

DEPARTMENT OF CIVIL, CONSTRUCTION, AND ENVIRONMENTAL ENGINEERING

North Carolina State University

Annual Report

2007–2008

George F. List , Professor & Head
Vernon C. Matzen , Professor & Associate Head for Graduate Programs
James M. Nau , Professor & Associate Head for Undergraduate Programs
David W. Parish , Lecturer & Coordinator of Advising

The Department of Civil, Construction, and Environmental Engineering is pleased to publish its **2007-08** Annual report which summarizes the dedicated work of its faculty, staff and students. Our commitment continues to integrate strong engineering education and research into all areas of the Department. These efforts are clearly recognized by our continued success in obtaining outside funding. This funding strengthens our traditional engineering programs while allowing us to invest in emerging fields which prepare our students for the workforce of the future. We thank our alumni and friends for their continued generous support.

The following data highlight research and related activities for the current year. Ten-year trends are presented in subsequent sections of this report. Some of the significant observations are as follows:

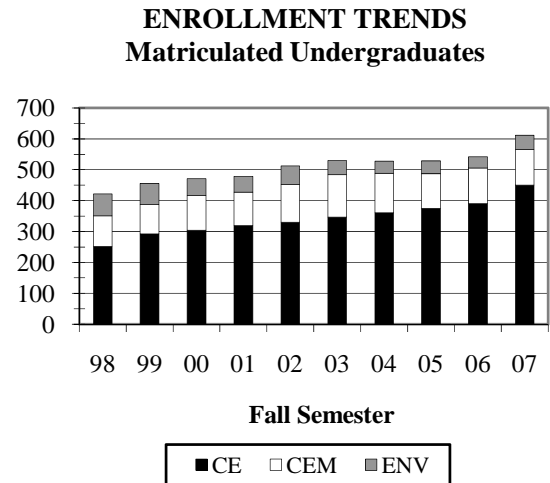
- Undergraduate enrollment increased to **617** matriculated students and **931** total students in Fall 2007. BS degrees awarded in 2007-08 totaled **182** including **132** CE, **38** CEM, and **12** ENE degrees. Scholarship support continues to expand.
- Total graduate enrollment remained stable at **247** in Fall 2007. This breaks down to **168** in the Master's program and **79** in the PhD. The online MCE degree program continues to grow, with **66** students enrolled in Spring 2008. Eighty-one graduate degrees were awarded this year and graduate enrollment in distance education courses continues to expand with students representing **31** states.
- Our externally funded programs continue to prosper as faculty receive national recognition with grants, contracts, and other funding from federal, state, industry and private sources. The creative work of our faculty and students is being recognized by publication in some of the most respected scholarly journals in the profession as well as through leadership roles in professional societies. External funding generated by the faculty totaled **\$14,294,305** in active research, evaluation, and training contracts and grants with expenditures of **\$4,253,165** for the fiscal year 2007-08.

UNDERGRADUATE PROGRAM

Total matriculated enrollment increased from **542** in Fall 06 to **617** in Fall 07. The number of degrees awarded remained stable from 2007 with **182** awarded in 2008.

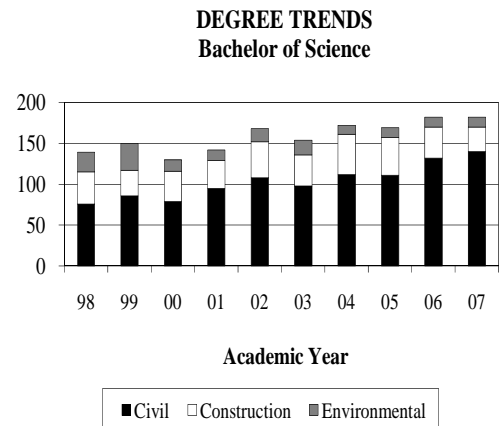
Enrollment – 2007-08

Matriculated	F07	S08
Civil Engineering (CE)	456	468
Construction Engineering and Management (CEM)	115	116
Environmental Engineering (ENE)	46	47
	617	631
Undesignated		
Civil (CEU)	227	205
Construction (CMU)	58	47
Environmental (ENU)	29	21
	314	273
Total:	931	904



Degrees Awarded – 2007-08

Bachelor of Science	
Civil Engineering (CE)	132
Construction Engineering and Management (CEM)	38
Environmental Engineering (ENG)	12
Total	182



Scholarships & Awards

The following students received awards were received by these students:

- **Samuel H. Lee**, Faculty Senior Scholar Award
- **Kaitlin H. Marley**, Engineering Senior Award for Scholarly Achievement
- **Kent Dickens**, Engineering Senior Award for Citizenship and Service
- **Nicholas J. Lutzweiler**, Engineering Senior Award for Leadership
- **Ryan L. Vargochik**, Carolinas Assoc. General Contractors Annual Award as the Outstanding Senior

Many of our undergraduates were awarded scholarship funds during the 2007-08 academic year. A list of the recipients and scholarships follows:

- Emily Adams, **Welch**
- Michael Alston, **Jones Group**
- Francis Anum, **John Deere**
- Brandon Ashton, **Jones Group**
- Christopher Aycock, **Thompson**
- Joseph Bagwell, **Wooten**
- Tyler Barker, **Wooten**
- Brittany Beaudoux, **Welch**
- Eric Benfield, **Thompson**
- George Blackard, **Carolina Assoc. General Contractors**
- Carey Blackmar, **Kraynik**
- Cary Blackmar, **PCEA**
- Brittany Beaudoux, **Thompson**
- Brandon Bowland, **Paul Stephens**
- Cory Bowman, **Dixon**
- Steven Brock, **Thompson**
- Jessica Brooks, **Thompson**
- Wesley Brown, **Thompson**
- Christopher Burgess, **Little**
- Christopher Burgess, **Thompson**
- Bryan Burnitt, **Thompson**
- Christopher Burton, **Thompson**
- Scott Burwell, **Blessis**
- Jeff Cappadona, **Welch**
- Byung Ho Choi, **Thompson**
- William Clarke, **SteelFab**
- Patricia Clayton, **Craig**
- Patricia Clayton, **Wooten**
- Charles Cunningham, **Brantley**
- Paul Duncan, **Shelco/Gardner**
- Tommy Evans, **Thompson**
- Jack Fitzgerald, **Thompson**
- Randy Freeman, **Thompson**
- Claire Galie, **Thompson**
- Philip Gaston, **Thompson**
- Stephen Gibson, **Clancy**
- Steven Gibson, **Thompson**
- Christopher Gray, **Jones Group**
- Cameron Guice, **Wilson**
- Ernest Hahn, **R E Smith**
- Mary Hamilton, **Eubanks**
- William Hanlin, **Thompson**
- Nathaniel Harvey, **Clancy**
- Nathan Harvey, **Moore**
- David Heath, **Thompson**
- Juana Hernandez, **Thompson**
- Aaron Heustess, **Thompson**
- Catherine Hoffman, **Welch**
- Stephanie Holloman, **Thompson**
- Mark Honeycutt, **Bramer**
- Robert Jarman, **Blessis**
- Robert Jarman, **Covington**
- Ashton Jeffries, **Bryan**
- Logan Johnson, **Jones Group**
- Logan Johnson, **Thompson**
- Britni Jones, **CSX Diversity**
- Joshua Kallam, **Blessis**
- Joshua Kallam, **Mangum**
- Jeremy Keene, **Lin Wiggins**
- Kurtis Kennedy, **Thompson**
- Peter Kiwanuka, **Gregg Mullen**
- Kelly Kronenwetter, **Esckridge & Long**
- Drake Kuebler, **Thompson**
- Johnathan Lanahan, **McNair**
- Lucas Lankford, **Thompson**
- Kyle Levitt, **Thompson**
- Harold Livingston, **Mangum**

- Harold Livingston, **CFMA**
- Nicholas Lutzweiler, **Brad Hatcher**
- Carol Ly, **Thompson**
- Kaitlin Marley, **Futrell**
- Brandon Massingill, **Jones Group**
- Nathan McKittrick, **Thompson**
- Andrew McNamara, **Clancy**
- Brian Meilke, **McAdams**
- Brian Meilke, **Bryan**
- Ben Meilke, **Bryan**
- Ben Meilke, **McAdams**
- Justin Miller, **Brantley**
- John Miller, **Samet N&S**
- John Miller, **Sullivan H&M**
- Brooks Moore, **Thompson**
- Brooks Moore, **H & M Riley**
- Alyssa Moore, **Thompson**
- Elizabeth Moser, **Thompson**
- Evan Musselwhite, **Dixon**
- Evan Musselwhite, **Eskridge & Long**
- Adolfo Obregon, **Thompson**
- Suzette Ogbon, **CSX Diversity**
- Donnie Osborne, **Thompson**
- James Plott, **Bremer**
- William Price, **Brantley**
- William Price, **Paul Stephens**
- William Price, **Thompson**
- Manuel Privette, **Thompson**
- Yukiko Puram, **Thompson**
- Taylor Rawlinson, **Thompson**
- Justin Rice, **Thompson**
- Robert Secrist, **Thompson**
- Courtney Shepherd, **Rodgers**
- Joshua Shinn, **Thompson**
- Nick Shultz, **Wooten**
- Tiffany Sikes, **Brantley**
- Adam Simpson, **Covington**
- Samuel Smith, **Curlee**
- Kristi Steiner, **Thompson**
- Tyler Storm, **Thompson**
- Brittane Surgeon, **Thompson**
- Brandon Thomas, **Thompson**
- Chris Thompson, **Goins**
- Danielle Touma, **Thompson**
- Dustin Tuttle, **Browning**
- Dustin Tuttle, **Thompson**
- Ryan Vargochic, **Mangum**
- Ryan Vargochick, **PCEA**
- Ryan Vargochick, **Shelco/Endow**
- Viola Francesco, **Sepelak**
- William Watsib, **Thompson**
- Steve Whaley, **Thompson**
- Mary Williams, **R E Smith**
- Jeffrey Wilson, **Bryan**
- David Wyatt, **Shelco/Rose**
- Shain Zundel, **Thompson**

Student Organizations

Alfred P. Norwood Chapter of Chi Epsilon Chapter Report

The North Carolina State University Chapter of Chi Epsilon, endowed by the first chapter president **Alfred P. Norwood** and directed by **John Baugh**, is pleased to have welcomed seventeen new members this year. The following served as chapter officers:

- Hartley Grimes, **President**
- Kent Dickens, **Vice-President**
- Blake Bush, **Secretary**
- Beth Visintine, **Treasurer**
- Nicholas Schultz, **Associate Editor**
- Catherine Hoffman, **Marshal**

On December 2, 2007, the following eight students were initiated into the Alfred P. Norwood Chapter: **David Allen Heath, Aaron Michael Heustess, Ashton Heather Jeffries, Samuel Holton Lee, Justin Matthew Miller, James Read Plott, Claire Pei Shigekawa, and Jeffrey Cornwell Wilson.**

The initiation held on April 20, 2008 welcomed the following nine students into membership: **Taylor Craig Auten, Joseph James Bagwell, Christopher Scott Gray, Lina Kira Lawrence, Katelyn Blackmon Purnell, Courtney Jellinger Shepard, Danielle Elie Touma, Dustin Shane Tuttle, and Margaret Katherine Williams.**

After the initiation ceremony, the following members were installed as chapter officers for the 2008-09 academic year:

- Margaret Williams, **President**
- Kip Gray, **Vice-president**
- Adolfo Javier Obregon-Salinas, **Treasurer**
- Dustin Tuttle, **Editor**
- Taylor Auten, **Marshal**

ASCE Chapter Activities

This past year has been very successful and a positive experience for everyone involved in the NC State University student chapter of the American Society of Civil Engineers (ASCE). The chapter is dedicated to helping students grow as professionals as well as individuals by interacting outside the classroom with other students and professionals in the field of Civil Engineering. From interacting with recent PE's at young member socials to PE Roundtable Discussions to our monthly professional presentations, the chief purpose of ASCE is to benefit its members by bridging the gap between their studies at NC State and their professional careers.

ASCE also allows all of our members a great opportunity to participate through hands on learning as well as by helping our community. ASCE annually participates in events such as the Habitat for Humanity Shack-A-Thon as well as Service Raleigh. We feel these efforts in community service are helpful in developing Civil Engineers to become assets to society as well as representatives of NC State University and the Civil Engineering Department in the best way possible.

ASCE also offers scholarships each year based on participation and the ideals that ASCE represents. This year, **Taylor Auten** received the ASCE Academic Scholarship from the NC Section of ASCE. He competed with other outstanding students from UNCC, NCA&T, and Duke.

ASCE is not all work and no play. We participate in many competitions throughout the year. In late March ASCE traveled to Greensboro and the campus of NC A&T University to participate in the regional Carolinas Conference. This conference consisted of several smaller competitions headlined by a Concrete Canoe and a Steel Bridge Competition. The Concrete Canoe teams for both the men and the women were very competitive. The Steel Bridge won first place.

Engineers Without Borders Student Chapter Report

Various communities in Asankiri, Bolivia area are suffering from water borne illnesses caused by the coliforms that contaminate their water source. Engineers Without Borders at North Carolina State University has been looking for ways to remedy their problems in a simple sustainable manner. We have determined from the assessment trip that took place from December 2006 to January 2007, that E. coli is the primary coliform affecting the quality of the water. Our main goal is to eliminate and prevent the contamination of the water. The Capacitation Center's current water source, which is a spring from a nearby mountain, runs dry during their long dry season which is approximately 8 months. We have realized that a secondary water source is necessary to supplement their current one, so we have designed a rainwater harvesting system as a solution to this problem.

The Capacitation Center, where approximately 60 people reside throughout the year, is where we will be implementing our project in August 2008. The Capacitation Center's purpose is to educate young adults (early 20's) about agriculture and about hygiene. The students from the assessment trip suggested that the Capacitation Center would be the best place to implement our project, since after the students from the center graduate, they can take the knowledge back to their corresponding communities.

The purpose of Engineers Without Borders (EWB) is to encourage students to use the engineering skills that they have learned in a practical manner, in this case to help the people in Bolivia. Students participate through the whole process of finding a solution to a problem, including, the research, design, testing, and implementation. We are fortunate to have the help of professors such as Dr. Knappe, who has guided us and is currently guiding us through the whole process of our project. This year we have been focusing on water treatment and collection methods.

Without the help of the CCEE staff and facilities, we would not have been able to progress as much as we have this year. With the encouragement from Dr. Borden, we have contacted various engineering groups in Bolivia, and have collected topography maps to better understand the area. Students have realized the importance of having valid information and how difficult it is to find it. Students have also been conducting water quality experiments in the labs of Mann to better understand the process for finding contaminants in water.

Solar Disinfection, or SODIS, has been what the students have been primarily researching this year. It is a simple water treatment method where water is poured into plastic bottles and left outside so that the contaminants in the water can be deactivated by the UV rays from the sun. From the SODIS experiments, we have seen the effectiveness of the process and are looking for ways to improve it. In the summer and fall semester, our focus will shift to slow sand filtration and charcoal filtration since they eliminate more contaminants from the water.

Rainwater harvesting portion of our implementation project had been primarily worked on by our Civil and Environmental Engineering students. Students have been communicating with people of the community in Asankiri frequently via email and phone to stay current on their situations and to get specific information for the design. We have continued to keep hygiene education in mind as part of our project to ensure sustainability.

A team of 3 students and a mentor will be traveling to Bolivia in August to implement the rainwater harvesting system and SODIS. Students have been working hard to raise money for the project by hosting benefit dinners, having Guitar Hero Tournaments, and planning golf tournaments, as well as applying for grants to make sure that they raise enough money to implement the project that they have spent all year working on to help the people in Bolivia.

A&WMA Student Chapter Report

The student chapter of A&WMA at NC State continues to play an active role in serving the student body on campus with their academic interests. Activities hosted by the student chapter included academic seminars, field tour, poster contest, participation of the A&WMA annual meeting, and others. **This year the chapter placed third in the best chapter award.**

Student Chapter Organization

The student chapter had 18 members during the year 2006 to 2007. The officers and advisor are listed below:

Officers:

President:	Evelyn Frazer Major: MEAS Air Quality Year: (Masters)
Vice-President:	Zifel Liu Major: BAE Air Quality Year: (Doctoral)
Secretary:	Joshua Hemperly Major: MEAS Air Quality Year: (Masters)
Treasurer:	Kristen James Major: MEAS Air Quality Year: (Masters)

Advisor:

Dr. H. Christopher Frey
Professor of Civil, Construction, and Environmental Engineering

The chapter officers had meetings on a regular basis discussing issues related to the activities of this chapter. These included selection of topics for the seminars, candidates for speakers, field trips, fundraising and logistical support for the seminar and field trips. The chapter also maintained a website (http://www.ncsu.edu/stud_orgs/awma/index.html) to introduce the chapter to the public, and publicize important announcements such as seminars and scholarship opportunities. For the students at NCSU, the website also introduces available courses related to air and waste management on campus. In addition, the chapter also set up a mailing list to announce any coming activities, including the seminars and conferences locally and nationally. Many student members participate in the seminars of the A&WMA RTP chapter.

GRADUATE PROGRAM

Enrollment and Degrees

The Department offers the Master of Civil Engineering (MCE), Master of Science (MS), and Doctor of Philosophy (PhD) degrees in all specialty areas of Civil Engineering. Total enrollment in Fall 2007 was **247**. There were **81** graduate degrees awarded. The Distance Education Track of the MCE degree continues to see expanded enrollment. In Spring 2008, **66 CE** distance students were enrolled. In 2007-2008, there were 360 individual student enrollments in distance classes with students from 31 states (degree seeking and non-degree seeking). In the last four years the first **30** distance track MCE students graduated.

Enrollment by Degree		
	F07	S08
Masters (MCE/MS)	168	167
Doctoral (PhD)	79	78
Total:	247	245

Enrollment by Area		
	F07	S08
Computer-Aided Engineering	8	5
Construction	36	34
Geotechnical	23	21
Structures & Mechanics	70	84
Trans. Systems & Materials	51	48
Water Resources & Env. Eng.	59	53
Total	247	245

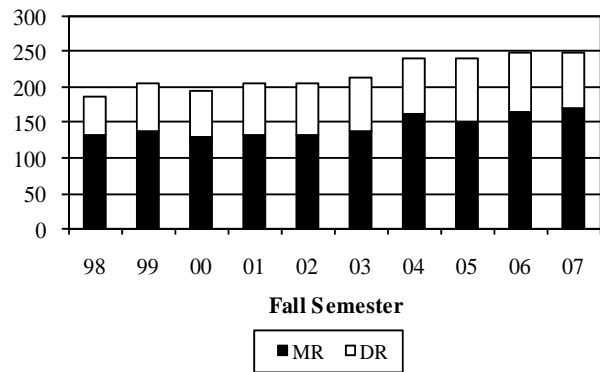
Sources of Support		
	F07	S08
Teaching Assistants (TAs)	38	40
Research Assistants (RAs)	76	73
Dean's Fellows*	7	7
Other Fellows & Scholarships*	16	12

*Some Fellows are also TAs or RAs.

Degrees Awarded		
	F07	S08
Masters (Total)	38	28
MCE	23	21
MS (thesis required)	15	7
Doctoral (PhD)	8	7
Total:	46	35

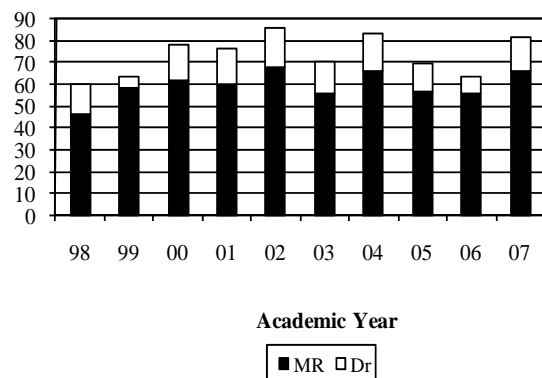
Summer 2008 Degrees Conferred have been grouped with Fall 07 Degrees

ENROLLMENT TRENDS
Graduate



Note: MR represents combined MS and MCE enrollment statistics.

DEGREE TRENDS
Graduate



Fellowships and Awards

College of Engineering Dean's Fellowships were awarded to the following Civil Engineering graduate students in 2007-2008:

- Joshua Griffin
- Hartley Grimes
- Andrew Jerome
- Dillon Lunn
- Elliott Taylor
- Beth Visintine
- Meade Willis

The following Civil Engineering graduate students received fellowships from the Southeastern Transportation Consortium:

- Javon Adams
- Elizabeth Harris
- Hyejung Hu
- Harikrishnan Krishnankuttynair
- Jisun Lee
- Jae Pil Moon
- Aditya Ramachandran
- Maryam Sakhaiefar
- Ting Yi

Special recognition goes to the holders of these prestigious fellowship awards:

- Preparing the Professoriate, **Scott Alpert**
- National Water Research Institute Fellowship, **Ana Carolina Baeza**
- Smallwood Fellowship, **Ana Carolina Baeza**
- Smallwood Fellowship, **Ki Young Cha**
- Mentored Teaching Assistantship, **Mina Dawood**
- Sean McGrath Memorial Fellowship, **Joe Godwin**
- Daniel P. Jenny Research Fellowship, **Hartley Grimes**
- Eisenhower Fellowship-US Dept. of Transportation, **Elizabeth Harris**
- Preparing the Professoriate, **Elizabeth Harris**
- NC Alliance for Minority Participation Fellowship, **Lauren Hart**
- NC Airport Assn. Bruce Matthews Aviation Fellowship, **Nathanial Harvey**
- Kimley-Horn Engineering Scholarship, **Serena Hendrix**
- Emol A. Fails Graduate Fellowship, **Andrew Jerome**
- Mentored Teaching Assistantship, **Harikrishnan Krishnankuttynair**
- Ed Vick Fellowship, **Andrew Lacroix**
- Emol A. Fails Graduate Fellowship, **Michael Phil Lewis**
- Smallwood Fellowship, **Jeseung Oh**
- Kimley-Horn Engineering Scholarship, **Laurel Pierpont**
- Eisenhower Fellowship-US Dept. of Transportation, **Brent Robinson**
- Mentored Teaching Assistantship, **Siddharth Savadatti**
- Preparing the Professoriate, **Siddharth Savadatti**
- Preparing the Professoriate, **Nadia Sharmin**
- Preparing the Professoriate, **Benjaming Underwood**
- Eisenhower Fellowship-US Dept. of Transportation, **Beth Visintine**

FACULTY

New Faculty Appointments

- **Dr. Min Liu** received her BSCE (1994) from the Department of Civil Engineering at the Tsingdao Institute of Architecture and Engineering (China), the MSCE (1997) from the Department of Civil Engineering at the Xi'an University of Architecture and Technology, the MS (2001) from the Department of Building at the National University of Singapore, and the PhD (2007) from the Department of Civil and Environmental Engineering at the University of California, Berkeley. She worked in the China Construction Bank from 1997-99. Min's research interests include construction labor productivity improvement; lean construction (project-based production management for the architecture-engineering-construction industry); project performance improvement (budget/cost; schedule/time; quality; and safety); and international project management.

Promotions

- **Dr. S. Ranji Ranjithan** was promoted to Professor effective August 16, 2007. Ranjithan received his doctoral degree in environmental engineering from the University of Illinois at Urbana-Champaign in 1992. He earned his master's degree in industrial engineering and management in 1985 from the Asian Institute of Technology, and he received his bachelor's degree in mechanical engineering from the University of Peradeniya, Sri Lanka, in 1981. His speciality areas include mathematical modeling and optimization, evolutionary computation, systems analysis, computer-based decision support tools, decision making under uncertainty, and artificial neural networks.

Faculty Honors & Awards

- **Francis de los Reyes** (Associate Professor) was appointed Balik-Scientist by the Phillipine Government.
- **Chris Frey** (Professor) was invited to serve on the Clean Air Scientific Committee Particulate Matter (PM) Review Panel, 2007.
- **Chris Frey** was appointed Fellow, Air & Waste Management (March 2008).
- **Chris Frey** was recipient of the NCSU Alumni Outstanding Research Award (2008).
- **Mohammed A. Gabr** (Professor) was recipient of the ASCE-GeoInstitute Outstanding Service Award as Chair of the ASCE Geosynthetics Committee.
- **Mohammed A. Gabr** was recipient of the NCSU Outstanding Teacher Award, 2008.
- **Murthy N. Guddati**, (Associate Professor) was selected as one of 45 Invited participants worldwide for the 2008 Oberwolfach Workshop on Atomic Models of Materials: Mathematical Challenges (Germany).
- **Murthy N. Guddati's** paper was selected as one of the 2007 Editorial Highlights by the *Journal Inverse Problems*.
- **Murthy N. Guddati** was appointed Visiting Fellow of Applied and Computational Mathematics, Princeton University, Spring 2007.
- **Abhinav Gupta** (Associate Professor) was awarded a Summer Faculty Position at the US Nuclear Regulatory Commission.
- **Abhinav Gupta** was awarded a Gold Medal for professional recognition by the Bhabha Atomic Research Center (Department of Atomic Energy, Government of India).

- **Abhinav Gupta** was appointed to the International Association of Structural Mechanics in Structural Mechanics (IASMiRT) Advisory Board.
- **Joseph E. Hummer**, (Professor) received one of five Outstanding Paper Awards for the paper “Recent Superstreet Implementation and Research,” which was presented at the Third Urban Street Symposium, Transportation Research Board, Seattle, WA, June 2007.
- **Mervyn Kowalsky** (Associate Professor) with **Nigel Priestley**, was invited to present 1-1/2 day seminar on Displacement-Based Seismic Design during the 30th anniversary of the Dominican Society Earthquake Engineering (SODOSISMICA), August 2007, Santo Domingo, DR.
- **Sami H. Rizkalla** (Distinguished Professor of Civil Engineering and Construction, Director of the Constructed Facilities Laboratory) was awarded the the Joe W. Kelly Award by the American Concrete Institute at the Spring Convention of the American Concrete Institute in Los Angeles, CA, March 2008 in recognition of over 30 years of dedication to concrete education and research in concrete technology.
- **Sami H. Rizkalla** presented the Keynote Address at the Japan Carbon Fiber Manufacturing

Courses Taught

Course No.	Course Title	Instructor	
		Fall 07	Spring 08
CE 201	Civil Engineering Measurements and Surveys	Rasdorf	Rasdorf
CE 214	Engineering Mechanics-Statics	Nau, Brown, Savadatti	Krishna, Brown, Tayebali, Savadatti
CE 215	Engineering Mechanics-Dynamics	Parish	Parish
CE 261	Construction Engineering Systems		Liu
CE 297	Current Topics in Civil Engineering	List	List
CE 305	Traffic Engineering	Hummer, Schroeder	Stone
CE 313	Mechanics of Solids	Guddati	Hassan
CE 324	Structural Behavior Measurement	Matzen	Gupta
CE 325	Structural Analysis I	Matzen	Matzen
CE 327	Reinforced Concrete Design	Wilkins, Seracino	Rizkalla, Wilkins
CE 332	Materials of Construction	Underwood	Khosla
CE 342	Engineering Behavior of Soils and Foundations	Rahman, Evans	Ahn
CE 367	Mechanical & Electrical Systems in Buildings		Nazario
CE 373	Fundamentals of Environmental Engineering	Ducoste	Knappe, Alpert
CE 374	Environmental Engineering Lab	Knappe	
CE 375	Civil Engineering Systems	Ranjithan, Baugh	Baugh
CE 381	Hydraulics Systems Measurements Lab	Ranjithan	Ranjithan
CE 382	Hydraulics	Overton, Sciaudone	Ducoste, Kumar
CE 383	Hydrology and Urban Water Systems	RC Borden	Arumugam, Briggs
CE 400	Transportation Engineering Project		Stone
CE 401	Transportation Systems Engineering	Stone	
CE 413	Principles of Pavement Design	Khosla	
CE 420	Structural Engineering Project		Sumner
CE 421	Structural Engineering Project	Kowalsky	
CE 425	Structural Analysis II	Matzen	
CE 426	Structural Steel Design	Sumner	Nau
CE 435	Engineering Geology	Gabr	
CE 440	Geotechnical Engineering Project	RH Borden	
CE 443	Seepage, Earth Embankments & Retaining Structures		Gabr
CE 463	Construction Estimating, Planning and Control	Nunez	
CE 464	Legal Aspects of Contracting	McCain	
CE 465	Construction Equipment and Methods		Leming
CE 466	Building Construction Engineering	Johnston	
CE 469	Construction Engineering Project	Leming	Nunez
CE 476	Air Pollution Control	Frey	
CE 477	Principles of Solid Waste Engineering		Barlaz
CE 479	Air Quality		Frey
CE 480	Water Resources Engineering Project		RC Borden
CE 481	Environmental Engineering Project		RC Borden
CE 484	Water Supply and Waste Water Systems	DeLos Reyes	
CE 487	Introduction to Coastal and Ocean Engineering		Overton
CE 488	Water Resources Engineering	Ranjithan	
CE 497C	ST in Construction Engineering Constr. Lab		Johnston

Course No.	Course Title	Instructor	
CE 497M	ST in Civil Engineering Multi Displ Sen Design		List
CE 497R	ST in Civil Engineering Environmental Biotech		De Los Reyes
CE 501	Transportation Systems Engineering	Stone	
CE 502	Traffic Operations	Williams	Williams
CE 503	Highway Design		Hummer
CE 506	Transportation Eng Data Collection & Analysis	Williams	
CE 522	Theory and Design of Prestressed Concrete	Rizkalla	
CE 523	Theory and Behavior of Steel Structures	Sumner	
CE 524	Analysis & Design of Masonry Structures		Kowalsky
CE 525	Structural analysis II	Matzen	
CE 537	Computer Methods and Applications	Baugh	
CE 538	Information Technology & Modeling		Rasdorf
CE 548	Engineering Properties of Soils I	Evans	
CE 561	Construction Project Management		Leming
CE 564	Legal Aspects of Contracting	McCain	
CE 567	Risk & Financial Management in Construction	Nunez	
CE 571	Physical Principles of Environmental Engineering		Ducoste
CE 573	Biological Principles of Environmental Engineering	De Los Reyes	
CE 574	Chemical Principles of Environmental Engineering	Barlaz	
Ce 576	Engineering Principles of Air Pollution Control	Frey	
CE 577	Engineering Principles Of Solid Waste Management		Barlaz
CE 579	Principles of Air Quality Engineering		Frey
CE 583	Engineering Aspects Of Coastal Processes		Overton
CE 584	Hydraulics of Ground Water	RC Borden	
CE 586	Engineering Hydrology	Arumugam	
CE 588	Water Resources Engineering	Ranjithan	
CE 590	Special Topics In Civil Engineering	Johnston	
CE 591I	Special Topics In Numerical Computing		Kumar
CE 592C	Special Topics in Construction Engineering Construction Lab		Johnston
CE 593S	ST in Geotechnical Engineering Adv Seepage Earth		Gabr
CE 594F	ST in Structures & Mechanics Str Rep Frp		Seracino
CE 595A	Special Topics in Transportation Eng.	Kim	
CE 596B	ST in Water Resource & Environmental Engineering	Knappe	
CE 596M	ST in Water Resource and Environmental Engineering		Overton
CE 596Y	ST in Water Resource and Environmental Engineering	Yu	Yu
CE 596Z	ST in Water Resource and Environmental Engineering	Ranjitahn, Zechman	
CE 603	Construction Engineering Seminar	Leming	Leming
CE 605	Structures and Mechanics Seminar	Hassan	Hassan
CE 607	Water Resource and Environmental Engineering Seminar	RC Borden	RC Borden

Course No.	Course Title	Instructor	
CE 635	Advanced Reading In Civil Engineering	Johnston	Matzen
CE 702	Traffic Flow Theory	Rouphail	
CE 706	Advanced Traffic Control		Williams
CE 707	Transportation Policy & Funding		Hummer
CE 714	Stress Waves		Gudatti
CE 715	Advanced Strength of Materials	Hassan	
CE 720	Matrix and Finite Element Structural Analysis I		Seracino
CE 722	Structural Dynamics		AB Gupta
CE 724	Probabilistic Methods of Structural Engineering	AB Gupta	
CE 725	Earthquake Structural Engineering	Kowalsky	
CE 742	Advanced Soil Mechanics	Rahman	
CE 747	Geosynthetics in Geotechnical Engineering	Gabr	
CE 755	Highway Pavement Design	Khosla	
CE 759	Inelastic Behavior of Construction Materials		Kim
CE 766	Building Construction Systems		Johnston
CE 771	Physical-Chemical Water Treatment Processes		Knappe
CE 772	Environmental Exposure & Risk Analysis		Frey
CE 774	Environmental Bioprocess Technology		De Los Reyes
CE 775	Modeling and Analysis of Environmental Systems	Brill	
CE 791	Advanced Topics in Civil Engineering Computing	Kumar	
CE 791B	Advanced Topics in High Perf. Com.		Ranjithan
CE 793N	Advanced Topics in Geotechnical Engineering		Rahman
CE 793U	Advanced Topics in Geotechnical Engineering		Evans
CE 794M	Advanced topics in Structures & Mechanics		Guddati
Ce 796A	Advanced Topics in Water Resource and Environmental Engineering		Arumugam
CE 803	Advanced Construction Engineering Seminar		Leming
CE 805	Advanced Structures and Mechanics Seminar	Hassan	Hassan
CE 807	Advanced Water Resource and Environmental Engineering Seminar	RC Borden	RC Borden
CE 839	Advanced Reading In Civil Engineering	Johnston	Matzen

Summary of Professional Activities

In 2007–08, members of the Civil, Construction, and Environmental Engineering faculty published or had accepted **240** refereed journal and conference papers. A reference list of faculty publications and reports can be accessed at the Department web site (<http://www.ce.ncsu.edu/reports/>).

In addition to producing publications, faculty members presented **176** invited lectures and other presentations. Most are active members of professional societies, and **30** served on **134** technical committees. More statistics follow.

Number of tenure-track faculty members	39
Number of faculty members chairing at least one graduate committee	38
Number of faculty members participating in peer review of journal papers or research proposals	36
Number of faculty members serving as journal editors or members of editorial boards	16
Publications	
Number of refereed journal/conference papers published (including in-press or accepted for publication)	240
Number of non-refereed scholarly publications	65
Number of books or book chapters	15
Number of publications submitted or in preparation	100
Invited Lectures	
Number of international lectures	35
Number of lectures in the US	60
Number of other scholarly presentations	78
National and International Technical Committee Service	
Number of faculty members serving on at least one technical committee	30
Total number of committees on which faculty members serve	134

Seminars/Symposiums

- **The Rion-Antirion Bridge**

4th Annual Paul Zia Distinguished Lecture Series in Civil Engineering and Construction
(September 7, 2007)

Presented by: Dr. Jean-Paul Teyssandier

The Rion-Antirion Bridge is located over the Gulf of Corinth in western Greece. It spans a stretch of water some 2,500 meters. Its environment presents an exceptional combination of physical conditions which constitutes a very difficult technical challenge: deep seabed, weak foundation soils, high seismicity, tectonic movements. In addition, the bridge has to withstand the collision of tankers. These extremely difficult conditions called for an original design based on very large foundations and long cable-stayed spans. This project includes many innovations and has set several world records: longest cable-stayed suspended bridge deck, deepest and largest bridge foundations. The lecture described the structure and the process which was followed to arrive at the final design. This project was developed under a private financing scheme, another difficult challenge which were also be addressed in the lecture.

The Rion-Antirion Bridge was completed within budget and opened five months ahead of schedule to allow for the Olympic Torch to cross on the eve of the 2004 Olympic Games in Athens.

Jean-Paul Teyssandier graduated from Ecole Polytechnique (France) in 1965 and Ecole des Ponts et Chaussées in 1968. He started his career in the French Highway Department where he became responsible for the design and construction of a freeway network in the East of France. In 1983 he joined the French construction firm GTM as a Technical Manager then became Senior Vice-President in charge of design and build projects. He was responsible, among many projects, for the design of two major structures: the Second Severn Bridge in the UK and the Rion-Antirion Bridge in Greece. The Rion-Antirion Bridge received the Outstanding Civil Engineering Achievement Award from the American Society of Civil Engineering in 2005. He received the highest French Engineering Award in 2006 and is a member of the French Academy of Engineering.

- **Sustainable Infrastructure and Transportation**

37th Henry M. Shaw Lecture (October 30, 2007)

Presented by: Dr. Chris Hendrickson, Duquesne Light Professor of Engineering, Department of Civil and Environmental Engineering, Carnegie Mellon University

Engineering sustainable infrastructure and systems is a widespread goal, but there are major problems in achieving the goal. This talk will discuss some practical approaches to move towards more sustainable design and decision-making, including triple-bottom line and life cycle assessment. Application examples are drawn from civil infrastructure and transportation systems applications. The talk concludes with some suggestions for useful policy changes, research topics, and local action.

Hendrickson is the Director of the Green Design Institute at Carnegie Mellon University. His research, teaching and consulting are in the area of engineering planning and management, including design for the environment, project management, transportation systems, finance and computer applications. Hendrickson has been the recipient of the 2002 ASCE Turner Lecture Award, the 2002 Fenves Systems Research Award, the 1994 Frank M. Masters Transportation Engineering Award, Outstanding Professor of the Year Award of the ASCE Pittsburgh Section (1990), the ASCE Walter L. Huber Civil Engineering Research Award (1989), the Benjamin Richard Teare Teaching Award from the Carnegie Institute of Technology (1987) and a Rhodes Scholarship (1973).

- **Fourth Structural & Mechanics Symposium** (March 14, 2008)

Keynote Presentation: Structural Identification – Surfacing the Truth

Presented by: Dr. **J. Darin Holt** , President and Founder, FDH Engineering, Raleigh ('99, '90, & '94 graduate of NCSU's Department of Civil Engineering with a major in Solid Mechanics/Structures and a minor in Mathematics. Co-developer and pioneer of Dispersive Wave Propagation Techniques as applied to bridge pile foundations. Holt currently performs and conducts research into this and other nondestructive testing methods for practical applications. He is a Registered Professional Engineer in 44 states and a 25-year resident of Raleigh.

Session 1: Behavior of Structural Systems and Bridges

Chairs: **Dillon Lunn & Kendra Cookson**

- “Shear Performance of High Strength Reinforced Light Weight Concrete Columns under Seismic Loading”
Presented by: **Serena Hendrix** (MS); Advisor **Mervyn Kowalsky**
- “Implementation of Direct Displacement Based Design for Highway Bridges”
Presented by: **Vinicio A. Suarez** (PhD); Advisor: **Mervyn Kowalsky**
- “Behavior of Structural Systems and Bridges”
Presented by: **Francisco Morera** (PhD); Advisor: **Emmett Sumner**

Session 2: Reinforcement of Structures with Advanced Materials

Chairs: **Vivek Hariharan & Meade Willis**

- “Analytical Model for Plate-End Debonding of Near-Surface Mounted FRP Strips”
Presented by: **Diego Vasquex** (MS); Advisor **Rudi Seracino**
- “Behavior of MMFX Steel as Shear Reinforcement for Concrete Beams”
Presented by: **Aruna Munikishna** (MS); Advisor: **Sami Rizkalla**
- “An Investigation of Impact Behavior of Fiber Reinforced Concrete”
Presented by: **Caleb Pike** (MS); Advisor: **Abhinav Gupta**

Session 3: Behavior of Systems under Cyclical Loading

Chairs: **Elliot Taylor & Dan Klingshirn**

- “Low Cycle Fatigue Life Prediction of End Plate Moment Connections”
Presented by: **Chemin Lim** (PhD); Advisor: **Emmett Sumner**
- “Improved Seismic Performance of Welded Steel Moment Connections”
Presented by: **Sammiuddin Syed** (MS); Advisor: **Tasnim Hassan**
- “Effectiveness of Uncertainties in Dynamic Analysis of Coupled Systems”
Presented by: **Sadir JKauth Tadinada** (MS); Advisor: **Abhinav Gupta**

- **The Sustainable Revolution: Challenges or Opportunities?**

Presented by: Dr. **James R. Mihelcic**, Professor of Civil & Environmental Engineering & Director of the Master’s International Program in Civil & Environmental Engineering, Michigan Technological University (April 28, 2008)

Since the release of *Limits to Growth* (Meadows et al., 1972) there has been increased global discussion on issues related to sustainability. Sustainability has many definitions and is often practically interpreted as mutually advancing the long-terms goals of economic growth, societal prosperity, and environmental protection. Issues such as population, water, the built environment, energy, consumption, health, and equity are at the forefront of the challenges to sustainability. The impact of population growth has long been understood as a grand challenge to advancing environmental, economic, and societal goals and creating a sustainable future. As the world’s population and per capita consumption of water, energy, and materials increases, so does the urgency for protecting and enhancing the environments and communities in which people, plants, and other animals reside. This talk introduced the audience to the sustainable revolution and explained where we are at. It provided an overview of the many challenges to a sustainable future that exist in the U.S. and the world. These challenges can also be viewed as opportunities for framing our discussions of education, research, scholarship, professional practice, and innovation. Innovation is at the core of the sustainable revolution and the talk concluded by presenting arguments on how sustainability and innovation can be integrated to improve our universities and country in the global world we now live in.

Extension Activities

Roberto Nunez had a busy year conducting and managing Civil Construction and Environmental Engineering Extension (CCEE) activities while teaching Construction Engineering and Management courses, advising students, and managing the concrete and construction systems laboratories in Mann Hall. During the past year, Nunez organized, taught and/or managed the following activities:

- Education and professional development events reached approximately 1,500 civil engineering and construction professionals through short courses leading to credentials in areas such as concrete technology certification, construction engineering diplomas, and OSHA construction safety cards. **Michael Leming**, CCEE Construction Engineering Faculty, continued to be a strong extension resource in these programs. Other courses developed to help designers stay up-to-date on technology and best practices were taught incorporating other CCEE Faculty as well as recognized leading experts.
- Nunez maintained a CCEE tradition to involve CE students in extension activities. This year, CCEE Extension went one step further to enhance its presence and deliverables. Two PhD students, **Luis Mata** and **Juan Jose Recalde**, both Construction Engineering students, were incorporated as CCEE teaching faculty with great success.
- The contribution of distinguished industry professionals continued to be a strong foundation of CCEE Extension efforts. CCEE Extension expresses its gratitude and recognition to **Stuart Phoenix** from FMI Corporation, **Henry Stewart** from Strategic Benefit Solutions, LLC, **Luke Laborde** from Willis, **Ufuk Dilek** and **John Arnold** from MACTEC, **Jeffrey Parsons** from PARSONS, **Richard Rohrbaugh** from Kimley-Horn and Associates Inc., **Everette Knight** from McKim & Creed, **John Cullian** from Deloitte, and **Joseph Angell** from KCI.
- The partnership contribution towards improving the level of competence among concrete construction professionals in NC continued between CCEE and the Materials and Tests Unit of the NC Department of Transportation by providing training and certification to concrete field technicians. This year, CCEE provided scholarships that allowed 15 NCSU students to attain this prestigious certification which, in-turn allowed them to become more marketable construction professionals. A new partnership established this year between CCEE Extension and the NC DOT allowed minority owned and disadvantage business construction entrepreneurs to access short courses offered by CCEE Extension.
- CCEE extension activities included alumni outreach. As in the previous 6 years, CCEE hosted its annual golf tournament during the month of May. Approximately 110 alumni and construction friends of the CCEE Department gathered for an afternoon of fun and camaraderie at the Crooked Creek Golf Course. This year, a team sponsored by **Hazen and Sawyer, PC** walked away with the top honors.
- As a part of the effort to immerse students in field projects and industry associations, 20 CCEE students visited the construction site of the George H. Bush Aircraft Carrier in Norfolk, Virginia. In addition, a 12-member CCEE team led by Nunez participated in the ACI Convention in Puerto Rico, and another 15 CCEE students traveled to the ACI Convention in Los Angeles where they received top honors for the aesthetic design of a test arch structure.
- In its continued international outreach efforts, Nunez established ACI certification programs in Panama and Guatemala which followed the successful NCSU-ACI model. Local engineers in these countries were intensively trained so these programs can become autonomous after the year 2008.

STAFF NEWS

New Hires

- **Diana Lotito** joined the Department in **February 2007** as an Administrative Assistant working with Dr. Sami Rizkalla at the Constructed Facilities Laboratory (CFL). Diana relocated to North Carolina from Ithaca, NY where she was employed at Ithaca College. She has a very diverse work background, working as a School Bus Driver, Bookkeeper, Office Manager, and Administrative Assistant.
- **Darin (Jake) Rhoads** joined the Department in September 2007 as Facilities Maintenance Technician. Originally from Lebanon, PA, Jake worked in the Millwright Department at Hershey Chocolate for 17 years where this department was in charge of the installation of all processing and wrapping equipment from start to finish. He is a certified welder and sheet metal fabricator. Prior to that, he worked for 17 years in a steel fabrication shop. He moved to North Carolina in June 2006.

Awards

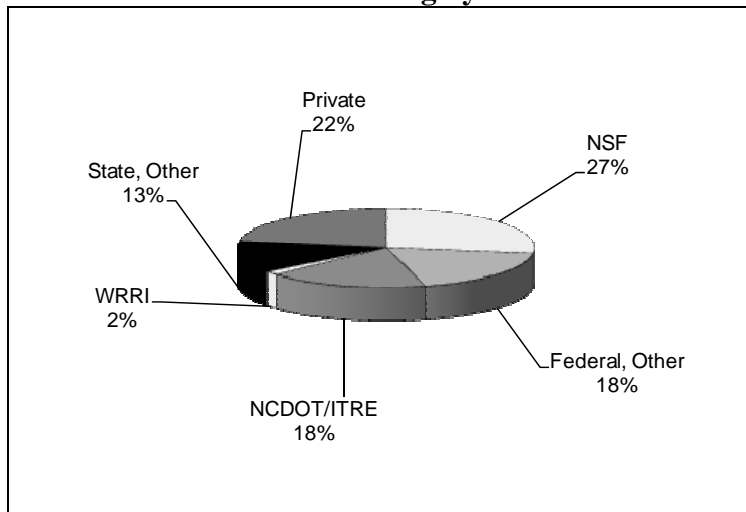
- **Annette Maynard**, Administrative Support Associate in the Department received the College of Engineering 2008 Award for Excellence for her dedication, dependability, timeliness, and position attitude. She is committed to the University and represents it well, often acting as an excellent community ambassador. In her tenure at NC State, she has mastered the critical skill of adaptation and change, reinventing her job to meet changing needs and tackling new tasks expertly and with a smile for the challenge. She has learned how to develop course materials and can be a great help to students. She is a dependable and irreplaceable asset to the department, handling promotion, tenure, and other personnel matters with the utmost professionalism.

RESEARCH CONTRACTS AND GRANTS

The total value of contracts, grants, and other external funding is **\$14,294,305** with annual expenditures of **\$4,253,165.06**. The following tables break down contract value and expenditures into sources of funding. A chart on research funds by source follows the table. Research abstracts can be accessed at the departmental web site (<http://www.ce.ncsu.edu/abstracts>).

	Award Dollars	FY 2008 Expenditures
TOTAL RESEARCH FUNDS	\$14,294,305.00	\$4,253,165.06
TOTAL NEW RESEARCH FUNDS	\$3,007,291.00	
TOTAL CONTINUING RESEARCH FUNDS	\$11,287,014.00	
SOURCES OF FUNDING	\$14,294,305.00	AWARD %
PRIVATE (INDUSTRIAL, CORPORATE)	\$3,189,797.00	22.32%
NATIONAL SCIENCE FOUNDATION (NSF)	\$3,913,013.00	27.37%
NC DOT	\$2,487,456.00	17.40%
WATER RESOURCES RESEARCH	\$205,983.00	1.44%
STATE AGENCIES (NC AND OTHER	\$1,872,430.00	13.10%
FEDERAL SPONSORS	\$2,625,626.00	18.37%
	14,294,305.00	100.00%
SOURCE OF EXPENDITURES	\$4,253,165.06	TOTAL EXP %
PRIVATE (INDUSTRIAL, CORPORATE)	\$1,131,766.75	26.61%
NATIONAL SCIENCE FOUNDATION (NSF)	\$826,343.08	19.43%
NC DOT	\$1,084,163.62	25.49%
WATER RESOURCES RESEARCH	\$89,690.58	2.11%
STATE AGENCIES (NC AND OTHER	\$346,821.87	8.15%
FEDERAL SPONSORS	\$774,379.16	18.21%
	\$4,253,165.06	100.00%

Research Funding by Source



DEPARTMENTAL SPONSORS

Donations to the Department were received from the following during 2007-08:

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ACI Student Chapter:	ASCE Student Chapter	
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PLT Concrete	Fluor	
ST Wooten	Charles W. Moyers	
Carolina Agc Inc.	ACI Carolinas Chapter	
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Terratech Engineers Inc.	HSMM (SEM Symposium)	
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Skanska USA Building

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