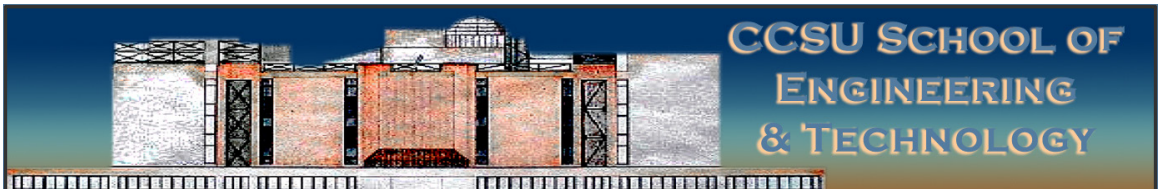
CENTRAL CONNECTICUT STATE UNIVERSITY

INFOTECH

SCHOOL OF ENGINEERING & TECHNOLOGY NEWSLETTER



Mechanical Engineering Program's First EAC of ABET Accreditation

In the summer of 2010 the Mechanical Engineering program received its initial accreditation by the Engineering Accreditation Commission (EAC) of the Accreditation Board of Engineering and Technology, Inc. (ABET). The accreditation was effective as of 2008 and therefore, it includes the very first graduates. This accreditation is certainly a great achievement not only for the school, but also for all the mechanical engineering graduates. The Mechanical Engineering program at CCSU is one of several programs administered by the Department of Engineering in the School of Engineering and Technology. Currently, there are over 170 students in the program, far exceeding early projections.

The preparation to offer the first engineering program at CSU system started in 2004 with a feasibility study that was conducted by **Dr. Nidal Al-Masoud** and **Dr. Peter Baumann.** According to the School of Technology's (currently, the School of Engineering and Technology) Strategic Plan at that time "a new engineering program, if developed within the next 3-5 years, would aid in the growth of the school, and provide an affordable engineering option to prospective students. Engineering program(s) development will also up-grade the school's status, and justify the currently desired name change [to include engineering]".

The efforts leading to achieving this strategic goal were led by **Dr. N. Al-Masoud, P. Baumann** and **Dr. A. Gates** and culminated in the inauguration of the Mechanical Engineering program in 2006 with 42 students. The program's mission is to provide and sustain a quality, state-of-the-art education in mechanical engineering that enables students to develop specialized knowledge and experience required to practice as professional mechanical engineers or to pursue graduate study. To realize this mission, the vision of the program was, and will continue to be, an accredited program in mechanical engineering to serve Connecticut and neighboring states by providing a quality engineering education that enables students to achieve excellence in their particular field of study.

The actual preparation for professional accreditation by ABET began long before the program inception in 2006. Accreditation was an important factor in the feasibility study, the curriculum design, and the application for licensure by the Connecticut Department of Higher Education. The coursework was designed and sequenced following the standards of quality set forth by ABET, which is the most respected accreditation organization in the U.S. and abroad for programs in applied science, computing, engineering, and technology.

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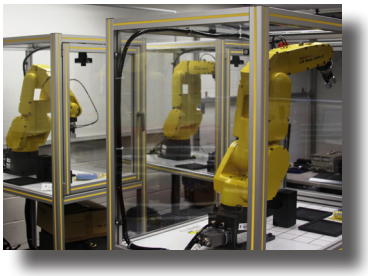
New Robotics and Mechatronics Engineering Technology Program

For over a century the State of Connecticut has been a leader in various industries as well as the technologies that support industry. A strong base in the aerospace manufacturing industry has in particular been developed during the last several decades, creating numerous jobs in high technology fields. Such high technologies are in demand for all types of industries, both for operations and products. This includes, for example the design and implementation of robotics and mechatronics systems for aerospace components, general manufacturing, public utilities, and shipbuilding. Throughout the state of Connecticut there are a variety of companies that are involved in the manufacture, development, implementation, management, and marketing of robotics and mechatronics technologies.



Global competition has led many such companies to look to cost reduction activities, which unfortunately includes the relocation to cheaper labor markets. The result of this is a change from a skills-based to a knowledge-based labor force. It is in Connecticut's best interest to help retain its great manufacturers by providing key areas of knowledge to its labor force. This largely includes STEM (science, technology, engineering, and mathematics) knowledge, which will provide Connecticut companies with a labor force that can be strategically utilized to bolster the state's businesses. This potentially includes a variety of mechatronics technologies, especially in the areas of robotics, automation, machine vision, sensing and control systems, expert systems, and computer-integrated manufacturing.

Manufacturing and Construction Management Department in the School of Engineering and Technology at CCSU has designed a robust program requiring the consideration of what the specific needs are of its graduates. The School subscribes to the STEM philosophy for producing graduates in a knowledge-based economy. What must be realized is that such graduates, regardless of individual educational program, will need to have developed a variety of skills to market themselves and to utilize in their careers. This is particularly important in a robotics and mechatronics program, in which a variety of highly specialized subfields exist, and for which a variety

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CCSU is a University of the Connecticut State University system and an AA/EO institution.

DEANS' CORNER

Dr. Zdzislaw B. **KREMENS**

Central to the ongoing economic recession has been a concern over jobs; not just the high rate of unemployment but also, and as important, the matching of workforce needs with highly prepared professionals who can lead in the emerging new economy. You may be surprised to hear that key to that is an emphasis on the core academic values and general education standards.

As a university we prepare graduates for jobs which, in many if not most cases, do not exist today. Therefore we need to plan for many years ahead and analyze all probable changes and trends. The responsiveness to vital state workforce needs becomes more important than ever, as the nation continues to transition to a knowledge-based economy operating in a global, competitive market.

Although we consider workforce development a crucial goal, we are not engaged in vocational training and for a very good reason. Statistics show that, responding both to their own interests and to evolving workforce needs, most college graduates change their jobs and their disciplines several times during their working life. Therefore, lifelong learning and professional development become absolutely necessary with rapid changes in sciences, technology, and engineering. In such a context, too narrow an education would be totally counterproductive. Consequently, we need to preserve academic standards and values, in order to equip graduates with the broad general and professional knowledge that will help them to adapt to an ever-changing work environment.

At CCSU we are embarked on a new initiative to revise and strengthen our general education standards. I believe that this is a critically important undertaking that will enable all CCSU graduates to have an excellent command of their major subject and will be able to:

- analyze societal and global implications
- be sensitive to all aspects of ethical issues
- think critically and creatively
- communicate effectively
- work on teams and provide leadership
- become an active and productive citizen and community member.

I will conclude with a quote from the famous 2005 report titled "Educating the Engineer of 2020" by the National Academy of Engineering:

> "…learning disciplinary technical subjects to the exclusion of a selection of humanities, economics, political science, language,…is not in the best interest of producing engineers able to communicate with the public, able to engage."

Civic Engagement

Just as we aspire to graduate students deeply prepared in their majors who will become active and engaged citizens, so the School of Engineering and Technology aspires to be mindful of its own potential for civic engagement.

Recent research by Georgetown University's Center for Education and Workforce concludes that in Connecticut by 2018 as many as 61.2% to 68.1% of job openings will require some type of postsecondary education! While only some 8.3%-11.8% will require an associate's degree, most jobs in Connecticut will require bachelor's degree (23%-27%) or master's and higher degrees (11.5%-25.2%).

These numbers reflect the phenomenon of job polarization in America. Last year's report by the Center for American Progress and the Hamilton Project illustrates that job polarization is a worrying and developing trend. Job opportunities in high-skill occupations are growing at a faster pace than in low-skill occupations, resulting in increased earnings inequality. The rising demand and lagging supply of highly educated workers will result in steadily growing wages for that group. At the same time, low-skill jobs will offer low wages. It is well known that such inequalities can diminish the quality of life in a society. As a school in a major public university that is committed both to access and excellence, however, we believe that this challenge presents a significant opportunity to assist the state in workforce development in STEM disciplines.

As a public institution of higher education CCSU is real bargain. We provide high quality, affordable educational opportunities to Connecticut residents. We offer a range of programs to support and sustain students from diverse economic situations. We are thus well positioned both to help many individuals make their dreams come true and at the same time to contribute significantly to state economic prosperity. I believe that it reflects a universal core of our mission as we strive to build a premier school of engineering and technology in the region. CCSU President Jack Miller has challenged the University to improve the lives of people in Connecticut. In his words, he wants every state resident to have an answer to the question: How is my life better because there is a CCSU? At the School of Engineering and Technology we believe that one powerful way to do that is by providing an education that enables graduates to overcome the inequalities they confront.

Significant Milestone

Following the Engineering Accreditation Commission (EAC) of ABET visit in 2009, our BS in Mechanical Engineering program was granted an initial accreditation. This prestigious professional accreditation in 2010 is retroactively effective to 2008 to include the very first graduates. This is a significant milestone in our school's history, testifying to the quality of the program and the excellent qualifications, unparalleled dedication, and hard work of our faculty.

Biomolecular Sciences receives the 2011-2012 Graduate Community of Scholars Tribute

The Graduate Community of Scholars Tribute is awarded to one department at CCSU each year. Recipients of the award must clearly demonstrate a fulfillment of the five Graduate Studies Tenets which include: Community of Scholars, Scholarly Inquiry, Intellectual and Personal Integrity, Excellence, and Leadership. The department was recognized for its strong research-based curriculum which provides students with current, cutting edge research within the discipline and hands-on practical experience in the laboratory setting. The department was also recognized for its focus on integrity and excellence as demonstrated by emphasis on professional rigorous standards and ongoing assessment efforts. Finally the department was recognized for success in promoting high standards, challenging coursework, and ambitious theses which has resulted in several successful graduates, who have gone on to enter PhD programs, or become professionals in the Biotech industry.

New Faculty

Dr. Xiaobing Hou joined the Department of Computer Electronics and Graphics Technology in the fall 2010 with four years of teaching experience in networking, telecommunications, and computer science. Dr. Hou holds a Ph.D. in Information Science with concentration on Telecommunications from the University of Pittsburgh. His current research interests include Network Protocol Design and Evaluation, Wireless Ad Hoc and Sensor Networks, Group Communications, Information Security. Dr. Hou is a member of IEEE and ACM.

Dr. Steve Kirstukas joined CCSU's Department of Engineering as an assistant professor in August 2010. He has degrees in Civil and Mechanical Engineering, with a PhD from the University of Minnesota. At Iowa State University, he completed a post-doctorate assistantship where he developed engineering design tools for immersive environments. Steve has worked in industry as a software developer and as a design engineer with a manufacturer of hydraulic pumps. He has interests in biomechanics and is exploring the use of virtual reality to enhance the engineering design process.

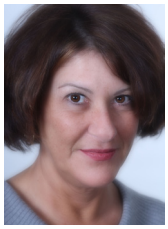
Dr. Ronald J. Miers, an associate professor of construction management, has years of professional and academic experience. While teaching at the university level, Dr. Miers has served as Internship Coordinator. He has worked at the national level in the official capacity of Director of the Northeast Region for the Associated Schools of Construction (ASC). Dr. Miers is an active reviewer for the American Institute of Constructors (AIC), American Society of Civil Engineers (ASCE), and the American Society for Engineering Education (ASEE). He is published in many construction industry journals and has presented at national and regional level conferences. Dr. Miers serves on the educational committee for the Associated General Contractors of America/Connecticut Construction Industry Board. He provides training for the Institute of Technology and Business Development. He holds a doctorate in construction management from SUNY College of Environmental Science & Forestry in Syracuse, NY.

Dr. Basile Panoutsopoulos holds a Ph.D. from the Graduate Center of the City University of New York, a ME in Electrical Engineering from The City College of the City University of New York, a MS in Applied Mathematics and a BS in Electrical Engineering from New Jersey Institute of Technology. He joined the Department of Computer Electronics and Graphics Technology during the Fall semester 2010. Before, he worked for eighteen years with the Naval Undersea Warfare Center, initially in New London, CT, and later in Newport, RI. He has taught courses in Physics, Mathematics and Electrical Engineering and Technology. His interests concentrate in Electromagnetics and Applications, Radio Frequency Telecommunications, Bioelectromagnetics, Energy Systems, Applied Mathematics, and Pedagogy (especially Problem Solving techniques). He volunteers in LEGO Robotics and Mathcounts Clubs.

Linda Reeder, AIA, LEED AP joined the Construction Management program as an Assistant Professor fall 2010. She has been a part- or full-time instructor in the program since 2004. An architect, Professor Reeder's research interests include sustainable design and construction. She is the author of the book Guide to Green Building Rating Systems: Understanding LEED, Green Globes, ENERGY STAR, the National Green Building Standard, and More published by John Wiley & Sons. She holds a Master of Architecture degree from the Yale School of Architecture and a B.A. from Oberlin College.

2010 Outstanding Alumnus - Robert Mercier

A 1988 graduate of Central Connecticut State University, Robert started his engineering career in the greater Hartford area at companies like Fafnir Bearing and Pratt & Whitney, where he established his background in processing and manufacturing technologies prior to becoming an engineer at Covidien. Covidien (formerly United States Surgical of Norwalk CT) is a premiere surgical device manufacturer and home to some of the most advanced medical devices in the world. Robert advanced through various engineering positions in Manufacturing and Business Processes. As an engineering director, Robert managed key Mergers and Acquisitions that were imputes of growth for the company in the late nineties. It was also at this time that he completed his masters in Engineering Management from the University of Bridgeport. Additionally, he completed an Executive Management program at Rensselaer Polytech. In his current role, as Senior Director of Divisional Engineering, he directs a staff of 120 engineers who support new product development. His group also supports projects such as establishing "Centers of Excellence" for R & D and Manufacturing with a strong focus on driving lean methodologies early in the process. He has also been instrumental in the identification, early assessment and streamlining of various processing technologies to increase "Time to Market" for new products. Robert has also implemented the "Lean for New Product Development" program, business simulation modeling, robust product transfer management and development of knowledge based data collection systems. Robert also spearheaded a first of its kind, Co-Operative Education program at Covidien in conjunction with CCSU. This provided a Scholarship Program funded by Covidien for students to increase their knowledge and understanding of business processes prior to graduating and moving into the marketplace. Robert is also a member of the Technology Management Advisory Board at CCSU.



Angela DiGiro joined the Manufacturing and Construction Management & Computer Electronics and Graphic Technology Departments in April of 2010 as their new Secretary. She's been employed with The State for twelve years, previously at the Departments of Developmental Services, Labor, and State Police. In 2003 she was with the Modern Language Department working for Dr. Louis Auld. She left when offered a promotion at the Labor Department and is thrilled to be back at Central.

Dr. Bin (Brenda) Zhou joined CCSU's Department of Engineering as an assistant professor in August 2009. She earned her PhD in Civil Engineering from the University of Texas at Austin in June 2009, and held a BS in Civil Engineering and a second BS in Accounting from Shanghai Jiao Tong University, China and a MS in Transportation Planning and Engineering from Polytechnic University (now Polytechnic Institute of New York University). She published eleven papers in professional journals and recently co-authored a book chapter "Transportation and Land Use" to be published in Transportation Engineers Handbook.

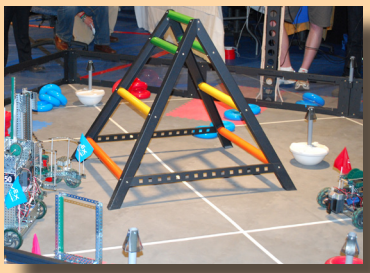
The Exciting World of BEST Robotics at CCSU

This year, CCSU will again host the BEST (Boosting Engineering Science and Technology) Robotics competition for middle and high schools around the region. **Dr. Ravindra Thamma** started the BEST Robotics Connecticut BEST Robotics Hub at CCSU in 2006 and has been running the competition as hub director for 5 years. Co-directors **Dr. Daniel Kirby** and **Dr. Haoyu Wang** assist him in recruiting schools, ordering materials, running kick-off training and the competition. The mission of the BEST competition is to excite our nation's students about engineering, science and technology – to unlock their imagination and discover their potential. Last year's game was titled "Total Recall," which simulates a manufacturing process of two products. Participating teams were challenged to design and build robots which can operate in this "factory" (the game field). The factory had two products that needed to be processed: Gadgets (white, black, and yellow golf balls), and Gizmos (magnetic and non-magnetic plastic eggs). To get the highest possible score, a team needed to operate their robot to process and package as many "good" Gadgets and Gizmos as possible and move "defect" Gadgets and Gizmos to a recall area within 3 minutes. BEST Teams are challenged to be innovative in robot design, operating strategy, programming and sensor applications. They have only six weeks to design, build, and test their robots to be ready for the competition. A $500 value kit including everything they needed to build the robot is provided to each team free of charge. Technical questions are answered through phone calls and emails by the directors.

About 600 students from the participating schools and their family members joined us in the competition. More and more schools from around the Northeast join the CCSU BEST Robotics competition because it is low-cost, entertaining, and educational. We do our best to raise funds and provide service to make it happen every year. All faculty, staff, and students of CCSU are invited to get involved in this outstanding volunteer opportunity, or even to attend the competition. We are looking forward to seeing you there in this year game on November 5th, 2011.

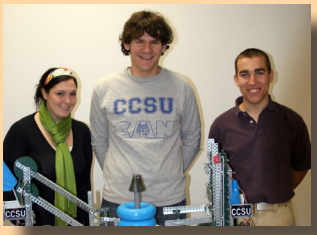
2011 Connecticut CTEA VEX Robotics State Championship Held at CCSU Campus

The 2011 Connecticut CTEA VEX Robotics State Championship was held on campus at CCSU on April 3rd, with over thirty middle and high school teams competing. The event was sponsored by the College of Technology – Connecticut Community Colleges, National Science Foundation, School of Engineering and Technology at CCSU, and supported by the Connecticut Technology Education Association. The VEX Robotics Competition is the largest and fastest growing middle and high school robotics program globally with more than 2,600 teams from 20 countries playing in over 200 tournaments worldwide. This was the second VEX State Championship held on the CCSU campus with dozens of volunteers committed to providing exceptional hands-on opportunities to promote Science, Technology, Engineering, and Math (STEM) activities for grades 6-12 students.



CCSU Students Win Regional VEX Robotics Competition

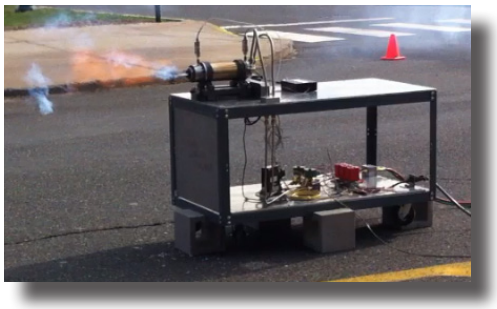
Three students from the CCSU Department of Technology and Engineering Education traveled to California University of Pennsylvania to compete in a regional VEX Robotics competition. The CCSU team of Ben Haase, Rachael Kane and Johnny Kassay took a first place in the college division with two robots designed and built in the TE 417 Robotics class. The win in Pennsylvania qualifies them for a spot in the 2011 VEX Robotics College Challenge World Championship competition that will take place in the ESPN Wide World of Sports Complex at Disney World in Florida. The competition will take place in April.



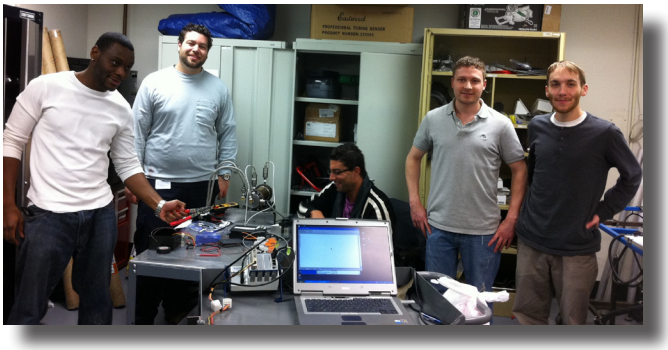
CCSU Team (L to R) Rachael Kane, Ben Haase and Johnny Kassay

Hybrid Propellant Rocket Engine Project

Green technology in engineering is usually associated with alternative energy research, new automotive fuels or fuels for aviation technique. Reducing of rocket launch environment impacts using non-conventional non-toxic propellants is the other area that is attracting attention of scholars and practitioners worldwide.



In Fall 2010 Department of Engineering offered a new senior design project -"Investigation of the Combustion of Non-Conventional Fuels in Hybrid Propellant Rocket Engine". Under the supervision of **Dr. V. Naoumov,** students decided on the design and of the build test facility for the research of combustion of ecologically clean, paraffin-wax-based and other non-conventional fuels. Based on preliminary thermodynamic analysis, the 2010 student team designed and built a 20 pound-thrust small-scale Hybrid Propellant Rocket Engine (HPRE) test fixture and developed the instrumentation system for collecting new data on fuels' regression rates. The current 2011 HPRE team finalized the assembling of the test fixture and built the instrumentation system. The first fire test of the engine was successfully performed on April 9, 2011.



Hybrid Propellant Rocket Engine Fire Test2011 Hybrid Propellant Rocket team. From left to right: Rukie Egborge, Alexander Haralambous, Ryan Campbell, Michael Hrubiec, Adam Goldreich, Tom Boyton (not pictured)

Accreditation continued from page 1

In 2009, and in anticipation of the graduation of the first student from the program, the mechanical engineering program led by Dr. Nidal Al-Masoud conducted an internal evaluation and a self-study questionnaire. The self-study documents whether students, curriculum, faculty, administration, facilities, and institutional support meet the ABET established criteria. This step was followed by an on-campus visit by a team of evaluators with a mandate to review course materials, student projects, and sample assignments, and to interview students, faculty, and administrators. The visiting team identified the strengths and shortcomings of the program. The response to the visiting team was then sent to the ABET EAC commission for a re-evaluation of the visiting team's findings with EAC of ABET criteria. As a result of this thorough and systematic evaluation by a nationally recognized accreditation body, our program was granted accreditation effective 2008, allowing all our graduates to be considered graduates of an accredited program.

The importance of accreditation goes far beyond the assurance of a quality education program and its continuous improvement. It also provides the platform for employers to recruit well-prepared graduates to successfully start their engineering career. Besides strong analytical and design skills and the ability to keep up with the fast pace of the technological changes, our program prepares students to recognize and value attributes like practical ingenuity, creativity, leadership, professionalism, and lifelong learning. These attributes are an integral part of any engineering profession.

All faculty in the department have considerable industry experience, which helps to further strengthen the importance of those attributes. In addition, the department maintains a strong relation with local industries, through its Industrial Advisory Board, who usually voice the contemporary needs of industry to our program. Another important aspect of accreditation is that many graduate programs and state professional licensing boards require students to be graduates of an ABET-accredited program to be considered for graduate studies or a professional engineering (PE) license. In addition, parents and the state are assured that their educational funds are spent on a quality program that facilitates immediate recruitment to meet workforce demands. According to CSU System's statistics, over 85% of undergraduate and 91% of graduate students are state residents. They remain active, live and work in Connecticut upon graduation and contribute significantly to its economic growth. At the same time, according to regional graduate retention data (New England's Knowledge Corridor 2004), only 27% of graduates definitely want to stay in the region, while 45% plan to leave New England after graduation.

The Mechanical Engineering program, maintains strong linkages with local industries through several measures like the Industrial Advisory Board, participation in internship and co-op programs through a mandatory 400 hours of industrial experience prior to graduation, and including numerous lab-based activities and hands-on oriented curriculum components. Our recent graduates are currently employed at places like Pratt and Whitney, General Dynamics, FuelCell Energy Hamilton Sundstrand, Sikorsky, and Covidien to mention a few.

National Rebuilding Day

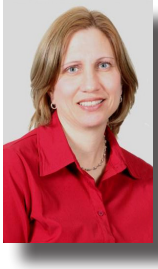
CCSU Technology and Engineering Education Faculty and Students will participate in National Rebuilding Day

On Saturday, April 30, 2011, Technology and Engineering Education (TEE) faculty and students will once again participate in National Rebuilding Day. The one-day event, held annually in more than 865 cities and towns throughout the country, is "dedicated to helping low-income homeowners, through home renovation and repair."

During the past two Rebuilding Together events the TEE faculty and students partnered with Farmington High School to work on a jobsite in Hartford. The events provided students with experience in community service projects including reroofing a garage, erecting a shed, replacing a stockade fence, and replacing the frame and floor on a porch to mention a few. For the upcoming April event, the TEE department will manage their own jobsite in New Britain.

TEE faculty member, **Dr. Michael Vincenti** will serve as the House Captain. Liz Chatis, a TEE sophomore, is the Event Coordinator, and Adriano Borgia, a TEE Senior, is the Equipment Manager and one of 6 Task Leaders. All three are veteran Rebuilding Together volunteers.

When asked about her past "Rebuild" experiences, Liz said, "Serving the community is a big part of teaching. Rebuild is a great way to get out there and help out." Dr. Vincenti remarked," Our students really get excited about Rebuild. In addition to developing an understanding of the community service responsibilities associated with teaching, they also gain real world renovating experiences that dovetail nicely with the Building Design and Construction curriculum in the TEE program."



Diane Hunter, Career Services Coordinator for the School of Engineering and Technology, has over ten years of diverse experience in the engineering field and has been a part-time professor in the engineering department at CCSU for almost five years. She has a BS in Mechanical Engineering from Northeastern University and an MBA from Rensselaer Polytechnic Institute. She held four co-op positions while at Northeastern and has worked for several companies since including Pratt & Whitney, Duracell and The Stanley Works.

The School of Engineering and Technology welcomes a new Server Administrator into its Information Systems department. **Ken Trochsler** joins the team with twelve years of experience in all aspects of the information technology field. His most recent experience is from the retail industry where he spent the last 6 years as a senior IT Manager. He is a graduate of Sacred Heart University earning both a BS and an MS degree in computer sciences and holds MCSA and MCSA Messaging certifications.

Dr. Olusegun Odesina, Associate Dean presents winners of the 2010-2011 School of Engineering & Technology Student Survey with Apple iPods. Pictured left to right: Brian Ventura (Mechanical Engineering), Nick Kyerematen (Mechanical Engineering), Dr. Olusegun Odesina and Matthew Stanley (Construction Management)

Twelfth Annual FIRST LEGO Competition at CCSU

The students and staff of the School of Engineering and Technology at Central Connecticut State University continued their involvement in middle-school robotics activities during fall 2010; both at the statewide level and locally in New Britain. For the twelfth consecutive year, CCSU hosted over 500 Connecticut middle-schoolers at the Connecticut First Lego League Tournament on December 12. More than 1,000 spectators also attended.

This year, the two top teams in the 51-team tournament were both from Greenwich. RoboElite, from the all-girls Greenwich Academy, was named the tournament champion. This qualifies them to compete at the national championship this April in St. Louis. The second Greenwich team, The Dragon Terminators from the International School at Dundee, earned the top robot game score.

Connecticut FIRST™ LEGO® League Robotics Competition

The FIRST Lego League, known as "FLL", is a New-Hampshire based nonprofit program which issues a Lego robotics challenge each September. In teams of ten middle school students, they have about ten weeks to address the two parts of the FLL challenge; the research project and the robot game. For the research project, teams identify a real-life problem related to the annual challenge. Based on their research and discussions with local experts, they create a presentation outlining possible solutions to the problem. The robot game requires students to design, build, and program Lego robots to compete a series of "missions" on a 4' x 8' playing field.

The first Connecticut FLL competition was held at CCSU in 1999. Teams from four states participated in the event, one of 16 nationwide, which focused primarily on the robot game. The research project was added the following year. Since 2005, teams have qualified for the state tournament based on their performance in local tournaments in November and early December. In 2010, more than 125 teams competed in these events which were held in Berlin, Old Lyme, Shelton, Suffield and Vernon.

CCSU will host the thirteenth annual Connecticut First Lego League Tournament on December 11, 2011. This year's theme will be "Food Factor," with a focus on food safety. As always, this event will be free and open to the public. Visit our website, ct-fll.org, for more information.

Dr. Michele Dischino judging middle school students' robot entry.

NASA Moonbuggy Vehicle

After the CCSU first successful experience at 17th NASA Great Moonbuggy Race held at Marshall Space Center (Huntsville, AL) in April 2010 the new team continued working on moonbuggy vehicle improvement under the supervision of **Dr. V. Naoumov.**

Mechanical Engineering students applied their knowledge and skills to reduce the weight of the vehicle, and make moonbuggy transmission more dependable.

On April 1-2, 2011 they tested their design at 18th NASA Great Moonbuggy Race, and came in 11th out of 42 teams from the US and overseas universities.

Moonbuggy team members John Vontell and Sahand Dailamipour work on the moonbuggy Improvement

2011 CCSU Moonbuggy team in NASA Moonbuggy Marshall Space Center. Students: John Vontell, Sahand Dailamipour, Benjamin Eichner, Helene Bonczek, Michael Harnos and Kyle Reutenauer with faculty advisor **Dr. V. Naoumov** and Infotech Enterprises America, Inc. team mentor **Hitesh Shah.**

CCSU Students help Boys' and Girls' Club of New Britain begin a FIRST Lego League Robotics Program

Middle-school students at the Boys' and Girls' Club of New Britain have begun a FIRST Lego League (FLL) robotics program with the help of students from CCSU's Technology and Engineering Education department. It takes most teams a year or two to become ready for FLL tournament competition, and many teams begin as informal afterschool activities. Middle-school students at the New Britain Boys' and Girls' Club, for example, began from scratch on October 21, when seven CCSU students, all studying to become technology teachers, met with more than thirty interested Club members.

The CCSU students, led by **Justin Amenta** from Southington, divided the boys and girls into teams for friendly intramural competitions. Lego robotics was new for most of the middle-school students and none had ever programmed a robot. After a few weekly meetings, the teams became competent at using a computer to wirelessly control a robot. The sessions ended in mid-December but Amenta and a new group of CCSU students returned in February after college courses had begun.

The CCSU School of Engineering and Technology is also partnering with several organizations to pursue funding for the creation of the Program for Growth and Sustainment of Underserved FLL Teams. This program is an effort to bring First Lego League opportunities to children in Stamford, Norwalk, Bridgeport, New Britain, Waterbury, New London, Hartford, New Haven, and Danbury by establishing and fostering the growth of 45 new teams in these cities over the next three years.

CAREER FAIRS

Construction Management Career Fair

The annual Construction Management Career Fair was held in the Constitution Room on March 9, 2011. Twenty three construction companies participated in the event. Student resumes were provided to each construction company for their use. Over 70 students participated in the career fair. The CSU Board of Trustees also walked through the career fair and they were very impressed with the turnout. Photos of the event are posted on the School's website. Many students have been contacted for interviews since the career fair.

Interviewer at the Construction Management Career Fair

Department of Engineering Career Fair

The Department of Engineering at CCSU hosted an Engineering Career Fair on Monday, April 11, 2011. There were 17 companies who participated and approximately 50 students in attendance. Companies in attendance included GE Aviation, General Dynamics, Hamilton Sundstrand, Pratt & Whitney, UPS, and the Connecticut Department of Transportation. There were also several other local mechanical, manufacturing and civil engineering firms represented. Students were able to talk with company representatives first hand to learn about job openings for internships, co-ops and permanent employment. This was the first event of its kind for the Department of Engineering and due to its success it will become an annual event

The School of Engineering and Technology Student Services Center

In the spring of 2011, the School of Engineering and Technology opened its new school based Center as part of a new initiative to provide necessary support to our students to help in retaining them and facilitate an increase in graduation rate. Several of the student satisfaction survey results that have been administered in the last five years and focus group meetings that have been conducted by the school revealed the need for extra provision of service in three areas. These areas are academic advising, tutoring, and provision of guidance for work opportunities. Because of these needs, the school administration established the center to help students in the outlined areas.

In the area of advising, the center is staffed by two graduate assistants and two student workers who have undergone training and understand all of the general education requirements, and can answer most frequently asked questions by students. This service provides opportunity to students to have their questions answered especially when the academic advisor is not available. It does not in any way replace the meeting with their regular academic advisors who work with them on a regular basis on all academic as well as professional issues.

The center also provides tutoring to all students within the school on a walk-in basis. Tutors are able to teach several engineering, science, and mathematics courses. The office hours are posted on the center's doors, online and in display cases and an appointment with a tutor can also be requested through the school's web site.

To provide work opportunity services, a new Career Services coordinator has been hired to coordinate all cooperative work, internships, and permanent work efforts for the school. Apart from liaising with companies to find opportunities for students, she also conducts workshops on employment related issues. The School of Engineering and Technology is happy to welcome **Diane Hunter** to this position. I must mention that Diane is not new to the School of Engineering and Technology as she has taught as an adjunct professor for the department of engineering for many years.

The center works closely with the Center for Advising and Career Exploration (CACE) as well and the Learning Center which are well established and cater to all university population in providing advising, career information, tutoring, and several other services targeted at enhancing student success.

The center is located in Nicholaus Copernicus 241. If you have questions and comments about the center, please do not hesitate to contact **Dr. Olusegun Odesina** at (860) 832-1800 or via e-mail at odesina@ccsu.edu.

National Helicopter Program at CCSU

In August 2010, CCSU was the host University for a week long National Helicopter Program. The Helicopter Program was funded by the NASA Connecticut Space Grant College Consortium. Students attended from universities as far away as University of Washington, and University of Nebraska, along with students from many other schools that participate in their states College Consortium. The week long helicopter program was an intense program that involved classroom instruction, actual demonstration and laboratory experimentation involving, aerodynamics, helicopter principles of flight, wind tunnel testing, vertical takeoff remote control aircraft design and construction, Unmanned Aerial Vehicle, UAV, Technology coupled with visiting KAMAN Aerospace and Sikorsky Aircraft helicopter manufacturing.

Senior mechanical engineering and mechanical engineering technology students from the Department of Engineering at CCSU participated in the event and built two large helicopter rotor blade test fixtures used for experimentation during the week. The helicopter rotor blade test fixtures were used to collect experimental data for designing a human powered helicopter. The air foil ribs and part of the rotor blades were manufactured at East Haddam high school.

Students started off the week by flying remote control helicopters and airplanes. The second two days involved class room instruction followed by experimentation with the helicopter rotor blade test fixtures, building vertical takeoff remote control aircraft and actual flying of helicopters.

During the mid week, students went to the University of Hartford to wind tunnel test scale helicopter bodies that were be used to design an intermeshing UAV helicopter similar to the K-MAX helicopter. **Professors Fu-Shang (John) Wei** and **Alfred A. Gates** received NASA funding to develop the UAV helicopter.

Students and instructors visited KAMAN Aerospace where they viewed testing of the K-MAX (Burro) UAV Helicopter. The students also talked to engineers about helicopter manufacturing. The following day students received classroom instruction on fixed wing UAV technology developed at CCSU Department of Engineering, followed by a plant tour of Sikorsky Aircraft.

The final day of the week long helicopter program students attended a UAV flight demonstration using a UAV Aircraft that was built in the UAV course the day before. The students also got to see if the aircraft they designed and built would fly. **Professor Gates** and CCSU mechanical engineering graduate **Luke Ionno** successfully flew every aircraft built by 9 student teams.

CCSU Helicopter Flight Simulator

Students in the Engineering program are in the process of building the first fully functioning helicopter flight simulator in the history of CCSU. This project is being spearheaded by **Dr. Gates** and **Dr. Wei,** who presented the idea to CCSU students in October 2010. The goals of this project are: to encourage students to participate in student-faculty research projects; to use off-the-shelf hardware and software components to build a cost-effective flight simulator; to give students more time and opportunities to conduct their senior projects; to let students put what they have learned in the laboratory and the classroom to use in real engineering applications; and to provide students with hands-on experience on how to fly a helicopter. Figure 1 presents a preliminary CAD drawing of the helicopter cockpit and control stick.

The initial design concept was to make a stationary flight simulator that could teach students the basics of piloting a helicopter. However, the students involved decided to take the concept a step further and design a motion platform to simulate the full effects of helicopter flight. The Bell 206 helicopter was chosen as the basic design structure for the simulator and has been used as a reference for all measurements and design requirements. Recently, a few of the students involved in the project had a chance to take a look at the actual helicopter they are basing the simulator on. (See Fig. 2)

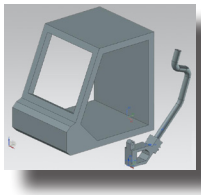


Figure 1

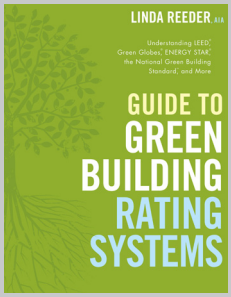
Figure 2

Figure 3 presents a Bell 206 helicopter flight control panel arrangement. This photo was taken during the trip. The flight simulator will have realistic motion based on flight path, realistic gage clusters, and chassis to scale with fully functional controls. The design requirements include a two-place side-by-side seat with moving base (pitch, roll & yaw) and dual control; hands-on control instruction for hover, turns and maneuver training; and the flight and engine instrumentation displayed on a computer.

Figure 3

The entire design project was divided into nine groups of 2 to 3 students each. The design groups are in charge of the overall arrangement – CAD drawing, hardware and software design, and FEA analysis. The hardware design includes flight control, computer & display, cockpit instruments, motion platform, navigation system, helicopter system and warning systems. The group hopes to have a fully functioning cockpit built by the summer and to begin building the motion platform in the fall of 2011.

Linda Reeder, AIA, LEED AP, Assistant Professor in CCSU's Department of Manufacturing and Construction Management, has written a book on residential and commercial rating systems. Rating systems provide a metric for determining how "green" construction is. Published by John Wiley & Sons in 2010, the book is titled Guide to Green Building Rating Systems: Understanding LEED, Green Globes, ENERGY STAR, National Green Building Standard, and More. It includes an in-depth look at and comparisons among the major national rating systems; how the ratings systems work for different types of buildings- commercial, multi-family residential, and single-family residential, construction; and illustrated case studies from different climate regions with project descriptions, cost data, and lessons learned by design teams, constructors, and owners.



GO FOR AEROSPACE!

With funding from the National Aeronautics and Space Administration (NASA), the School of Engineering and Technology has developed an innovative, year-long program to reach out to high school juniors with high potential in math and science and excite them about careers in aerospace engineering. Now in its third year, "Go For Aerospace!" provides mentoring and support to these students and encourages them to pursue a degree in engineering. Based on the recommendation of high school math and science teachers in several districts including New Britain, Waterbury and Hartford and Bridgeport, more than forty high-achieving high school juniors are participating this year.

Zdzislaw Kremens, dean of CCSU's School of Engineering and Technology, conceived the idea for the program, which is being implemented by four faculty, **Nidal Al-Masoud**, **Peter Baumann** and **Viatcheslav Naoumov**, from the Engineering Department, and **Michele Dischino** from Technology and Engineering Education.

"These professors hope to inspire the next generation to consider careers in the aerospace field," Dean Kremens said. "Too few students recognize the opportunities available to them with an engineering degree."

Ms. Rachael Manzer delivers the keynote address.

The 2010-2011 program kicked off with a dinner at CCSU for the students and their parents, nominating teachers, industry and public education representatives, and university officials. **Ms. Rachael Manzer** delivered the keynote address. Ms. Manzer is one of seven teachers nation-wide selected as the first astronaut-teachers to participate in the nonprofit Teachers in Space program.

During the spring semester, the high school students participate in four full-day field trips, during which they work with CCSU faculty and students on projects related to mechanical and aerospace engineering, and visit companies including Hamilton Sundstrand, Pratt and Whitney, Kaman and Trumpf to tour research and manufacturing labs and speak with practicing engineers.

The culminating event will be a summer institute where students will spend four days at CCSU participating in activities including seminars and workshops designed to familiarize them with campus life and the college application process. Students will then travel to NASA's Goddard Space Flight Center in Maryland for a five-day visit during which they will learn about state-of-the-art engineering directly from Goddard scientists who operate most of NASA's research satellites. The trip will also include a tour of the Smithsonian Institution's National Air and Space Museum in Washington, D.C.

Dr. Zdzislaw Kremens, Dean of CCSU's School of Engineering and Technology, joins high school juniors at Go For Aerospace event

UAV Intermeshing Rotor Helicopter Design and Testing

Spring 2010 CCSU faculty, **Dr. Wei** and **Dr. Gates,** proposed and was awarded a research grant from the Connecticut Space Grant Consortium to investigate the development of a K-MAX scale UAV helicopter.

The goals of this research project are to develop a programmable autonomous helicopter with a high flight time and a high lift to power ratio. Another key goal of the project is to increase student involvement in faculty research and increase the interest in aerospace projects.

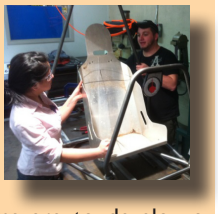
To maximize the potential of this research two baseline remote control, RC helicopter sizes are being investigated. The reason for the two baseline sizes is to develop formulas based on the aerodynamic scaling law that can be used to predict the performance of other sizes of RC helicopters. In addition, the scaled intermeshing rotor helicopter can be used as a helicopter rotor research and development test bed for data collection with only a fraction cost of a real helicopter. The size of the RC helicopters are 400 (711 mm, 28 inch rotor blade diameter) and 700 (1630 mm, 64 inch rotor blade diameter). Also students and faculty developed a RC helicopter design that utilizes RC technology but represents the K-MAX intermeshing helicopter built by KAMAN Aerospace. The performance of the K-MAX RC helicopter were tested and compared with off the shelf, 400 and 700 size RC helicopters using a test fixture built by senior mechanical engineering technology students during the fall 2010 semester.

The test fixture has been developed to test RC helicopters ranging from a 200 size all the way up to the 700 size. A 700 size helicopter can generate over 25 pounds of lift force. The test fixture will be used to determine the lift, pitch, roll and yaw forces and moments. Another capability of the test fixture is that a helicopter can be set up to fly in a predictable manner by using the load cell information from the test fixture. This will aid in the minimization of costly crashes. The main purpose of the test fixture will be to determine the lift to power ratio of helicopter designs. A desirable quality of a helicopter is a very high lift to power ratio like the K-MAX helicopter which can lift twice its weight.

Human Powered Vehicle Team

The Human Powered Vehicle Team and the School of Engineering and Technology hosted the 2010 American Society of Mechanical Engineers HPV Challenge at Stafford Motor Speedway in Stafford Springs, CT. The three day event attracted 24 schools from South America, Canada, and the United States of America. The competition consisted of a single day of presentations and dynamic safety inspections and two days of speed and endurance racing. The event was extra exciting this year with the addition of 40 mile per hour wind gusts, lightning, and torrential rain. The CCSU vehicle "Devil's Chariot" earned ninth place in the unrestricted class. The CCSU team is currently completing their next ASME entry for 2011 to be raced at the Indianapolis Motor Speedway on April 29th through May 2nd.

Formula SAE Design, Fabrication and Competition



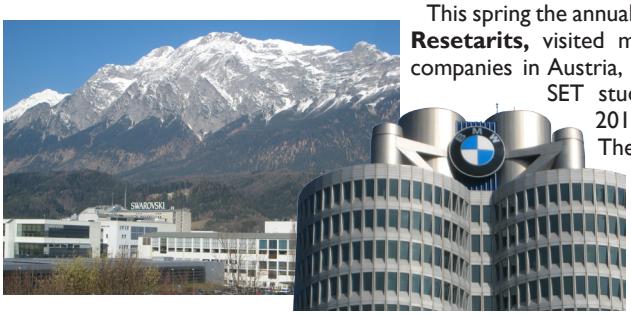
Students from the School of Engineering and Technology have entered the 2011 Formula SAE Collegiate Design Series to be held at the Michigan International Speedway May 11 through 14. Students will be representing CCSU and competing head to head against 120 of the top universities from around the world.

The concept behind Formula SAE is that student design teams are to develop a prototype Formula-style race car. The race car is of a space frame design with a wheelbase of five feet and uses a 600 cubic centimeter motorcycle engine. Each student team designs, builds and tests a prototype vehicle based on a series of strict rules which are designed to promote comprehensive problem solving while encouraging creativity in engineering design. The prototype vehicle will be presented and scored based on the demonstration of sound engineering principles as well as engineering innovation. After successful completion of a rigorous technical inspection, students will participate in the highly competitive dynamic events which include acceleration, breaking, skid pad, autocross and endurance.

The Formula SAE team, under the guidance of team captain **Ryan Garvin** has been working diligently since September 2010. Thousands of person-hours from a cross functional team of students, of all disciplines, has contributed to the great success and many accomplishments already achieved this year. The team is in the final stages of manufacturing and plans to unveil the prototype vehicle at the C3 Car Show May 1st.

Professors Frank Lahey and **Peter Baumann** are serving as faculty advisors to the team, and much appreciation goes to the entire faculty who has contributed both their time and engineering insight to further develop the students' talent. Gratitude also goes to the Dean's and the Department Chair for their administrative assistance and monetary support as well as the Student Government Association, Student Activities and Leadership Development, and private donors without which this program would not have been possible.

CCSU Students Gain Valuable International Experience



This spring the annual course abroad lead by **Dr. Paul Resetarits,** visited manufacturing and construction companies in Austria, Germany and Lichtenstein. The SET students travelled March 17- 26, 2011, during the Spring Break. The trip started in Dornbirn, Austria where the students were hosted by Vorarlberg University of Applied Sciences Fachhochschule Vorarlberg (FHV). The students met with their counterparts from FHV and gained a better understanding of the educational system in Austria. Professor Carsten Bartsch provided very interesting lectures on the current makeup of the European Union and the troubles with their Euro currency.

The students visited the World Headquarters and factory of Hilti the maker of power tools for the construction industry and Liebherr who produces some of the largest heavy equipment such as cranes and excavators.

The students spent a day in Innsbruck, Austria visiting world famous Swarovski Glass in route to Munich Germany where they toured BMW World and the BMW Museum. In Stuttgart, Germany the students visited a Mercedes-Benz factory for a tour and then went to the Mercedes-Benz museum which chronicled the development of the automobile. The students did a comparative analysis of the companies visited.

All students earned three credits in Technology and three credits toward their international requirement for graduation. Plans are currently underway to offer this course again next spring and to add Porsche – Audi. For more information contact **Dr. Resetarits** at resetarits@ccsu.edu

Program continued from page 1

of different job types are available. This was addressed statistically via a review of current advertised job openings, and a questionnaire survey of potential employers of our graduates.

The new Bachelor of Science in Robotics and Mechatronics Engineering Technology program is to prepare undergraduate students with intensive technical knowledge in the fields of computer, electronics and mechanical applications. The program is intended to graduate professionals who are well prepared in designing, improving, or maintaining robotic systems, manufacturing automation systems, and process control systems. The program develops mind-set and vision in students and prepares them to advance their career by continuing self development, creating innovative practical solutions to diverse real world technical problems.

Eligibility for admission to the Robotics and Mechatronics Engineering Technology Program are the same as general admissions criteria to CCSU. However the candidates are strongly encouraged to complete pre-calculus or calculus and two years of foreign language class in the high school.

The Bachelor of Science in Robotics and Mechatronics Engineering Technology is a program of study requiring 130 credits of undergraduate work including a one term senior project capstone requirement. This program also requires a 480 hour summer internship in relevant industries as a graduation requirement. An important educational aspect of this program is its focus on development of critical, logical thinking for problem solving and practical/hands-on skills of the graduates through a laboratory component in all technical courses designed for this major.

Overall, Robotics and Mechatronics Engineering Technology Program is an applied-science, engineering technology and research-based field with strong practical applications. The Robotics and Mechatronics Engineering Technology program was designed with intention to meet or exceed all the relevant TAC of ABET standards.

The application for licensure was prepared concurrent with the University review process during Spring 2011 term by faculty of Manufacturing and Construction Management Department. The package now awaits submission to the Department of Higher Education. If licensure is approved by the Department of Higher Education, the School of Engineering and Technology is prepared to offer the program in the Fall of 2012. Interested personnel may contact the Manufacturing and Construction Management Department for additional information.

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