

# CENTRAL CONNECTICUT STATE UNIVERSITY

# INFOTECH

## SCHOOL OF ENGINEERING & TECHNOLOGY NEWSLETTER



More than two dozen juniors with high potential in math and science have been chosen for Go For Aerospace!, a program undertaken by Central Connecticut State University. The students, from New Britain, Hartford, Waterbury, Bloomfield and Bridgeport, were nominated by their math and science teachers for their high achievement.

CCSU received a grant from the National Aeronautics and Space Administration for a year-long extracurricular program aimed at students uncertain about their college plans. Go For Aerospace! will provide mentoring and support, as well as opportunities to explore engineering.

This spring, the high school students will work with CCSU faculty and undergraduates on projects related to mechanical and aerospace engineering. They will also visit industrial aerospace facilities. Hamilton Sundstrand, Pratt and Whitney, Sikorsky and Trumpf will open their research and manufacturing labs to the students who will be able to speak with company engineers.

**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 Naumov**, 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.

"The job prospects for engineering majors are promising. There are more job openings than there are graduates to fill them."

The program kicked off with a dinner at CCSU for the students and their parents, nominating teachers, industry and public education representatives, and

**Students from five Connecticut school districts will see a piece of the moon and examples of satellites and rockets this summer as part of a program to encourage students to pursue a degree in engineering.**

university officials. **Captain Daniel Burbank**, a NASA astronaut and U.S. Coast Guard aviator, delivered the keynote address.

He told the students what life is like in space, explaining how astronauts eat their meals and take care of personal hygiene. He also outlined possible future missions and their inherent challenges, reminding students that NASA will be counting on the next generation of engineers to make these operations successful.

Capt. Burbank encouraged the students to persevere as they face academic and personal difficulties. "The first time I applied for the Coast Guard I was rejected," he said, "and the first time I applied for NASA I was also rejected. Don't give up."

The highlight of the Go For Aerospace! program could well be the summer institute. Students will spend three days at CCSU becoming familiar with the college application process and campus life.

Next, the students will travel to NASA's Goddard Space Flight Center in Maryland for five days. There they will see an authentic moon rock, walk through a full-size rocket garden and learn about state-of-the-art engineering directly from Goddard scientists who operate most of NASA's research satellites.

The trip will continue on to Washington, D.C., for a tour of the Smithsonian Institution's National Air and Space Museum.



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CCSU is a university of  
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In the center is Captain Daniel Burbank surrounded by the program students.



## DEANS' CORNER

Dr. Zdzislaw B.  
**KREMENS**

Whenever economic downturns occur, education becomes more important than ever, enabling critical investment in a

more prosperous future and presenting the most promising path to economic recovery. In fact, a very well educated workforce is vital for the prosperity of any nation. In our increasingly technology-dependent world, the STEM (Sciences, Technology, Engineering and Mathematics) disciplines will play an ever more critical role in economic recovery and future growth.

That means, among other things, that we will need to attract the most talented high-school graduates, reaching out especially to those talented students in underrepresented and underprivileged groups who, for various reasons, might not otherwise pursue higher education. At the same time, we will need to provide educational opportunities for adults who will be looking for new professional careers as technology continues to change the way that businesses and companies operate.

As a regional university, CCSU is uniquely poised for success. We offer an easily accessed location, programs

of exceptional quality, well-equipped facilities, and an outstanding faculty skilled in their disciplines and fully versed in the best practices of “real-world” engineering and technology. In addition, our students’ enrollment rate, their retention, and their employment success after graduation convincingly demonstrate that we are a major contributor to the state’s economy. For over ten years we have generated continuously increasing enrollment, including a 10% surge during the current academic year. This is very good news, but it also points to a challenge we face, as we are evidently reaching our capacity while current financial constraints limit our potential growth.

### Looking Back

This past year was very successful in many ways as we launched numerous recruitment and community outreach projects:

- “Go for Aerospace,” a NASA-sponsored recruitment program for high school students
- “Girls in Tech” Expo at CCSU for middle school students
- “Pathways/Senderos” research program for New Britain students led by Bio-molecular Sciences Department faculty, and many other departmental initiatives.

In addition, we became a genuine

Connecticut hub in robotics by offering three state-wide competitions in robotics:

- the 10th FIRST LEGO League Robotics Competition for middle schools in December
- the 3rd BEST Robotics Competition for both middle and high schools in October; and
- the 1st VEX Robotics Competition for high school students in April.

### Looking Ahead

We hope to offer these events every year, to promote robotics programs in both high and middle schools, and, ultimately, to recruit the most talented students to the School of Engineering and Technology. Based on these educational efforts as well as numerous student/faculty research projects, we are applying for federal support to create a Robotics Research and Education Center at CCSU.

Our commitment to students’ success and to excellence in education is well articulated in our newly developed Strategic Plan, which is currently navigating the approval process. Based on our accomplishments, our strengths and our contributions to the State’s vital need for a well-educated STEM workforce, we are looking optimistically to future opportunities, whatever they might be.

## Nancy Krackowsky

appointed new Associate Dean in the School of Engineering and Technology



The School of Engineering and Technology is pleased to welcome **Nancy KRACKOWSKY** as its new associate dean. Nancy brings to her new position a combination of both industry and academic experience. She has over 20 years of manufacturing and engineering management experience, primarily with Digital Equipment Corporation and has served as adjunct and full time faculty at CCSU in the Manufacturing and Construction Management and Computer Electronics and Graphics Technology departments. Most recently, as Business Development Administrator at CCSU Institute of Technology & Business Development, she worked with the CT Department of Transportation to implement the Connecticut Business Opportunities & Workforce Development Center.

Nancy received a B.S. in Elementary Education and a M.S. in Technology Education from CCSU and holds a CPIM Certification from the American Production and Inventory Control Society. The focus of her responsibilities for the School of Engineering and Technology will be in the areas of resource and facilities management and academic affairs. We are pleased to welcome Nancy to our School and look forward to working with her.

# NEW FACULTY



**Thomas J. VASKO**, PhD, PE, joined the Department of Engineering in the fall 2008 semester after retiring from United Technologies Corporation. Dr. Vasko began his UTC career as an analytical engineer at Hamilton Standard, and then transferred to the UTC Research Center Applied Mechanics Group, where he was a specialist in nonlinear structural analyses utilizing the finite-element method. In 1997, he transferred to Pratt & Whitney, where his primary

responsibility was the design and analysis of jet-engine components for bird-strike and containment. In 2002, he was named a Pratt & Whitney Fellow in Computational Structural Mechanics. While at UTC, Dr. Vasko held adjunct-instructor faculty positions at the University of Hartford and RPI Groton. He holds a PhD in ME from the University of Connecticut, an MSME from RPI, and a BSME from Lehigh University. In 2004, he received a NASA award as a member of the Jet Engine Containment Concepts and Blade-Out Simulation Team. He is a licensed Professional Engineer in Connecticut and he is currently Vice President of the Connecticut Society of Professional Engineers. His research interests include advanced finite-element techniques with both aerospace and manufacturing applications.



**Dr. Haoyu WANG** joined the Department of Manufacturing and Construction Management in the Fall 2008 semester, and has been teaching courses in CAD, materials, and tool design. Dr. Wang was an assistant professor of Industrial Technology with Bowling Green State University between 2004 and 2008. He received his Ph.D. in Mechanical Engineering from Syracuse University in 2004. Prior to that, Dr. Wang lived in China, where he received his B.S. in Mechanical

Engineering (1994) from Hebei Institute of Technology and M.S. in Mechanical and Electronics Engineering (1996) from Harbin Institute of Technology. His research interests include Injury Biomechanics, CAD, Tolerance Analysis and Synthesis, Quality Control, Assembly Modeling, and Robotics.



**Dr. Mohamed GADALLA** joined the Engineering Department in the Fall 2008. Dr. Gadalla has a Ph. D. in Mechanical Engineering from the University of Western Ontario in Canada. He graduated with honor from Cairo University with B.Sc. in Mechanical Engineering followed by a Master degree (M. Sc.) from the same university. He served as a research engineer and visiting scholar in several universities in the USA, Canada, Germany, and Egypt. He also served as a program

coordinator for the computer Integrated Design and Manufacturing at Kean University. Dr. Gadalla joined industry as an application engineer designing Computer Maintenance Management (CMM) programs. He also worked in industry as a CNC programmer and manufacturing engineer. He has published over 32 papers in journals and conference proceedings, including articles on curriculum research and workforce development.

**Amy (Curtin) SHWISHA** graduated from CCSU School of Technology in 1992 with a BS in Engineering Technology, and earned her Masters of Science in Industrial Technical Management in 2000. In 2005, she earned her MBA in an accelerated 2-year online program at Indiana University, Kelley School of Business.



## AMY (Curtin) SHWISHA the School of Engineering and Technology's 2008 Outstanding Alumnus

Amy is a lead engineer in the Preliminary Design Group at Sikorsky Aircraft in Stratford, CT ([www.sikorsky.com](http://www.sikorsky.com)). As a lead engineer, Amy provides technical support to the sales group. In this role, Amy interacts with many different business units from platform engineering, to sales and marketing to legal and export controls. Working primarily on International and U.S. Government proposals, Amy provides support for upgrades/modifications to existing platforms, systems engineering and new technologies.

Previously, Amy worked at Kaman Aerospace Corporation in Bloomfield, CT where she began her career in airframe design using UniGraphics 3-D modeling software to design new cockpits and cabin arrangements for SH-2G helicopters. She eventually transitioned into a business development role at Kaman, a small-family owned company, which provided unlimited opportunities for learning all aspects of civil and military helicopter design and operations. This prepared her for her current job at Sikorsky.

Amy received the Young Alumni Award from CCSU in 2001. Additional achievements as an officer in the American Helicopter Society include: Most New Members (1998, 1999) and Greatest Percentage Member Increase (1998).

Amy is married to Dan, who she met on a blind date set up by her CCSU roommate, and is the mother of two boys Jack (2) and Nicholas (1) living in Woodbridge, CT.

### Construction Management student named **Construction Supervisor of the Year** by AGC-CT



At its annual awards banquet on November 13, 2008, the Associated General Contractors, Connecticut chapter, named **Ms. Basia PONTELLO** its Construction Supervisor of the Year for 2008. Ms. Pontello graduated cum laude from CCSU in 2008 with a B.S. in Construction Management. While at CCSU she was very active in the Construction Management Student Club, serving as the organizer of the Construction Career Expo in 2007, 2008 and 2009 even after she had graduated. She was also active on the Dean's student advisory committee. Currently, Ms. Pontello owns her own company, Pontello Construction Management, LLC, and is also a certified technician in Pervious Concrete and Flatwork.



On December 14, 2008, the School of Engineering Technology organized and hosted the tenth Connecticut FIRST™ LEGO® League Robotics Competition. Designed to inspire middle school students to learn more about math, science, engineering and technology, the “Climate Connections” challenge competition brought together approximately 500 middle school students. The students designed, built, and operated LEGO® Robots in an exciting robot game, which was the most visible portion of the challenge.

In addition, the middle school students presented their original research related to climate changes. The challenge was focused on exploration of the earth’s climate and discovering links between science, people, resources and communities. Students had to identify a problem caused by climate in their own geographic area as well as in another place in the world, analyze climate data, and discover what the communities were doing to solve these problems.

## Connecticut FIRST™ LEGO® League Robotics Competition

Fifty teams of middle school students (ages 9 through 14) had been selected through five local competitions



and participated in the State Championship at CCSU. In total, over 1000 students (103 teams) from Connecticut middle schools participated in the FLL program this year.

The event was co-sponsored by Northeast Utilities, Millstone Nuclear Power Station and CT Science Center and was co-organized by Technology and Engineering Education faculty and students and Michael Gentry and Matthew D. Starkey of Northeast Utilities.

Top. Members of Girls incorporated of Southwestern Connecticut readying their robot. Bottom. St. Mary School students and parents cheering on their team.

## Just PLANE CRAZY



The School of Engineering and Technology hosted the VEX Robotics Challenge for high school and middle schools from New York, New Jersey, Massachusetts, and Connecticut on April 5th, 2009 in Kaiser gymnasium. Thirty five teams competed in head to head competitions attempting to secure as many points possible by manipulating foam cubes into specified locations with remotely controlled and autonomous robots. One of the event organizers for the VEX competition, Assistant Professor of Technology & Engineering Education David Sianez, notes, “Robotic competitions such as VEX provide challenging opportunities for all middle and high school students to explore technological solutions while integrating academic topics to concrete experiences.”

Third annual “BEST” Robotics competition for the northeast region was held on Sunday, October 19, 2008 at Central Connecticut State University. This year, over 25 schools and more than 500 students participated. The contest has drawn teams from the Connecticut, New York, New Jersey, and Massachusetts schools.

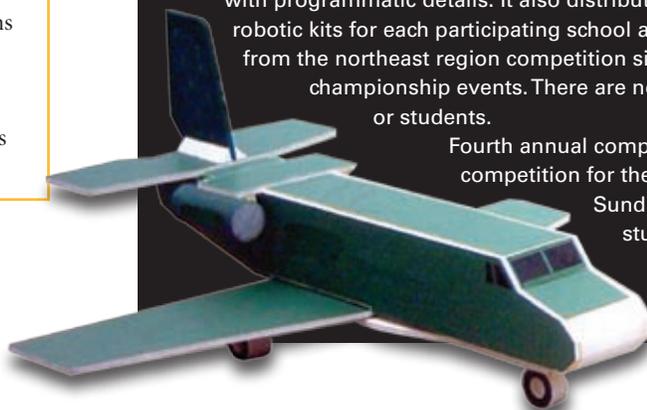
BEST stands for “Boosting Engineering, Science and Technology.” BEST Robotics, Inc., the contest’s governing body, is a nonprofit, volunteer organization whose mission is to inspire students to pursue careers in engineering and science through participation in a science-and-engineering based robotics competition.

“Just Plane Crazy” was the theme of the competition hosted by CCSU’s School of Engineering & Technology. Major sponsorship funding was provided by Pratt & Whitney, a United Technologies company, which is a world leader in the design, manufacture, and service of aircraft engines, industrial gas turbines and space propulsion systems. Lowes of Newington is also a sponsor of the event.

The competition scenario: “Just Plane Crazy is driven by the growing demand for commercial and general aviation aircraft. Record sales have contributed to sizable backlogs for aircraft manufacturers. More manufacturing capacity is needed to meet present and forecasted demands. Engineers believe that part of the solution will lie in factory automation, and by streamlining existing processes. Experts within the industry that have relied upon traditional methods believe that using robots is “Just Plane Crazy” and have declined to pursue it. The project focused upon the BEST way to assemble an aircraft using robots that integrate BRAIN (Best Robotics Advanced Instruction Node) control. Teams competed against each other to produce the most effective and time-efficient assembly procedures.

The School of Engineering & Technology provided high and middle schools with programmatic details. It also distributed consumable and returnable robotic kits for each participating school at no cost. Winning five teams from the northeast region competition sites advanced to regional championship events. There are no costs for participating schools or students.

Fourth annual competition “BEST” Robotics competition for the northeast region will be held on Sunday, 1 November, 2009 at CCSU’s student center. Please visit [www.ccsu.edu/technology/CTBEST/](http://www.ccsu.edu/technology/CTBEST/) for further information.



# School of Engineering and Technology Encourages and Fosters Student-Faculty Activities and Research Endeavors

## Associated Schools Of Construction Regional Competition Fall 2008

### Documenting Alterations Development of Zebrafish

Since arriving in the fall of 2007 **Dr. Dobbs-McAuliffe** of the Biomolecular Sciences Department has been conducting research with students in the area of developmental biology. Projects in the laboratory investigate the events that transform a single celled embryo into a complex adult organism. In particular their research focuses on the molecular events that promote particular cells within the embryo to become muscle fibers. To study these very early events in embryonic development they use zebrafish as a model organism. Zebrafish are used extensively in research due to their many advantages, such the large number of small, externally fertilized, transparent embryos they lay. These embryos, the size of a letter on a penny, can easily be collected from tanks containing adults and used for experiments. Grants from the School of Engineering and Technology have funded the purchase of microscopes and microinjection equipment for these experiments. With this equipment students are now taking the very youngest embryos and injecting them with small molecules that turn particular genes off. They can then watch the embryos grow to see if the genetic manipulations have altered the way the muscle in the embryos develops. These data have implications for understanding the molecular biology of human muscle development as the genes involved in this process in zebrafish and humans are the same.



Left. Student researchers altering development of zebrafish embryos using microinjection equipment funded by the School of Engineering and Technology. Left to Right, Kristina Carlson, Zanna Aristarhova, Elia Lopez-Bernardo



Right. Student Researcher Elia Lopez-Bernardo observing zebrafish embryos using a stereomicroscope purchased through grants from the School of Engineering and Technology.

Central Connecticut State University has been participating in this competition since its inception 19 years ago. The competition started simply as an estimating and scheduling problem and it has evolved into three separate divisions; Design Build, Heavy/highway and Commercial Building. Teams are comprised of six students. Central competed in all three divisions last year thus providing 18 students with one of the best academic experiences of their college career. **Dr. Kovel** coached the Design Build team which came in second place. **Dr. Hammad** coached the Heavy/highway team and **Dr. Perreault** coached the Commercial Building team.

The Heavy/highway team placed first in 2004 and the Commercial Building team placed first in 2000 and 2002. Regional winners compete in the National Student Competition which we have done three times. We also have placed second in 2006 and third in 2003.

Corporate sponsors such as Whiting Turner, Perini, Skanska, Turner, Shawmut, Konover, Pizzagalli, Weeks Marine to name a few, provide the problem, judges and prizes for the winners. First place prize is \$2,000 for the team, *Winest* estimating software for second place and *Means* dictionary for third place. During the exit interviews with our Industrial Advisory Board, students who competed have consistently indicated that the competition was the best educational experience that they received at CCSU. Dr. Perreault is the founder of the regional competition.



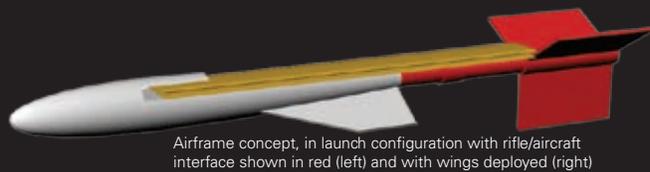
### Cardiac Cell Analysis

The hypothesis behind the project is that cardiac fibroblasts, the most numerous cell type within the human heart, is exposed to constant stretch as the heart fills with blood and expands. Increased stretch or rate of stretch can change the gene expression of the fibroblasts, causing them to produce more collagen or to act as smooth muscle cells. Cell culture is done in static cell culture dishes, which is nothing like the physiological environment of the heart. This project began in January, with a new pacing engine designed and constructed by Dr. David Sianez. Using this device, we are able to adjust the frequency of stretch of fibroblasts and the force of stretch. Five BMS students are growing cells, pacing them and then testing for changes in protein production caused by changes in gene expression. This device is unique as is this cardiovascular research. We expect to present results at the end of the semester at the BMS departmental poster session.

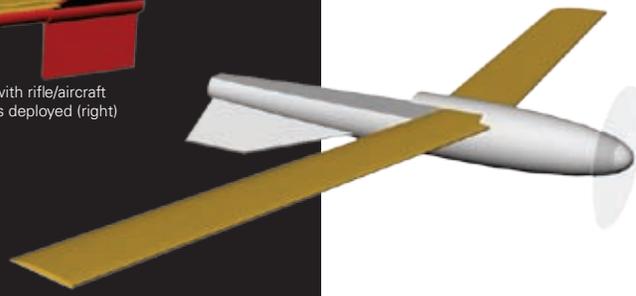
# Unmanned Aerial Vehicle & Launching System

**Luke IONNO**, a mechanical engineering student and mechanical engineering technology graduate, received funding from the Connecticut Space Grant Consortium to develop an Unmanned Aerial Vehicle and Launching System. The overall goal of this project is to develop and fabricate a compact UAV, capable of rapid, vertical deployment from confined, urban areas, and suitable for use as a squad-level assist. The aircraft would share many of the core technologies demonstrated by the RC/P-SUAV, and would maintain a low per-unit cost of less than \$2000 for the airborne element of the system. In order to achieve this goal, the aircraft would be equipped with a launch adapter, which would allow it to be fired from a 22mm grenade-launcher barrel fitting, found on the AR15, M16, and M4 assault rifles, employed by law enforcement and US military forces.

The aircraft would be small (approximately 350mm long, with a 760mm span) and lightweight (200 g). When stowed for transport, the fully assembled aircraft would fit inside a tube, similar in size to the storage tube for a mortar cartridge. To allow storage and to minimize stresses during the high speed portion of the launch profile, the aircraft would have swing wings, as shown in Figure 1; these would extend automatically after the aircraft was launched. The propulsion system would consist of a small electric motor, powered by lithium batteries. Flight times of 10-20 minutes would be typical, with a cruise speed of 50-60 km/h (30-40 MPH).



Airframe concept, in launch configuration with rifle/aircraft interface shown in red (left) and with wings deployed (right)



School of  
Engineering  
and Technology

Encourages and  
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## Formula SAE

The Formula Society of Automotive Engineers (F.S.A.E) is a collegiate design series that represents race car competitions under the jurisdiction of the Society of Automotive Engineers (S.A.E). The SAE regulates a wide range of standards in the automotive world such as those for head light specifications and motor oil requirements.

Students are challenged to build a formula style race car using a strict set of rules and guidelines that is similar to what an engineer encounters in the real world. Teamwork is encouraged with the exchange of brain storming ideas necessary to build a safe, attractive, competitive car.

All aspects of the competitions are managed by students with the guidance of faculty and professionals. These events will involve the student's ability to market a car, design and build the structure of the vehicle, practice high performance driving techniques, and transport the vehicle of designated locations. Each collegiate team is judged based on several aspects of the car such as: safety, aesthetics, performance, cost, fuel efficiency, durability, marketability, and presentation. Our car will be competing against teams from around the world such as the Massachusetts Institute of Technology (M.I.T), the University of Texas - Arlington, the University of Wisconsin (2007 winners), Honda Technical College Kansai (Japan), RMIT University (Australia), and the Rochester Institute of Technology (R.I.T). This annual event attracts thousands of the best, brightest, and most dedicated engineering and business students every year.

**Blue Devil Motorsports** was formed by the students of Central Connecticut State University in the Fall of 2007 with the goal of competing in the 2010 competition. Students and faculty have begun the preliminary planning of the 2010 vehicle. They have recruited former SAE faculty Captain **Frank Lahey**, from the University of Hartford, and **Alfred A. Gates** who will provide the necessary insightful knowledge and reliable experiences to progress through the early developmental stages. The Blue Devil Motor sports program places a strong emphasis on taking new ideas and applying them to each design component resulting in a high performance race car. If you would like more information on F.S.A.E, please visit <http://Students.sae.org/competitions/formulaseries>.



Formula Style Race Car



## School of Engineering and Technology Student wins National Robotics Competition

**Jeffrey RODRIGUEZ**, a Technology and Engineering Education undergraduate major, was the winner of the Technology Education Collegiate Association (TECA) Robotics Contest held at the ITEA Conference in Louisville, KY the last weekend of March 2009. Jeff competed on the national level with teams from several other universities.

This year's competition required that contestants manipulate tennis balls about a playing field in order to score points. Contestants were also required to document the robot design process as well as compile and submit a design notebook for review.

With the help and support of the Technology & Engineering Education Department and the School of Engineering & Technology, Jeff designed and built an ingenious radio controlled, 4 wheel drive robot that was powered by twin 12 volt Dewalt drill motors and batteries. His robot was the fastest of all those competing. Even though his design included a three speed transmission, he easily beat the competition in this time trial event, and never had to shift beyond first gear! Jeff modeled the entire robot in Autodesk Inventor before building it and did a great job of documenting the design process. As a result, he also scored well above the competition in Design Notebook points.

Special thanks go to Jeff Rodriguez for bringing national recognition to the Technology and Engineering Education Department and the CCSU School of Engineering and Technology.



# INTERSECTING PATHWAYS

## Biomolecular Sciences and the Pathways/Senderos Center Pathways/Senderos Goes to College

This year the Department of Biomolecular Sciences embarked on a new community engagement project that aims to bring teens into our research laboratories as interns working with advanced CCSU undergraduates on current research projects. The department has teamed up with the Pathways/Senderos Center in downtown New Britain, a center originally focused on teen pregnancy prevention, to provide an experiential learning opportunity and an exposure to a university setting. Students from the Center come to campus one day a week for three hours to engage in an original research project. In the fall 2008 semester, six pathways students worked with three CCSU mentors on two independent projects. One project was in the laboratory of **Dr. Thomas King** investigating the genetic relationship between a rat and a mouse with hair defects.

The other project was in the laboratory of **Dr. James Mulrooney**, examining the role of various proteins in the extracellular matrix that provide a substrate for cell adhesion and migration. This spring, three additional pathway's students and three CCSU mentors were added to the program, along with an additional research project in the laboratory of **Dr. Michael Davis**, investigating the ability of soil bacteria to degrade plastic as a mechanism of improving the environment. This program represents one of many that the Pathways/Senderos Center engages in to help the students identify academic and career goals. Currently

the Center reports a 100% high school graduation rate, with 72% pursuing college degrees.

The department has and continues to be involved in educational outreach that focuses on science enrichment. The majority of these outreach programs take a workshop approach, where a prepared "hands on" experience is delivered to the participants.

The Pathways/Senderos program differs in that it provides a real, basic research opportunity to the participants while at the same time allowing the CCSU student mentors the opportunity to gain valuable experience in planning and directing a research project and mentoring the participants, thus enhancing their educational experience here at CCSU. In this sense the project is mutually beneficial to both the participants and the mentors. When asked about the program,

*"This is an exceptional opportunity for our youngsters. It's a program director's dream come true-to have our youth on campus in a college lab on a weekly basis with individual mentors. The exposure will be expansive for all involved. This opportunity will facilitate their look into college life, careers in sciences, and much, much more."*

*RoseAnne Bilodeau,  
Executive Director,  
Pathways/Senderos Center*

a Pathways participant responded, "It's a great experience. Being able to do this will really help me achieve my goal of going to college". Dr. King, the CCSU coordinator of the program, hopes that bringing these students to campus and providing them with a college-age mentor and a real research project will make a college degree and a career in science a part of their future plans. In addition it is hoped that these experiences will facilitate a smooth transition from high school to college for the participants with the School of Engineering and Technology at CCSU as one of their choices for pursuing a college degree.



Left. CCSU mentor, Damek Spacek with Pathways/Senderos participants, Brandon Carerro and Faith Roldan.  
Right. CCSU mentor, Adrian Pacheco with Pathways/Senderos participants, Marcelino Thillet and Kayla Garcia.

# Manufacturing Laboratories Enhanced through SPE Thermoforming Division Equipment Grant

School of Engineering and Technology Professors **Baumann, Sianez, and Lema** received an SPE Thermoforming Division Equipment

Grant to obtain an industrial quality MAAC ASP thermoforming machine. This machine provides the processing capability necessary to develop prototype models for designs requiring thin walls and medium range of sizes and shapes, or in a similar manner to create finished parts that require formed contours.

This unit contributes to the manufacturing laboratory experiences by introducing the principles of thermoforming technology through applied laboratory experiments and extends our capability to conduct research and development projects that require thermoformed prototypes. Thermoforming equipment over the years has played a major role in the education of our students and contributed to the learning experience through the creation of tooling for product research and development.

The MAAC thermoforming machine is located in the School of Engineering and Technology Plastics and Composites Laboratory within its manufacturing area. Additional laboratory equipment for the processing of plastics and composite materials include: Arburg injection molding machine, Monarch compression molding press, blow molder, ultrasonic welder, Henkel-Loctite adhesive bonding apparatus, composites bagless vacuum molding and curing oven, material dryer and grinder, and mold temperature controllers. The acquisition of the MAAC Thermoforming Machine maintains our ability to provide practical, hands-on exposure to this fundamental plastics manufacturing process within the manufacturing processes courses at our University.



Controller activation of set-up processing.

Students in ME 216 Manufacturing Engineering Processes laboratory, work with University Lead Technician Thomas Chapman and Dr. Peter Baumann, as assisted by student worker Patrick Molitor, to review the thermoforming process and set-up process parameters in the controller to produce a thermoformed desk tray.



Part reviewed for optimizing the process.



## Technology & Engineering Education Student named Finalist for 2009 Women of Innovation

**Laura BAKER**, a senior Technology & Engineering Education major, has been named a finalist for the 2009 Women of Innovation Awards. Laura was the only student from CCSU and the CSU System to be named a finalist. A Dean's List student, Laura's strong academic work complements her commitment to extracurricular activities related to her field. As President of the CCSU chapter of the Technology Education Collegiate Association, Laura works tirelessly to coordinate the chapter's events including the regional conference and associated student competitions, as well as the Electrathon, an electric vehicle design competition for high school students. As a future educator, Laura hopes to pass along her love of science and technology to the next generation. Laura is also a member of the CCSU women's volleyball team and an award-winning vocalist. Laura was nominated for the Collegian Innovation and Leadership category.



## Girls and Technology Expo

On Wednesday, April 1, 2009, Central Connecticut State University hosted its first Girls and Technology Expo in collaboration with the Connecticut Women's Education and Legal Fund. The expo was attended by 120 middle school girls from the Central Connecticut area and consisted of eight different workshops which were facilitated by CCSU professors and students within the technology and engineering education program. The day was meant to develop awareness of the many fields of science and engineering that are available and the important role of women in these fields. The day began with a presentation by School of Engineering and Technology alum, **Paula Chapla**, Operations Manager at Sikorsky Aircraft, who explained the importance of technology and the importance of a woman's role in such fields.

Utilizing CCSU's School of Engineering and Technology laboratories the girls were exposed to multiple topics including graphics design, astronomy, biomolecular science and chemistry – all within student activity-based workshops such as *Pasta Bridges*, *the Stars of Hogwarts*, *What's In Your Food?* *Girls, Start Your Engines!* and *What Makes Me Different From You?* The students' teachers were also part of the day, attending sessions taught by alum **Greg Kane** on how to get their schools involved in Robotics competitions and by **Tina Rivera** and **Susan Pesino** on using technology in the classroom. CCSU's mascot, Victor E, even made an appearance. A special thanks to everyone who participated in this great event.

A 7-year research project involving dozens of undergraduate and graduate Biomolecular Sciences majors—and even some high-school interns—has succeeded in determining the precise genetic defect responsible for mutant rodents named *frizzy*, *fuzzy*, and *hairless*.

This work began in 2002, when a group of 15 student researchers in Dr. Thomas King's lab noticed that the rat *hairless* trait tended to be transmitted to offspring together with albinism. In one semester this group analyzed DNA from a large rat family to determine the location of *hairless* on rat Chromosome 1, in the same position where the rat *fuzzy* mutation had previously been located. Next, these students imported the *fuzzy* rat and were able to show, by crossing *hairless* with *fuzzy* and observing mutant offspring, that both mutations were in the same gene. This team also suggested—but without proof—that the mouse *frizzy* mutation, since it seemed to be located in the right spot in the mouse genome, was likely to be the result of a defect in the same gene. But which gene might that be, exactly?

To answer that question, a new crop of students decided that the best approach would be to map the mouse *frizzy* mutation to such a high degree of precision that only a small number of "candidate" genes would occupy the same interval. This kind of high-resolution genetic mapping is much easier to accomplish with mice than with rats, but unfortunately the *frizzy* mouse was not easy to obtain, since it was not kept as a living stock in any lab in

## Students in Biomolecular Sciences discover one genetic cause of "BAD HAIR" in mice & rats



High school interns Faith Roldan, Brandon Carrero (left), Krystal Garcia, and Geo Martinez (right) with undergraduate mentors Damek Spacek and Amarilis Perez.

the world. We found, however, that we could have frozen *frizzy* embryos "reconstituted" for us, a pricey service that Dean Kremens generously supported with a Student/Faculty research grant. After the *frizzy* mice came to CCSU, another dozen students spent a couple of years making a high resolution map for *frizzy* by analyzing DNA from a very large mouse family.

Last summer, undergraduates Damek Spacek and Amarilis Perez started to assess some of the candidate genes that our genetic map had shown to lie in the vicinity of *frizzy*. One of these, called *Prss8*, peaked their

interest and they decided that they would, with the help of 4 high school interns, determine the complete DNA sequence of the *Prss8* gene in the *frizzy* mutant. This team succeeded in finding a change in just one letter in the DNA code of *Prss8* that they predicted would alter the *Prss8* protein by one amino acid, but they could not say for sure if that change was really responsible for the mutant's curly hair.

To see if this *Prss8* defect really is the basis of curly hair, graduate student Katelynn Ferranti proposed to cross *frizzy* mice with an engineered "knockout" mouse that has no copy of *Prss8*. If the offspring showed bad hair, then we could conclude that *frizzy* and the null mutation both have defects in *Prss8*. Unfortunately, the *Prss8* null mutant lived in Switzerland, and although the owners were graciously willing to share their special mouse,

we had to provide the air fare. Again the SE&T came through with a Student/Faculty grant to cover the cost of importing this animal to CCSU. Luckily the experiment paid off last December. By this time, Damek and Amarilis had already shown, with the help of four more high school interns, that the rat *hairless* mutant also has a defect in *Prss8* (12 missing letters of the DNA code), and with a new set of high school interns this spring, they are close, we think, to finding the *Prss8* defect in the *fuzzy* rat. We hope to submit for publication a paper describing this work by early summer.

### Epsilon Pi Tau – Alpha Eta Chapter Holds Initiation

The CCSU Alpha Eta chapter of EPT held an initiation for new members. The Honorary has been active at Central since 1949 and continues to recognize outstanding students most of whom are enrolled in the Technology & Engineering Education Program. The following new members were inducted at the December 2008 initiation: **Laura Baker**, East Haddam, CT; **Sean Gallagher**, Haddam, CT; **Christopher Garratt**, Marlborough, CT; **Michael Hogle**, Berlin, CT; **Daniel Petersen**, East Haddam, CT; **Jeffrey Rodriguez**, Vernon, CT; **Michael Wilkosz**, East Hartford, CT; **Jonathan Horan**, Avon, CT; and **Matthew Iaccarino**, Wallingford, CT.

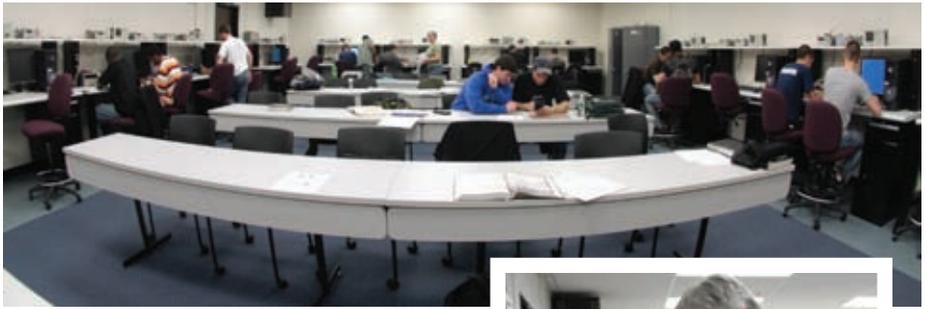
### Human Powered Vehicle

Assistant professor Dr. David Sianez, Department of Technology and Engineering Education, traveled to Reno, Nevada with five School of Engineering and Technology students to compete in the 2008 American Society of Mechanical Engineers Human Powered Vehicle Challenge. The vehicle design, construction, and analysis are one example of faculty/student applied research conducted within the School of Engineering and Technology. The applied research group will be traveling to Drexel University on April 17th-19th to compete in the 2009 East Coast ASME HPV Challenge in the new "Ripped Racer" design. In 2010, CCSU will be hosting 25 Universities at the East Coast ASME HPV competition.



When Copernicus Hall was first built back in the 70's, the then School of Technology had a brand new facility for its laboratories on the ground level. The Electronics labs occupied a double space in the middle of the level. It was quite a show piece with its beautiful, solid maple work benches which held Textronics function generators, power supplies and oscilloscopes. Over time, minor changes took place to update equipment or replace chairs.

Then a few years back, due to employment trends and changes in the curriculum, half the



## Electronics Laboratory "Back to the Future"

electronics space was converted to a state-of-the-art computer networking laboratory. The remaining section of the electronics lab looked pretty much the same as ever, only a bit more worn. Then, this past winter semester, the lab was completely renovated. The dreary linoleum flooring was replaced with static free carpet and rubber flooring, the wooden benches were finally removed and new black and white benches were installed around the perimeter of the room. Seating for students was setup in the center of the room for use during lectures since the space is used for both laboratory and lecture classes. Chairs have been replaced. New equipment was ordered a year ago and is now installed.

These changes in equipment and furniture would not look half as good as they do if it weren't for all the work the Facilities and Maintenance Department did replacing the dirty ceiling tiles, painting the walls, and installing new lights including dimmers to compliment the overhead projection system.

The room looks great and functions very well too! Students and instructors are enjoying the bright, clean efficient space.



## CCSU Team (School of Engineering) on the Ground of NASA Marshall's Space Center

The NASA Marshall's Space Center site posted the picture of CCSU team while students were going through the obstacles on their moonbuggy. The site says that almost 75 high school and college teams from around the world converged on Huntsville, Ala., April 3-4 for off-world racing in NASA's 16th annual Great Moonbuggy Race.

The moonbuggy race, which started in 1994, is inspired by the original lunar rovers designed and built for the Apollo moon missions in the 1970s by engineers at NASA's Marshall Space Flight Center in Huntsville, which organizes the race. America's next-generation engineers, explorers and scientists are building lightweight, self-powered buggies to overcome the challenges of the twisting, half-mile race course.

On a course at the US Marshall's Space & Rocket Center in Huntsville teams propelled wheeled human powered lunar rovers of their own design across a simulated moonscape one like no other racecourse on the Earth. Students strove to post the fastest buggy assembly and race times, competing for the top three prizes in high school and college divisions.

More than 475 high school and college students from 20 states, Puerto Rico, Canada, India, Romania and Germany participated in the races.

The 16th annual Great Moonbuggy Race was the first experience for the CCSU School of Engineering Moonbuggy team which drove their vehicle through the "craters," rocks, "lava" ridges, inclines and "lunar" soil.

The CCSU moonbuggy vehicle was designed, fabricated, and assembled in Senior Capstone Design Class by ME students Aaron Danenberg, Varghese Pravin, Shan Hitesh, Cristina Cook, Nick Cegelka, Kimberly Summers and Elias Geagea, Ayman Eihawli under the supervising of Dr. Viatcheslav Naoumov.

It was an incredible experience of problem identification, research, conceptual analysis and detailed design, procurement and fabrication, testing, and, finally, NASA competition. The CCSU team received the plaque and certificate from NASA Marshall's Space Center for participation in the races.

The CCSU team made its first steps on the "lunar soil"!



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