highway Research Program (NCHRP), through NC State University*, 2004-06, \$36,900.
25. **Mirmiran, A.**, “NCDOT 2005-10: Traffic Control Design for Portable Concrete Barriers,” *North Carolina Department of Transportation, through NC State University*, 2004-05, \$32,499.
26. **Mirmiran, A.**, “NCDOT 2005-18: Full Scale Testing of Overhang Falsework Hangers on NCDOT Modified Bulb Tee (MBT) Girders,” *North Carolina Department of Transportation, through NC State University*, 2004-05, \$12,300.
27. **Mirmiran, A.**, “A Pilot Study for Assessing, Protecting, Sensing, and Hardening for Safety and Security of Florida Transportation Structures,” *University Consortium for Intermodal Transportation Safety and Security (UCITSS), Florida Atlantic University*, 2005-06, \$98,700.
28. **Rogge, W.F.**, “Particle Supersite – Pittsburgh,” EPA, 2000-05, \$250,256.
29. **Rogge, W.F.**, “Particle Supersite – Baltimore,” EPA, 2000-05, \$370,380.
30. **Rogge, W.F.**, “Particle Supersite – Pittsburgh,” EPA, 2004-05, \$14,500.
31. **Shen, D.L.**, and **Gan, A.**, “Coordination of Specialized Transportation Services for Transportation-Disadvantaged Population: Issues and Solutions,” *Federal Transit Administration*, 2004-06, \$388,350.
32. **Czajkowski, J.R.**, and **Tang, W.**, “Applying Cutting Edge Environmental Economics to Establish an Optimal Level of Ecosystem Restoration and Economic Development in the Everglades National Park,” *Environmental Protection Agency, Minority Fellowship*, 2001-05, \$75,000.
33. **Zhao, F.**, “Integrating Data and Models for Analysis of Freight Movements on Multimodal Transportation Systems for FL,” *Florida Department of Transportation*, 2004-06, \$250,000.
34. **Zhao, F.**, and **Li, M-T**, “A Transit Ridership Model based on Geographically Weighted Regression and Incorporating Service Quality Variables,” *Florida Department of Transportation*, 2004-05, \$120,000.
35. **Zhao, F.**, “A Study of Alternative Land Use Forecasting Models,” *Florida Department of Transportation*, 2004-05, \$125,000.
36. **Zhao, F.**, and **Li, M-T**, “Comparing Short-Term Traffic Projections with Traffic Counts – the JUATS 2015 Model,” *Florida Department of Transportation*, 2004-05, \$100,000.
37. **Zhao, F.**, “AVL Data Analysis,” *Broward County Transit*, 2003-04, \$20,000.

38. **Zhao**, F., **Shen**, L.D., and **Gan**, A., "Refinement of FSUTMS Trip Distribution Methodology," *Florida Department of Transportation*, 1998-2004, \$255,000.
39. **Zhao**, F., **Gan**, A., and Li, M-T, "Calibration of Highway/Transit Speed Relationships for Improved Transit Network Modeling in FSUTMS," *Florida Department of Transportation*, 2002-05, \$90,000.
40. **Shen**, L.D., **Zhao**, F., and **Gan**, A., "A GIS-Based Decision System for Intermodal Security and Safety," *Federal Transit Administration*, 2004-06, \$376,000.

### 3.4 Internally Funded Research Projects

In this section, a listing of our faculty's internally funded research projects is compiled. These projects were funded through student support by the university.

1. **Laha**, S., "Evaluation of the sludges/biosolids generated by municipal wastewater treatment"
2. **Laha**, S., "Surfactant-amended remediation"
3. **Laha**, S., "Managing odor complaints in Broward County, FL"
4. **Laha**, S., "Monitoring the effectiveness of bioremediation"
5. **Tansel**, B., "TCE partitioning in amended soils," HCET
6. **Tansel**, B., "Land use and population encroachment due to airports," HCET
7. **Tansel**, B., "Nano technology applications in environmental engineering"
8. **Tansel**, B., "Fractal analysis of edible oil-water emulsions using microscopic image analysis techniques"
9. **Tansel**, B., "Effects of Surfactant Adsorption on Mobilization of Contaminants During Subsurface Remediation of Contaminated Soil"
10. **Tansel**, B., "Use of EPA's Models for Contaminant Partitioning and Mobility Analysis"

### 3.5 Research Sponsors

Research projects have been sponsored by a number of federal, state, and local agencies and private sector, some of which are listed below:

- Broward County Transit
- City of Miami
- EAC Consulting, Inc.
- Environmental Protection Agency (EPA)
- Federal Transit Administration (FTA)
- Florida Atlantic University (FAU)
- Florida Department of Community Affairs (FDCA)
- Florida Department of Transportation (FDOT)
- Harris Corporation
- Miami-Dade County
- National Academy of Sciences (NAS)
- National Oceanic and Atmospheric Administration (NOAA)
- National Science Foundation (NSF)
- North Carolina State University (NCSU)

- North Carolina Department of Transportation (NCDOT)
- Renaissance Reinsurance
- University of Miami (UM)
- University of Nevada-Reno (UNR)
- University of South Florida (USF)
- US Department of Transportation (USDOT)

### 3.6 Publications and Presentations

In this section, a listing of the faculty scholarly work is compiled. On average, our faculty published 1.2 journal paper, 1.8 conference proceeding paper, 1.5 conference presentation, and 1.0 research report per full-time tenure-track faculty during the last academic year. Only those publications that appeared are included here.

#### 3.6.1 Refereed Journals

1. Parker, W., and **Laha**, S., "Biosolids and Sludge Management," *Water Environment Research*, Vol. 76, No. 6, pp. 1266-1342, 2004.
2. Shao, Y., and **Mirmiran**, A. "Nonlinear Cyclic Response of Laminated Glass FRP Tubes Filled with Concrete," *Composite Structures*, Elsevier Science Ltd., Vol. 65, No. 1, pp. 91-101, July-August 2004.
3. Zhu, Z., **Mirmiran**, A., and Shahawy, M., "Stay-in-Place FRP Forms for Precast Modular Bridge Pier System," *Journal of Composites for Construction*, ASCE, Vol. 8, No. 6, pp. 560-568, December 2004.
4. Shao, Y., Aval, A., and **Mirmiran**, A. "Fiber Element Model for Cyclic Analysis of Concrete-Filled FRP Tubes," *Journal of Structural Engineering*, ASCE, Vol. 131, No. 2, pp. 292-303, February 2005.
5. Wu, Z., **Mirmiran**, A., and Swanson, J. "Fatigue Behavior of Prestressed Tubular Bridge Deck of Fiber-Reinforced Polymer," *Transportation Research Records No. 1892*, Design of Structures, Part 8 – Structural Fiber-Reinforced Plastics, Transportation Research Board, National Research Council, Washington, D.C., pp. 246-255, 2004.
6. Shao, Y., and **Mirmiran**, A., "Experimental Investigation of Cyclic Behavior of Concrete-Filled FRP Tubes," *Journal of Composites for Construction*, ASCE, Vol. 9, No. 3, pp. 263-273, May/June 2005.
7. Simoneit, B.R.T., Elia, V.O., Kobayashi, M., Kawamura, K., and Didyk, B.M., **Rogge**, W.F., "Sugars-Dominant Water-Soluble Organic Compounds in Soils and Characterization as Tracer in Atmospheric Particulate Matter," *Environmental Science and Technology*, pp. 5939-5949, 2004.
8. **Tansel**, B., Sager, J., Rector, T., Garland, J., Strayer, Richard F., Levine, L., Roberts, M., Hummerick, M., and Bauer, J., "Integrated Evaluation of Sequential Membrane Filtration for Recovery of Bioreactor Effluent during Long Space Missions," *Journal of Membrane Science*, Vol. 255, pp. 117-124, 2005.
9. **Tansel**, B., and Vilar, F. "Enhancement of Media Filter Performance with Coagulant Use for Treatment of Diesel Oil Contaminated Surface Water," *Journal of Desalination*, Vol. 173, pp. 69-76, 2005.

10. **Tansel**, B., and Pascual, B., "Factorial Evaluation of Operational Variables DAF Process to Improve PHC Removal Efficiency," *Journal of Desalination*, Vol. 169, pp. 1-10, 2004.
11. **Tansel**, B., Jolis, D., and Ho, C.F.H., "Gaseous Emissions from Wastewater Facilities," *Water Environment Research*, Vol. 76, pp. 1343-1374, 2004.
12. **Tansel**, B., and Nagarajan, P., "SEM Study of Phenolphthalein Adsorption on Granular Activated Carbon," *Advances in Environmental Research*, Vol. 8, pp. 411-415, 2004.
13. Zhang, H., Huang, D., and **Wang**, T-L., "Lateral Load Distribution in Curved Steel I-Girder Bridges," *Journal of Bridge Engineering*, ASCE, Vol. 10, No. 3, pp. 281-290, May/June 2005.
14. **Wang**, T-L., Liu, C., Huang, D., and Shahawy, M., "Truck Loading and Fatigue Damage Analysis for Girder Bridges Based on Weigh-in-Motion Data," *Journal of Bridge Engineering*, ASCE, Vol. 10, No. 1, pp. 12-20, January/February 2005.
15. **Zhao**, F., and Park, N., "Estimation of AADT Using Geographically Weighted Regression Models," *Transportation Research Record 1879*, Transportation Research Board, National Research Council, Washington, D.C., pp. 99-107, 2004.
16. Li, M-T, **Zhao**, F., and Wu, Y., "Application of Regression Analysis for Identifying Factors Affecting Seasonal Traffic Patterns in Southeast Florida," *Transportation Research Record 1870*, Transportation Research Board, National Research Council, Washington, D.C., pp. 153-161, 2004.

### 3.6.2 Books and Book Chapters

1. **Tang**, W. *Physicochemical Treatment of Hazardous Wastes*, Lewis Publishers, Boca Raton, FL, 2004.

### 3.6.3 Conference Proceedings

1. **Gan**, A., and Liu, K.Y., "A Database System for the Maintenance and Application of Crash Reduction Factors for Highway Safety Improvements," *Eighth International Conference on Application of Advanced Technologies in Transportation*, ASCE, Beijing, China, May 26-28, 2004.
2. Ubaka, I., **Gan**, A., and Zheng, J., "A Fully Automated System for Transit Peer Selection and Analysis," *Eighth International Conference on Application of Advanced Technologies in Transportation*, ASCE, Beijing, China, May 26-28, 2004.
3. **Masters**, F., L. Aponte, K. Gurley, and T. Reinhold. "Measurement and Stochastic Modeling of Ground-Level Wind Velocity During Landfalling Hurricanes," *Ninth Annual International Conference on Structural Safety and Reliability*, Rome, Italy, June 19-23, 2005.
4. Blessing, C. and F. **Masters**. "Attrition of Ground Weather Observations During Hurricane Landfall," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31-June 4, 2005.
5. **Masters**, F. and K. Gurley. "Multivariate Stochastic Simulation of Wind Pressure Over Low-Rise Structures Through Linear Model Interpolation," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31 – June 4, 2005.

6. **Masters**, F., K. Gurley and A. Kareem. "Gust Factors: From Theoretical Considerations to Field Measurements," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31-June 4, 2005.
7. **Masters**, F., T. Reinhold, K. Gurley and D. Prevatt. "The Effect of Hurricane Eyewall and Convective Features on Surface-Level Turbulence," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31-June 4, 2005.
8. **Masters**, F., T. Reinhold, K. Gurley and M. Powell. "Gust Factors Observed in Tropical Cyclone Landfalls," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31-June 4, 2005.
9. Willoughby, H. and F. **Masters**. "Early 21st Century Hurricane Threats: Maximum Potential Intensity, The Atlantic Multidecadal Oscillation, Global Warming, and Chance," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31-June 4, 2005.
10. Gurley, K., F. **Masters**, D. Prevatt And T. Reinhold. "Hurricane Data Collection: FCMP Deployments During The 2004 Atlantic Hurricane Season," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31-June 4, 2005.
11. Powell, M., S. Murillo, T. Reinhold, K. Gurley, F. **Masters** and D. Prevatt. "Hurricane Winds at Landfall: 2004," *Tenth Americas Conference on Wind Engineering*, Baton Rouge, LA, May 31-June 4, 2005.
12. Zhu, Z., Ahmad, I., and **Mirmiran**, A. "Concrete-Filled FRP Tube Columns for Highway Bridges," *Second U.S.-Turkey Workshop on Seismic Design and Retrofit of Highway Bridges*, Sponsored by National Science Foundation and Federal Highway Administration and Turkey Directorate of Highways, Ankara, Turkey, September 2004.
13. Rosenboom, O.A., Hassan, T.K., **Mirmiran**, A., and Rizkalla, S., "Static Behavior of 40-Year Old Prestressed Concrete Bridge Girders Strengthened with Various FRP Systems," *Second International Conference on FRP Composites in Civil Engineering*, Adelaide, Australia, International Institute for FRP in Construction (IIFC), December 2004.
14. Rosenboom, O.A., Hassan, T.K., **Mirmiran**, A., and Rizkalla, S., "Static and Fatigue Performance of 40 Year Old Prestressed Concrete Girders Strengthened with Various CFRP Systems," *International Conference on Future Vision and Challenges for Urban Development*, Housing and Building Research Center, Ministry of Housing, Utilities and Urban Communities, Cairo, Egypt, December 2004.
15. Zhu, Z., Ahmad, I., and **Mirmiran**, A. "Effect of Fiber Composite Shells on Seismic Performance of Reinforced Concrete Columns," *International Conference on Future Vision and Challenges for Urban Development*, Housing and Building Research Center, Ministry of Housing, Utilities and Urban Communities, Cairo, Egypt, December 2004.
16. Hong, T.H., Hastak, M., and **Mirmiran**, A. "Composite Materials in Construction - A Life Cycle Perspective," *Fourth International Workshop on Life-Cycle Cost Analysis and Design of Civil Infrastructure Systems*, Cocoa Beach, FL, May 2005.

17. Robinson, A., Subramanian, R., and **Rogge**, W.F., "Evaluation of the Oxidation Kinetics of Molecular Markers used for Source-Apportionment of Primary Organic Aerosol," *23<sup>rd</sup> Annual Conference of the American Association for Aerosol Research*, Atlanta, GA, October 3-8, 2004.
18. **Rogge**, W.F., Bernardo-Bricker, A., Sevimoglu, O., Chen, Y., and Ondov, J., "Organic PM<sub>2.5</sub> at the Baltimore PM Supersite: Diurnal Variations during Summer and Winter with a Time-Resolution of Three Hours," *Second International Specialty Conference Sponsored by the American Association for Aerosol Research: Particulate Matter Supersites Program*, AAA, Atlanta, GA, February 7-11, 2005.
19. Sevimoglu, O., **Rogge**, W.F., Bernardo-Bricker, A., Robinson, A., and Subramanian, R., "Fine Particulate Abrasion Products from Leaf Surfaces of Urban Plants: Comparison between Los Angeles and Pittsburgh," *Second International Specialty Conference Sponsored by the American Association for Aerosol Research: Particulate Matter Supersites Program*, AAA, Atlanta, GA, February 7-11, 2005.
20. Bernardo-Bricker, A., **Rogge**, W.F., Sevimoglu, O., Robinson, A., Lipsky, E., and Grieshop, A., "Source Profiles for Organic PM<sub>2.5</sub> for Diesel Trucks and Gasoline Vehicles Determined for the Squirrel Hill Tunnel in Pittsburgh, PA," *Second International Specialty Conference Sponsored by the American Association for Aerosol Research: Particulate Matter Supersites Program*, AAA, Atlanta, GA, February 7-11, 2005.
21. Subramanian, R., Robinson, A., Bernardo-Bricker, A., and **Rogge**, W.F., "Organic Carbon Mass Balance and Source Apportionment of Primary Organic Carbon in the Pittsburgh Region using Molecular Markers," *Second International Specialty Conference Sponsored by the American Association for Aerosol Research: Particulate Matter Supersites Program*, AAA, Atlanta, GA, February 7-11, 2005.
22. Robinson, A., Lipsky, E., Pekney, N., **Rogge**, W.F., Bernardo-Bricker, A., and Sevimoglu, O., "Fine Particulate Emission Profile for Road Dust in Pittsburgh, PA," *Second International Specialty Conference Sponsored by the American Association for Aerosol Research: Particulate Matter Supersites Program*, AAA, Atlanta, GA, February 7-11, 2005.
23. Katsenovich, Y., Ozturk, Z., Moos, L., Allen, M., and **Tansel**, B., "TCE Sorption Characteristics of Soil Amendments Suitable for Permeable Biological Barrier," *International Conference on Environmental Science and Technology*, January 23-26, 2005, New Orleans, Louisiana.

### 3.6.4 Presentations and Invited Talks

1. **Fuentes**, H.R., 2005 Source Water Protection Symposium, American Water Works Association, West Palm Beach, FL, January 23-26, 2005.
2. **Masters**, F., "The Wall of Wind," *University Research and Hurricanes Session of the 19th Annual Governor's Hurricane Conference*, Tampa, FL, May 13, 2005.
3. **Masters**, F., "Capturing Surface Level Wind Speeds at Landfall" Storm Chasers session of the 19th Annual Governor's Hurricane Conference, Tampa, Florida, May 13, 2005.

4. **Masters, F.**, "Field Measurement Activities To Come When The Next Hurricane Strikes Miami-Dade County," *Miami-Dade County Local Mitigation Strategy*, Miami, FL, March 16, 2005.
5. **Masters, F.**, T. Reinhold, K. Gurley and D. Prevatt, "Measurement of Tropical Cyclone Surface Winds at Landfall," *Observing and Reconnaissance Technologies Session of the 59th OFCM Interdepartmental Hurricane Conference*, Jacksonville, FL, March 8, 2005.
6. **Masters, F.** "Assessing Structural Vulnerability," *Beach Management Tourism and the Coastal Environment Conference*, Miami, FL, March 2, 2005.
7. **Masters, F.**, K. Gurley, D. Prevatt and T. Reinhold, "Florida Coastal Monitoring Program (FCMP) Activities During The 2004 Atlantic Hurricane Season," *2005 International Codes Council (ICC) Hurricane Symposium: Impact on the Built Environment and Lessons Learned*, Tampa, FL, February 11, 2005.
8. **Masters, F.** "FCMP Logistics And Capabilities," American Association for Wind Engineering Workshop, Orlando, Florida, December 7, 2004.
9. **Masters, F.** "Capturing Surface-Level Winds During Hurricane Landfall," *Department of Earth Sciences Seminar*, Florida International University, Miami, FL, October 15, 2004.
10. Zhu, Z., Ahmad, I., Shao, Y., and **Mirmiran, A.** "Seismic Performance of Concrete-Filled FRP Tube Columns for Highway Bridges," *ACI Fall Convention*, American Concrete Institute, San Francisco, CA, October 2004.
11. **Mirmiran, A.**, "Seismic Performance of Concrete Bridge Columns Encased in FRP Tube," *Transportation Research Board Committee AFF80 on Structural Fiber Reinforced Plastics*, Washington, D.C., January 2005.
12. **Tang, W.**, "Nonthermal Plasma Technology for Destruction of VOCs," *University of Tokyo*, Tokyo, Japan, July 14, 2004.
13. **Tang, W.**, "QSAR in Advanced Oxidation Processes," Gumma University, Japan, July 22, 2004.
14. **Tang, W.**, "QSAR in Nonthermal Plasma Technology," *Advanced Institute of Science and Technology of Japan*, August 12, 2004
15. **Tang, W.**, "Teaching Assessment Method in the United States," *Shenzhen Graduate School, Harbin Institute of Technology*, Shenzhen, China, August 11, 2005.
16. Czajkowski, J.R., and **Tang, W.**, "Economic Analysis of the Florida Everglades Restoration," *Science to Achieve Results (STAR) and Greater Research Opportunities (GRO) Fellowship Conference*, Environmental Protection Agency, Washington, D.C., October 2004.
17. Czajkowski, J.R., and **Tang, W.**, "Estimating the Economic Benefits of Improved Water Quality Through Housing Prices," *EPA Science Forum on Collaborative Science for Environmental Solutions*, Environmental Protection Agency, Washington, D.C., May 2005.
18. Lagos, L., Gudavalli, R., Katsenovich, Y., Allen, M., and **Tansel, B.** "Study of TCE Biodegradation Indicator parameters Using Multisensor Array Package," *Eight International Symposium on In-Situ and On-Site Bioremediation*, Baltimore, MD, June 6-9, 2005.

19. Ozturk, Z., Katsenovich, Y., Moos, L., Allen, M., and **Tansel**, B., "Sorption Potentials of Different Soil Amendments for Permeable Biological Barrier," *Florida Section's Annual Conference of Air and Waste Management Association*, Orlando, FL, September 12-14, 2004.
20. **Zhao**, F., "Estimation of AADT Using Geographically Weighted Regression Model," *Fifth NACOTA Conference*, Changan University, Xian, China, June 25-26, 2005.

### 3.6.5 Research Reports

1. **Gan**, A., **Shen**, L.D., and Rodriguez, A., "Updates of Florida Crash Reduction Factors and Countermeasures to Improve the Development of District Safety Improvement Projects," *Final Research Report*, Florida Department of Transportation, State Safety Office, Tallahassee, FL, April 2005.
2. **Gan**, A., and Cevallos, F., "Development of an Automated Bus Stop Data Collection and Analysis System," *Final Research Report*, Florida Department of Transportation, Tallahassee, FL, February 2005.
3. **Gan**, A., "Florida Transit Information Systems Version 2004," *User's Guide*, Florida Department of Transportation, Tallahassee, FL, September 2004.
4. **Gan**, A., Jung, R., Liu, K.Y., Li, X., and Sandoval, D., "Vehicle Occupancy Data Collection Methods," *Final Research Report*, Florida Department of Transportation, Tallahassee, FL, February 2005.
5. Miller, R.A., Castrodale, R., **Mirmiran**, A., and Hastak, M., "Connection Between Simple Span Precast Concrete Girders Made Continuous," *NCHRP Report 519*, National Cooperative Highway Research Program, Transportation Research Board, Washington, D.C., 2004.
6. **Mirmiran**, A., "NSF-CAREER: Hybrid Columns of Concrete and FRP," National Science Foundation, Arlington, VA, 2004.
7. **Tansel**, B., "Integrated Evaluation of Membrane Processes for Space Craft Wastewater Recovery and Recycling," *Technical Report*, NASA, Kennedy Space Center, Cape Canaveral, FL, August 2004.
8. **Zhao**, F., and Li, M-T, "Integrating Data and Models for Analysis of Freight Movements on Multimodal Transportation Systems for Florida, Technical Memorandum No. 1, Literature Review," *Technical Report*, Florida Department of Transportation, Tallahassee, FL, May 2005.
9. **Zhao**, F., Chow, L-F, and Li, M-T, "A Transit Ridership Model Based on Geographically Weighted Regression and Service Quality Variables," *Final Report*, Florida Department of Transportation, Tallahassee, FL, April 2005.
10. **Zhao**, F., and Li, M-T, "Calibration of Highway/Transit Speed Relationships for Improved Transit Network Modeling in FSUTMS," *Final Report*, Florida Department of Transportation, Tallahassee, FL, March 2005.
11. **Zhao**, F., and Li, M-T, "Transit Network Optimization – Maximize Service Coverage and Reduce Transfers without a Larger Budget, TNet Optimizer v. 1.0," *User's Guide*, Florida Department of Transportation, Tallahassee, FL, November 2004.

12. **Zhao**, F., Li, M-T, Chow, L-F, and **Gan**, A., "Refinement of FSUTMS Trip Distribution Methodology," *Final Report*, Florida Department of Transportation, Tallahassee, FL, September 2004.
13. **Zhao**, F., Li, M-T, Chow, L-F, and **Gan**, A., "Alternatives for Estimating Seasonal Factors on Rural and Urban Roads in Florida," *Final Report*, Florida Department of Transportation, Tallahassee, FL, July 2004.

#### **4. Training**

For the first time in several years, the department actively offered a variety of technology transfer and training opportunities for professionals through its extension arm; *Center for Technology Transfer and Training (CT3)*. The mission of CT3 is to provide training and information to assist professionals in public or private sectors, in particular those engaged in public works and highway or transportation projects. CT3 helps facilitate and accelerate technology transfer from research to practice; promotes collaboration between researchers and the industry; and assists in the growth and economic development of South Florida companies by enhancing technological leadership. In addition to the following structured programs, the department has offered to help design unique on-site training programs based on the needs of each company.

The department has the following four training programs at this time:

##### **4.3.1 Fundamental of Engineering (FE) Review**

A team-taught twelve-week course offered twice a year in Fall and Spring by the Civil and Environmental Engineering faculty, and open to professionals interested in taking the first step toward their licensure by taking the Fundamentals of Engineering examination. This is a regular course that is also offered to the undergraduate and graduate students, and is a required course for the undergraduate students.

##### **4.3.2 Professional Engineering (PE) Review**

A team-taught ten-week course offered on Saturdays by the Civil and Environmental Engineering faculty, and open to professionals interested in obtaining their professional engineering (PE) license.

##### **4.3.3 Continuing Education**

A series of seminars and workshops offered several times during the year on engineering ethics and legal issues, disciplinary professionalism, structural design, construction engineering and management, transportation systems, environmental engineering, water resources, geotechnical, and wind engineering. We have applied to the Florida Board of Professional Engineers for a license to offer certificates for continuing education (CE) units.

##### **4.3.4 Construction Training Qualification Program (CTQP)**

This program constitutes training, examination, and certificate in concrete, asphalt, aggregate, earthwork, geotechnical, quality control management, and structures and grouting for qualification and certification under the Florida Department of Transportation Construction Training Qualification Program (CTQP).

The ever changing technology in the highway and bridge construction sector, and the federal mandate for using skilled technicians and engineers to work on federally funded transportation projects, have prompted the Florida Department of Transportation to establish a rigorous training and certification program, CTQP.

In fall of 2004, FDOT decided to diversify and decentralize the program, and separated the administration component of the program (i.e., exams, qualifications and database management) from its training component. The training component of the program is being offered to qualified providers that meet the stringent requirements of the FDOT Technical Review Teams. The Department of Civil and Environmental Engineering at FIU has been approved as provider in the following areas:

1. Aggregate Technician Training and Qualification Program
2. Asphalt Inspection Training and Qualification Program
3. Concrete Training and Qualification Program
4. Earthwork Training and Qualification Program
5. Geotechnical Training Program
6. Quality Management
7. Structures Training and Qualification Program
8. Final Estimates Training and Qualifications Program

Classes will start in late August.

## **5. Fundraising**

The department was actively involved with fund-raising throughout the year in the following areas:

- The department has taken great stride in establishing its CEE Foundation Account for the first time. The account was made possible with the generous help of Dr. Fuentes and Nova Consulting.
- ASCE Student Chapter helped with fundraising of over \$10,000 for its regional competition in Alabama.
- Several student scholarships were obtained through industrial partners.
- Bentley Software donated software licenses to the department totaling close to \$1M in value.
- For the Construction and Structures Lab, the following companies have donated materials and services:
  - GFA International, Inc. of Boca Raton, FL has provided GPR testing, soils investigation and soils report.
  - Capri Engineering and its sister company Columbia Engineering, both of Sunrise, FL have provided the engineering design and signed and sealed drawings at no cost.
  - Mo Steel Fabricators of North Miami, FL has donated a small structural testing frame.

- Steel Fabricators, LLC of Ft Lauderdale, FL has donated a large 15½ ft tall four-legged fully fabricated structural testing frame weighing in excess of 5,000 lbs.
- Florida Concrete and Products Association and five of its members; Central Concrete Supermix, Inc.; Continental Florida Materials Inc. (a subsidiary of Lehigh Cement and its parent organization, Heidelberg Cement of Germany); Florida Rock Industries, Inc.; Rinker Materials Corp.; and Tarmac (a Titan America Company) have donated 250 cubic yards of high-strength concrete in the amount of \$35,000.
- Gerdau Ameristeel has donated over 32 tons of steel in the amount of \$35,000.
- C&C Pumping has committed itself to pumping and finishing concrete for the lab.
- Skanska USA has committed its time and personnel for the construction of the lab, which will occur in August-September 2005.

## **6. Future Plans**

### **6.1 Academics**

The following priorities are established:

1. Developing and/or enhancing a number of academic programs, as follows:
  - *BS in Environmental Engineering*: The faculty approved to request the change of its existing inactive BS degree program in Environmental and Urban Systems to Environmental Engineering. It is expected that the program will be offered as early as Fall 2006.
  - *MS in Environmental and Urban System*: There is significant interest to develop a joint program with the School of Public Health that deals with environmental and health issues in an urban setting. Discussions are underway to ensure such program can be developed in a timely manner.
  - *MS in Disaster Management*: The faculty is in the process of developing a primarily on-line program in disaster management that deals with both natural and man-made hazards, in terms of preparedness, mitigation, remediation, and aftermath issues. Given the inter-disciplinary nature of the topic and the wide range of disasters from terrorist attacks to hurricanes and earthquakes, the subject matter may include social and economical issues as well as engineering and management.
  - *BS and MS in Construction Engineering*: There is college-wide effort to develop BS and MS degrees in Construction Engineering jointly between Civil and Environmental Engineering and Construction Management.
  - *Tracks in BS and PhD*: The department will develop two PhD tracks in Construction and Environmental areas. We will also develop a track in Construction at the BS level.
2. Faculty hiring: The department has hired two new faculty members for each of the last two years. However, it is still short of its original faculty size before a series of retirements began a few years ago. Two new faculty positions are

planned for the next academic year, which may be in the form of joint appointments with the International Hurricane Research Center (IHRC) and the Hemispheric Center for Environmental Technology (HCET). The needs of the department at this stage are primarily in structural and wind engineering, and construction materials. To be competitive at the state and national levels, the department needs to pass the threshold of 20 faculty members.

3. Enrollment growth is expected to continue during the next academic year. The recruitment activities of the department, however, are more long-term oriented, and any short-term impact will be a pleasant welcome.

## **6.2 Research**

The following priorities are established:

1. Research Infrastructure: Complete the renovations of the Lehman Center for Transportation Research, including the receptionist area, EC 3720 for student offices, and EC 3725 for the new ITS lab. Complete the renovation of the OU-105 for the Geotechnical Laboratory as well as pavement research lab, including necessary hoods for asphalt testing. Complete Phase I of the Structures Lab for the strong floor in early fall, and begin Phase II for the overhead crane in late fall.
2. Staff: Hire a new lab manager for the department.
3. Research Funding: Expand the sponsor-base as well as proposal activity during the next academic year.
4. Pursue an REU site from NSF during this academic year.
5. Expand partnership within the university with IHRC, HCET and SERC.
6. Pursue regional centers, such as the University Transportation Center with other major universities in the region.

## **6.3 Training**

The following priorities are established:

1. Solidify the market base for the CTQP training program in South Florida and expand to the tri-county area;
2. Obtain Continuing Education license from the Florida Board of Professional Engineers (FBPE) and the Construction Industry Licensing Board (CILB); and
3. Pursue the option of offering the FE Review course to non-degree-seeking participants as a departmental seminar.

## **6.4 Fundraising**

The following priorities are established:

1. Complete establishment of the new Structures Laboratory, and pursue naming the lab after a prominent individual or company.
2. Establish an endowed professorship for the department.
3. Strengthen the alumni base of the department for continued support of departmental activities and student scholarships.
4. Seek monetary and in-kind donations for various departmental needs.