NJIT New Jersey's Science & Technology University

Civil and Environmental Engineering Department

SPRING 2011 NEWSLETTER

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ASCE STEEL BRIDGE TEAM SWEEPS 2010 REGIONAL COMPETITION

For the fifth year in a row, the NJIT Steel Bridge Team took **first place** in the Metropolitan Region's Steel Bridge Competition in 2010. The team further distinguished itself this year by winning every single category in the contest, such as structural efficiency, construction economy, stiffness and aesthetics. The NJIT team beat a host of other engineering schools such as Columbia University and Cooper Union.

During the contest, held at Farleigh Dickinson, the student teams had to assemble small-scale bridges in less than 30 minutes. The bridges had to be light yet able to sustain 2,500 pound loads. Under the discerning eye of judges, four NJIT students assembled its bridge in just over seven minutes, besting the second place team by seven minutes. By winning the regionals, the NJIT team earned a spot in the national steel bridge contest, which took place Memorial Day Weekend at Perdue University.

At the National Competition, the Team placed 19th overall. This is also quite impressive considering the entire field consisted of over 200 other University Teams. The traditions are continuing this year, as the Steel Bridge Team is currently in the building stages of their 2011 Bridge Design.

The dedicated team is hard at work preparing and practicing for Regionals in mid April. They practice from 9-11pm Monday—Thursday while still attending class, doing homework, and taking exams.

We have an increased number of sophomores and juniors than ever before which will ensure even more success in the coming years.

The **Regional Competition** will again be at FDU–Teaneck. It will take place **April 16, 2011**. Anyone is welcome to come and cheer the team on! If history repeats itself again, and the Team makes it to the **National Competition**, they will be headed to **Texas A&M May 20 - 21, 2011**!

Pictures from 2011 on page 10

If you are interested in providing a donation to the team, please contact Heidi Young, 973.596.2446 or cee@njit.edu, for details.

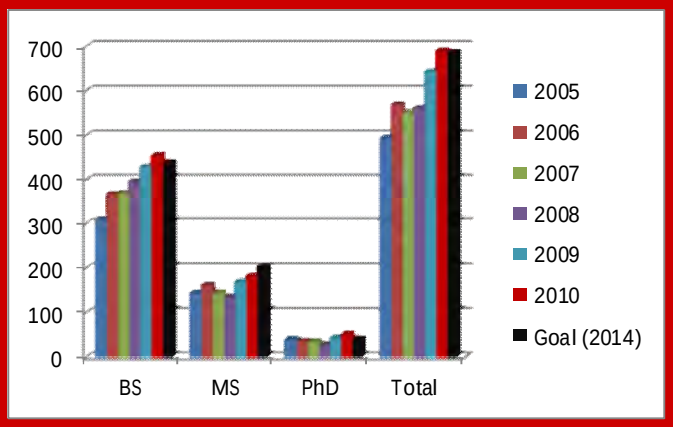
MESSAGE FROM OUR CHAIRMAN

This past year, the CEE Department lost a true ambassador to civil engineering, Distinguished Professor **William Spillers**. Bill attended the University of California at Berkeley where he received his BS and MS in Structural Engineering in 1955 and 1956, respectively, and then joined Columbia University where he received his PhD in 1961. He was on the faculty at Columbia for 15 years until 1976 when he joined RPI until 1990. He joined NJIT as CEE Department Chairman from 1990 to 1998. He was promoted to Distinguished Professor in 1998, a rank intended for those whose professional accomplishments in teaching and within their disciplines are known and respected nationally.

Bill had numerous research grants from NSF, Department of Energy and the Department of Transportation. He has published 9 books, several book chapters and over 120 technical papers in the areas of structural mechanics and design theory.

Most recent significant contributions to the field include a book with Robert Levy on geometrically nonlinear structural analysis (that introduced a new approach), his 2004 paper on the use of mass/stiffness eccentricity to reduce structural vibrations, and his 2006 paper with Keith McBain on a new approach to structural optimization, which concluded with his latest book entitled "Structural Optimization" published last year. Bill was the Editor-in-Chief of the North Holland Monographs in Design Theory, Editor of the Journal of Design Computing and the ASCE Journal of Computing in Civil Engineering. Bill is a great loss to the CEE Department.

As we move forward we acknowledge that the achievements of our-your CEE department -are fueled by its people, the faculty, staff, students, alumni and friends who work together to engineer a better future for us all. Our faculty and staff continue to make exciting and significant contributions in the transportation, environmental and infrastructure areas of research and academics. Our FY2010 external direct research funding has increased by 25% over FY2009 and 39% over FY2008. The undergraduate enrollment has increased 50% in the past 5 years, with a current enrollment of about 450 students. Our current total enrollment in both undergraduate and graduate programs is about 690 students.



The ASCE students continue to be placed first in the Metropolitan Region Steel Bridge competition and then compete nationally and show their prowess against the best teams from across the country. Our Student Chapter of Engineers Without Borders is working on sustainable toilets and water purification systems for the town of Milot, Haiti serving society through engineering.

We welcome you supporting the department's vision through involvement in our educational, research, and service activities and invite you to join us for the Annual CEE Commencement and Awards Ceremony at 1pm on May 16, 2011 (RSVP CEE@NJIT.EDU)

Regards,

Taha F. Marhaba, PhD, PE

ASCE MEMBERS DEVELOP CLASSROOM PRESENTATION TO TEACH 4th GRADERS ABOUT CIVIL ENGINEERING

By: Patrick Granitzki, CE Junior

We had a great time visiting the Randolph School System and presenting to the class. We spent about two hours with them and look forward to more class visits in the future.

We introduced them to engineering with a brief explanation and then a short 5 minute video. Next we went into specific aspects of civil engineering such as structural engineering, construction, transportation, geotechnical, and water resources. During which we included the aspects of safety while on a construction site such as reflective vests and hard hats (which we brought with us to show them). Then we discussed ASCE, and what we do at our local Chapter, as well as Habitat for Humanity (which they could do in their own town). This lecture portion took about 40 minutes.

Next was the fun part! The design activity. Groups where formed consisting of two people per group. They had to design a bridge out of Toothpicks and Dots, within the specifications of 3 toothpicks long, one tall, and one wide. Some of their designs where really creative. Once their drawing was finished they had to estimate how much it could hold. Then they had to switch their design with the group next to them and build the other groups design. This was to illustrate how sometimes their can be some confusion between the designers and the builders. Also, that drawing plans are not always interpreted correctly. They, also, had to write on their handout if the design they were given was easy to understand or not and why. After they constructed their bridge we did a load test.

After each bridge was tested, we would discuss the reason why it failed. Was it due to design error or build error, etc. The final part was a cost analysis. They had to determine the cost of their bridge based on one toothpick costing $1.00 and one Dot costing $0.50. This then lead to the discussion on which bridge was the most cost effective while withstanding a 2.9 pound load.

Overall they had a fun time, and the teacher asked us to come back next year when she has a new class to do the presentation again. We spent about two hours with the students and look forward to presenting to more classes in the future.

STEEL BRIDGE TEAM MEMBERS PARTICIPATE IN NEW JERSEY SCIENCE AND ENGINEERING FESTIVAL

The Steel Bridge Team participated this past Fall in the New Jersey Science and Engineering Festival at Clifton High School. "How to Engineer a Bridge" was the theme of their display, which featured designing a virtual bridge with software and then load testing it with an animated truck. They also conducted a "Paper Bridge Challenge" where students created a bridge from one sheet of copy paper that had to support 100 pennies. The Team had such a great time that they anticipate participating again this Fall.

The Festival is a "Worlds Fair" of science and technology, with different exhibitors providing many types of exhibits for all different types of people, with different levels of interest, education, understanding of science and technology.

With over 12,000 attendees this year it was definitely a success!

ENGINEERS WITHOUT BORDERS HAITI UPDATE

By: Julia Gayner, EWB-NJIT President

This October, EWB-NJIT sent three students, Julia Gayner, Jason Jawidzik and Paul Rodriguez, and one faculty mentor, Allyn Luke to Milot, Haiti. Over the course of a week, the team followed up on the Biosand Filter project, performed assessments for the Bioreactor, Solar Water Heater and Ecotoilet projects, and investigated Milot's piping system.

The Biosand Filter project was initiated in 2009 when a previous travel team trained local technicians in the construction and installation of filter units. The biosand filter uses a biological layer of bacteriovores followed by an anaerobic layer of gravel to eliminate pathogenic bacteria in contaminated water poured through the filter's top. Twenty-five units were installed during the 2009 trip. During the recent 2010, Paul Rodriguez, Julia Gayner and Milot resident Joel Derius visited each household that had received a filter, took samples for water quality testing and reviewed filter maintenance with the filter users. With the first batch of filters installed and in working condition after a year and a half of use, the travel team prepared two of the original technicians, Joel Derius and Jose Valbraun, to take over the project as their own business.

Faculty mentor Allyn Luke contributed to Derius and Valbraun's biosand filter business by instructing Derius in a new method of diffuser plate construction. The diffuser plate, a component of the biosand filter that prevents incoming water from disturbing the biological layer, is a plastic sheet perforated by a grid of holes and is the only part of the filter that could not be constructed locally. However, Mr. Luke devised a method of creating diffuser plates out of pervious concrete, which allows water to pass through as easily as the perforated plastic but requires only locally available materials and skills, and trained Derius in the new technique.

Mr. Luke and student lead Jason Jawidzik also devoted some time to investigating Milot's water distribution system. During filter visits, several residents had complained of tadpoles hatching in tap water left standing for some time, including any tap water standing in biosand filters. Though the filters effectively remove impurities associated with tadpoles, Mr. Luke, concerned about other pathogens that might accompany frog eggs, attempted to pinpoint the source of contamination. He and Jawizdik identified a potential means of ingress near the source of the water system, a spring on the mountain above Milot. However, Mr. Luke believes that locating other breaches to the distribution system and repairing the pipes would be a project on a scale beyond EWB-NJIT's capabilities, and therefore the travel team agreed to assist Milot's water committee in writing grant applications for funding to finance professional assistance.

Meanwhile, Jawidzik spearheaded the assessments for the two projects ongoing at Milot's hospital, Sacre Coeur. He evaluated possible sites for the solar water heater, which he designed the preceding semester, and for the bioreactor, which was still in the design process at that time. Jawidzik also collected information on the volume of waste the bioreactor would need to handle for the use of the two NJIT student design teams who later finalized two competing designs to be evaluated by Sacre Coeur.

Jawidzik, Rodriguez and Gayner also collected data by interviewing residents of Milot on their attitudes toward waste sanitation, in an effort to take cultural preferences into account in designing ecolatrines. The ecolatrine's primary design requirement is to effectively compost human waste on a household level. However, because it requires regular maintenance, it is crucial to use the attitudes of potential end-users at each stage of the design process.

ALUMNI HELP MENTOR SENIOR PROJECT TEAMS

As you may know, the CEE Department requires all students to enroll in CE 495 Civil Engineering Design II (our senior capstone course) in which students work with the CEE faculty instructor alongside a practicing engineer – their mentor – to solve a real world problem. Each team's project would be contributed by the mentor, perhaps a project he/she has already completed, is currently being solved, or is being planned.

We invite you, as alumni, to help educate future engineers by making a commitment to serve as a mentor in the NJIT CE 495.

We have found that real-world projects sponsored by local industry result in some of the best experiences for our student designers.

Each group of four students works with a mentor, sometimes meeting at the CE Building (Colton Hall), and sometimes at the project or business place of the mentor.

You will receive Professional Development Hours (PDH's). A list of mentor responsibilities follows.

Mentor Responsibilities:

1. Provide information about potential projects by at least one month before the start of the semester of mentorship.
2. Meet with faculty instructor (s) to discuss course requirements.
3. If your project is chosen, present an introductory talk on the project at the start of the semester.
4. Meet with the student team (s) regularly, with the meeting place and time decided based on students' and your schedule.
5. Make yourself available for Q/A and discussion between these meetings (using phone and electronic means that the department will set up).
6. Provide background information and technical assistance on the project.
7. Provide comments and grades on written reports: work plan; preliminary report; draft of final report; final report.
8. Attend final oral presentation at the end of the semester.

*Please contact us at **CEE@njit.edu** if you would like to become a mentor*

FEEDBACK FROM CURRENT MENTORS

Elliott Schwartz, PE

Engineering Manager, New Jersey American Water

Being asked to mentor college students is an honor, but when you are asked to do so at your alma mater, that it makes it all the more special. I was approached by Dr. Nelson to see if I would be interested in mentoring a team of students in her senior level design course.

I jumped at the opportunity, which helps these students deal with real-life situations and real-life engineering challenges. In this mentoring assignment, he will guide a team of students on a team projects and will introduce topics such as codes and specifications, risk assessment, and sustainability. My team is working on a water supply and treatment project that has its own unique issues that need a custom engineered solution.

It is a privilege to be a part of this program, especially since I graduated from NJIT. I am enjoying working with the students and sharing my knowledge; after all, they are the engineers of tomorrow.

George Hollerbach Jr., PE

Principal, Quantum Management Group

The course is valuable to the mentors as well. With great enthusiasm, I have enjoyed some of the professional seminars as well as many of the project presentations by the class. Some of the topics such as bridge design, tunneling, and transportation routing are outside my day to day project management activity and it's important for me to stay on top of the newest activities in Civil Engineering.

As someone who spent 15 years coaching young people as a volunteer in all levels of athletics, it's refreshing to still teach the importance of teamwork to these design projects and instill enthusiasm on a complex academic topic.

FACULTY HIGHLIGHTS

DR. DORAIRAJA RAGHU RECEIVED AN EXCELLENCE IN INSTRUCTION AWARD

Dr.Dorairaja Raghu received the Excellence in Upper Division Undergraduate Instruction Award at the NJIT University Convocation.

He summarizes his teaching philosophy with this astonishing statement: "The first principle of teaching is that nothing can be taught." By this he means that rote lectures and spoon-fed texts that don't engage the student do not lead to learning. In a career spanning over thirty years and covering eight different courses, Dr. Raghu is widely praised as a meticulously prepared, dedicated and motivational teacher in the field of geotechnical and foundation engineering.

DR. C.T. THOMAS HSU AWARDED A US PATENT

Dr. C.T. Thomas Hsu, along with S. Punurai and P.R. Munoz, has been awarded a U.S. Patent for their work on “Composite Floor System Having Shear Force Transfer Member”. More specifically, A system and method of constructing a composite floor system having increased shear transfer between a slab and support members of the system.

The composite floor system may include any combination of the following elements: a support member, a reinforcing member, a transfer member, a decking material, a fastener, and/or a slab. The Patent was approved on February 24, 2010.

DR. JOHN SCHURING AWARDED A PROVISIONAL US PATENT AS WELL AS A FACULTY ADVISOR CERTIFICATE OF COMMENDATION

Dr. John Schuring, along with S. Olender, has been awarded a provisional US Patent for their work on "Method and Apparatus to Seal and Recover Oil Leaking from a Deep Sea Oil Well," approved on May 24, 2010.

Dr. John Schuring was given a 2010 Faculty Advisor Certificate of Commendation from the American Society of Civil Engineers.

DR. TAHA MARHABA AWARDED THE 2010 DISTINGUISHED ENGINEER AWARD

Dr. Taha Marhaba, who received his BS, MS and PhD degrees from Rutgers University, was given the Distinguished Engineer Award by the Rutgers Engineering Society.

Each year the Society presents the Distinguished Engineer Award to a graduate of the school whose achievements have contributed significantly to the national economy, security, public welfare, the quality of life, or to the solution, or advancement of a specific technical need.

DR. SIMA BAGHERI SELECTED TO PARTICIPATE IN NAFKI CONFERENCE

Sima Bagheri, was selected to participate in the 8th Annual National Academies Keck Futures Initiative (NAKFI) Conference, "Seeing the Future with Imaging Science," that took place on November 17-19, 2010, in Irvine, California. Dr. Bagheri's contribution is entitled "The Impact of Global Change on Nearshore Water Quality – A Remote Sensing Approach."

The *Futures Initiative* is designed to enable scientists from different disciplines to focus on new questions, upon which they can base entirely new research, and to encourage and reward outstanding communication between scientists as well as between the scientific enterprise and the public.

DR. PRISCILLA NELSON AWARDED THE 2011 HENRY L. MICHEL AWARD

Dr. Priscilla Nelson was presented with the 2011 Henry L. Michel Award for Industry Advancement of Research in Washington DC as part of the ASCE OPAL Awards Gala. This award was established in 1996 in honor of Henry L. Michel, Past Chairman of the Board of Directors of the Civil Engineering Forum for Innovation (CEFI), formerly the Civil Engineering Research Foundation.

The annual award recognizes and acknowledges leaders of the design and construction industry whose dedication and aggressive vision have provided cornerstones for improving the quality of people's lives around the world through research in the design and construction industry.

DR. JAY MEEGODA NAMED FELLOW BY ASCE

Dr. Jay N. Meegoda, an expert in Geo-Environmental engineering, has been named a Fellow by the American Society of Civil Engineers (ASCE).

The ASCE awards fellowships to civil engineers who have made significant technical or professional contributions to the profession, hold a P.E. license, and have at least 10 years of exceptional, responsible engineering experience gained while at member grade in ASCE.

DR. I. J. STEVEN CHIEN HONORED AS DISTINGUISHED SCHOLAR

Dr. I.J. Steven Chien was honored as a Distinguished Scholar for National Cheng Kung University's Project of Promoting Academic Excellence & Developing World Class Research Center, The National Cheng Kung University (NCKU), Taiwan, ROC.

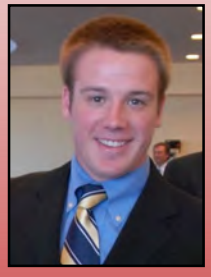
Over the years, NCKU faculty and students have achieved great success in research, which is reflected in a high number of publications in international academic journals.

STUDENT ACCOMPLISHMENTS

ASHISH BORGAONKAR WINS SILVER MEDAL AT DANA KNOX RESEARCH SHOWCASE

Ashish Borgaonkar, PhD Student in Environmental Engineering advised by Prof. Marhaba, won a Silver Medal for his poster presentation on "Enhancing Removal Efficiency of Engineered Nanoparticles From Water Using Cationic Surfactant-Modified Magnetite Nanoparticles" at the 2011 Showcase. An annual tradition at NJIT, the Showcase each spring allows both undergraduate and graduate students to present their original research to their fellow students, as well as NJIT faculty and NJIT industry partners.

KEITH CORKERY AWARDED PRESTIGIOUS SOL SEID AWARD AND OUTSTANDING SENIOR AWARD



Keith Corkery, class of 2011, received the 2010 Sol Seid Award for Excellence from the New Jersey Professional Engineers in Construction. Nominated by Professor Taha Marhaba, Corkery was chosen to receive the $10,000 award based upon his outstanding academic achievements and community involvement.

Keith was also recently awarded the **2011 Outstanding Senior in Civil Engineering Award,** presented at the Salute to Engineering Excellence.

TWO CEE STUDENTS RECEIVED NJDOT OUTSTANDING STUDENT AWARD

Drew Terpenning, CE Masters Student advised by Prof. Karaa, received one of the 2010 Outstanding Student in Transportation Award at the Annual Research Showcase.

Shengyan Gao, CE PhD Student advised by Prof. Meegoda, also received one of the 2010 Outstanding Student in Transportation Award at the Annual Research Showcase.

Shengyan was also awarded the **2011 NCE Outstanding Graduate Student Award,** presented at the Salute to Engineering Excellence.

SHABNAM DARJANI AWARDED GRANT TO ATTEND NSF CONFERENCE

Shabnam Darjani, CE PhD Student advised by M. Ala Saadeghvaziri, received a student participation grant and presented a poster paper entitled "Structural Performance and Human Comfort due to Bridge Vibrations." The 2011 NSF Engineering Research and Innovation Conference, sponsored by the Division of Civil, Mechanical and Manufacturing Innovation (CMMI), focuses on research and education across the Division's programs.

EWB CHAPTER, AND TWO CEE PROFESSORS, AWARDED EPA GRANT AND HEADS TO WASHINGTON DC FOR EPA EARTH DAY COMPETITION

Engineers Without Borders Chapter, along with Professors Jay Meegoda and Hsin-Neng Hsieh, received a grant of $10,000 to develop an ecologically sustainable sanitation system for Hopital Sacre Coeur in Haiti through the EPA's Project on Sustainability Focusing on People, Prosperity and the Planet.

EWB will then participate in the National Sustainable Design Expo in hopes of obtaining additional EPA funding awards. They will demonstrate their ecologically-sustainable sanitation system. Their design is a special latrine. The receptacle will not only collect human waste but also convert the waste into methane and fertilizer. Through a mechanism known as anaerobic digestion, the latrine will capture methane gas emissions to be used on-site as heating fuel.

ALEXANDER SALAZAR AWARDED PRINCETON UNIVERSITY PRESIDENTIAL FELLOWSHIP AND TAU BETA PI FELLOWSHIP

Alexander Salazar, ranked second in the 2011 graduating class with a 3.94 GPA, has been awarded the prestigious Presidential Fellowship at Princeton University. Only two are offered each academic year. Alex's masters will focus on mechanics, materials and structures.

It is a very competitive fellowship that is selected by the Dean of the Graduate School and represents one of the highest honors that can be bestowed on an incoming graduate student. He will not only receive full tuition and fees but an academic stipend as well. He will also receives funds towards research expenditures and travel to various professional conferences.

He was also awarded a Tau Beta Pi $10,000 Fellowship.

We are so very proud of Alex and the hard work and dedication he put into his studies here at NJIT. We wish him all the best with his Masters Degree at Princeton!

HIGHLIGHTS FROM COMMENCEMENT 2010 AT THE PRUDENTIAL CENTER

ADVISORY BOARD

Our Industrial Advisory Board represents a diverse cross-section of civil and environmental engineering professionals, including design consultants, construction managers, contractors and attorneys.

Ted Cassera, PE, '72 *Board Chair*
Omland Engineering Associates

David M. Cacoilo, PE '79
Mueser Rutledge Consulting Engineers

Dominic B. Carrino, PE '67
T&M Associates

Denise Cruz-Serpico, PE
EE Cruz & Company, Inc.

Lino A. DeAlmeida, Jr, Esq., '80
CCMS Corp.

John C. Ferrante, PE '73
E2 Project Management

Jerome F. Gallagher Jr. Esq., '80
Norris, McLaughlin & Marcus, PA

Daniel D. Kelly, PE '66
Kelly Engineering

Gregory A. Kelly, PE
Parsons Brinckerhoff

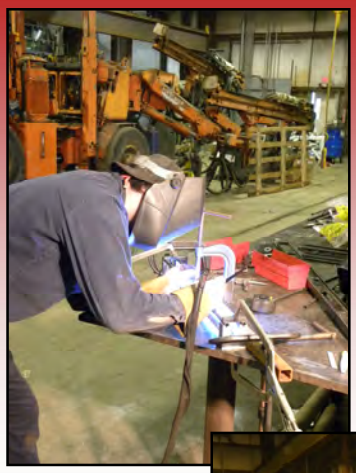
David M. Moskowitz, PE '63
Lichtenstein Consulting Engineers, Inc.

Wei Wang, PhD, '95
Urban Tech, Inc.

Michael Wright, PE, PP, PMP '79
Arora and Associates, PC

STEEL BRIDGE 2011

Here are some pictures of this years bridge in various stages:



Load Testing

Fabrication

NJIT Experience Day
Build Demo

DEPARTMENT TO OFFER NEW MSCE ONLINE DEGREE STARTING SUMMER 2011

The CEE Department recently developed a completely online MSCE degree. The degree provides in-depth knowledge in areas of civil engineering that is essential for professional practice. Courses are taught by full-time faculty members with a range of academic and professional experience as well as by adjunct instructors who are experts in their fields. The ten-courses degree can be completed in as little as one year. Applicants are expected to have an undergraduate degree in civil engineering or its equivalent, and must have proficiency in basic sciences and mathematics. Students who lack an appropriate undergraduate background may be granted conditional admission in order to complete a bridge program or its equivalent. For more information:

http://adultlearner.njit.edu/programs/civilengineering-ms.php

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CIVIL AND ENVIRONMENTAL ENGINEERING

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