Kirk Cameron Cuts Computers’ Power Use

by Karen A. Frenkel

After attending a lecture on cutting power consumption of electronic devices, Kirk Cameron a decade ago started pondering electricity usage in the supercomputers he studied.

Powering a big machine of that era, he discovered, cost almost $8 million a year, and technology on the horizon might eat up 10 times as much electricity.

“That scared me,” says Cameron, a computer science professor at Virginia Tech. “The conventional wisdom at the time was that power would not be an issue.”

The realization spurred Cameron, now 40, to develop power management software that today is used on supercomputers — and now PC — worldwide.

While other power-saving programs do little more than turn off the monitor and largely ignore a computer’s central processing unit, Cameron says, his software manages the CPU much like a dimmer controls a light fixture. For reading, you’ll want full light, but for a romantic dinner, low light is just fine.

“You tell the software how aggressive you want it to be,” says Cameron, a lifelong computer buff who started playing Pong on his grandfather’s Atari at age 5. …

Cameron’s work caught the eye of tech staffers at Merrill Lynch (BAC), which was looking for ways to reduce the electric bills at its data centers. In 2007, Merrill paid Cameron to adapt his program for its big See POWER, page 7

Engineer develops new approach for uncertainty estimation

By Lynn Nystrom

Pavlos Vlachos, associate professor of mechanical engineering at Virginia Tech, working with two engineers from Utah State Univ., has won the Lewis F. Moody Award for an outstanding original paper useful to the practice of mechanical engineering. The Moody Award, established in 1958 by the American Society of Mechanical Engineers’ Fluids Engineering Division, will be presented to Vlachos, and his two colleagues, Benjamin Timmins and Barton Smith of the mechanical engineering department at Utah State, at the annual international meeting of the society in Hamamatsu, Japan in July.

The three devised a new method to estimate uncertainty in a specific type of flow measurement, termed particle image velocimetry.

Soon, Helmet Data at A Keystroke

By Alan Schwarz

When a parent or youth-sports official decides which helmet will protect the head of a young football player, hard information ducks for cover.

All results from manufacturers’ laboratory testing are kept tightly confidential by industry agreement. The graphs and percentages that make it into marketing materials — and are often embellished by sales representatives — have become questionable enough that the Federal Trade Commission has been asked to investigate helmet companies for misleading safety claims.

An engineer at Virginia Tech, Stefan Duma, is working to pull back the curtain on the true performance properties of helmets. He is conducting tests and compiling an online database of results, through which one will be able to look up the protective qualities and star rating of every helmet model, much as one can for cars and child booster seats. But even people who applaud Duma’s intent fear that such See HELMET, page 3

Green IT

By Bryan Walsh

Computers seem so clean, don’t they, just sitting there and humming, without any noxious emissions? But of course computers need power, and right now most of our power comes from fossil fuels. Computers and IT are now a small but rapidly growing source of carbon — about 2% of global emissions, a figure that could easily double within a decade.

That’s where green IT comes in. Whether it’s more energy-efficient laptops and server farms, or software that automatically powers down our desktops when they’re not being used, there are ways to curb the IT sector’s energy hunger ways without losing performance. Software like Granola, for example, can run in the background of your operating system and tune See GREEN, page 15

Virginia Tech’s 82 mpg car wins GM/U.S. EcoCAR challenge

By Wendy Koch

How feasible is it to engineer a car that gets the equivalent of nearly 82 miles per gallon? Quite, for a team of students from Virginia Tech University who won first place in a U.S. car contest. …

The team beat out students from 15 other North American universities in the three-year “EcoCAR Challenge” co-sponsored by the U.S. Department of Energy and General Motors. It started with a GM-donated engine from a 2009 Chevy HHR and added a battery and electric motor. It made other tweaks, too, such as eliminating engine idle with stop/start. …
Consumers Detect Odd Odors, Tastes in Water Despite Government Guidelines  

by editorial staff  

People are more sensitive to metallic tastes in their water than federal guidelines about taste would suggest, according to a Colorado State University researcher’s manuscript in the Journal of Water and Health.

Through sensory studies, Pinar Omur-Ozbek, a Virginia Tech scientist (Amy Pruden), thinks she knows why, as WVTF's Sandy Hausman reports...

Antibiotics in Water  

by Sandy Hausman,  
Charlottesville Bureau Chief

WVTF, an NPR affiliate aired the segment “Antibiotics in Water” on Jan. 21, 2011, featuring Virginia Tech Professor Andrea M. Dietrich. A Virginia Tech scientist (Amy Pruden) of civil and environmental engineering...  

Doctors have been battling bacterial infections that resist antibiotics for more than a decade, making it difficult or impossible to treat patients. The call has gone out to stop prescribing antibiotics so freely — to use them only when necessary and appropriate — but the problem of resistance is growing. A Virginia Tech scientist (Amy Pruden) thinks she knows why, as WVTF's Sandy Hausman reports...

Cracked sewers bleed fecal germs  

by Janet Raloff  

New studies in California and Wisconsin reveal a dirty little secret: Out of sight, many urban sewer pipes are failing and germs-ridden...  

The studies tracked material hemorrhaging into storm drains. These pipes, which channel their contents into streams and coastal waters, are designed to collect fairly clean rainwater and runoff off watered lawns. Yet raw sewage at times constituted nearly 20 percent of one local storm drain's flow, reports Patricia Ann Holden of the University of California, Santa Barbara and her colleagues...

The California study is among the first “that definitively links leaky sewers to problems with water contamination of rivers, oceans and lakes,” says Marc Edwards of Virginia Tech in Blacksburg. “It informs our understanding of how decaying water infrastructure can threaten human health and the environment, and helps in prioritizing investment to mitigate these risks.”...

High lead levels found in Chicago water  

by Ellen Gabler  

Though Chicago and other cities have long reported that lead levels in their water meet federal standards, regulators and scientists worry testing methods used for two decades could significantly underestimate consumers' exposure to the toxic metal.

Recent test results in Chicago may back up those fears: High lead levels were found in drinking water in seven of 38 Chicago homes tested by federal regulators this spring, according to records obtained by the Tribune. “That's not really good news,” said Marc Edwards, an environmental engineering professor at Virginia Tech who researches lead in water. “High lead levels were found in drinking water during showering so they can understand consumer complaints.

Although the majority of water systems report that homes they test meet federal regulations, some experts think those results are due to outdated testing, government agencies gaming the system, or both.

“You can meet the federal standard, according to the letter of the law, but that doesn't mean that a large fraction of homes in your system aren't being exposed to levels of lead that are a public health concern,” Edwards said.

In 2004, the Washington Post found that residents in Washington and the surrounding area had been exposed to unsafe levels of lead in water for at least a year. Edwards and congressional committees helped document the extent of the lead problem and detailed how it had been covered up for years....

Nuclear engineering degree programs OK’d by Va. Tech Board of Visitors  

by Tonia Moxley  

The Virginia Tech Board of Visitors approved new nuclear engineering degree programs at its quarterly meeting Monday.

The new master’s and doctoral degree program proposals now will go to the State Council of Higher Education for Virginia for final approval. If approved there, the degrees could be offered in 2013.
Fading ability to taste iron raises health concerns

BLACKSBURG, Va. – Andrea Dietrich, professor of civil and environmental engineering at Virginia Tech, and her colleagues, Susan Mirlohi, of Christiansburg, Va., a Ph.D. student in environmental engineering, and Susan Duncan, professor of food science and technology, point out that the perception of a metallic flavor in water can help people limit exposure to metals such as iron, which occurs naturally in water or from corrosion of iron water-supply pipes. People need less iron after age 50.

“Metallic flavor, caused by the dissolved iron and copper commonly found in groundwater or which may be introduced to tap water by the nation’s corroding infrastructure, has been an issue for drinking water consumers and utilities,” Dietrich said.

More than two million miles of the nation’s infrastructure of water and wastewater pipes is nearing the end of its useful life, but the mostly underground facilities often do not attract much attention because of this “invisibility,” said Sunil Sinha, Virginia Tech associate professor of civil and environmental engineering and a colleague of Dietrich’s. Sinha is directing two new research projects to develop a National Pipeline Infrastructure Database.

Water tickles judges’ taste buds in search for the perfect quencher

by Meredith Somers

It’s a pretty common notion that water tastes like nothing, but 24 providers from across North America had fingers crossed Tuesday that their nothing tasted the best.

Greenville Water System, in South Carolina, took the top prize at the American Water Works Association’s Best of the Best seventh-annual competition, held this year at the Washington Convention Center.

“We’re looking for a balance, nothing extremely hard or soft,” said taste-test judge Andrea Dietrich, a professor of civil and environmental engineering at Virginia Tech.

A water’s taste, odor and feel depends on a range of factors, including minerals that are present, according to Diabetes, Heart Disease and Stroke Prevention.

Virginia Tech helmet research crucial

by Gregg Easterbrook

For years, football players, coaches and the parents of young players have been in the dark about which of the many helmets on the market may reduce the risk of concussions. The NFL does not mandate helmet types, while many NFL teams refuse even to reveal which helmets their players wear. The National Operating Committee on Standards for Athletic Equipment, which certifies sports equipment, has been AWOL on the issue of helmets and concussions. There’s been no place for the player seeking helmet safety information to turn.

Now all that has changed. Researchers at Virginia Tech have produced the first brand-by-brand, model-by-model ranking for the likely concussion resistance of helmets. A star-rating system modeled on crash safety rankings for automobiles, the rankings clearly identify the best and worst helmets. Virginia Tech researchers give high marks to these helmets: the Riddell Speed, Riddell Revolution, Riddell Revolution IQ; the Schutt Ion 4D and Schutt DNA; and the Xenith Xi. The Virginia Tech researchers give medium grades to the Schutt Air XP and Schutt Air Advantage. The Virginia Tech rankings warn players not to wear these helmets: the Riddell VSR4 and the Adams A2000.

Now the chilling part: the VSR4 -- Virginia Tech’s second-lowest-rated helmet -- was the most common helmet in the NFL last season. The VSR4 is widely worn in college and high school, too. Immediately after the Virginia Tech findings were released, Riddell advised football teams to stop using the VSR4, long the Virginia Tech’s second-lowest-rated helmet -- was the most common helmet in the NFL last season. The VSR4 is widely worn in college and high school, too. Immediately after the Virginia Tech findings were released, Riddell advised football teams to stop using the VSR4, long the...
Worm behavior impacts the study of biolocomotion

When worms stick together and swim on thin water, what happens and why does it matter? These parasites will actually stick together like Cheerios swimming in milk in a cereal bowl after a chance encounter “due to capillary force.” This observation has made Virginia Tech engineers speculate about the possible impacts on the study of biolocomotion.

Their work appears in the journal, Soft Matter, a publication of the Royal Society of Chemistry, the week of Feb. 7.

Two Harvard physicists first defined the Cheerios effect. In 2005, Dominic Vella and Lakshminarayan Mahadevan wrote an article on this activity, defined by scientists as relating to fluid mechanics, in the Journal of Physics. They cited its usefulness in the study of self-assembly of small structures. Self-assembly is used in the science of nanotechnology.

Dominic Vella who now teaches at the University of Oxford, United Kingdom, collaborated with Sungwan “Sunny” Jung, an assistant professor of engineering science and mechanics at Virginia Tech, and his student, Sean Gart, of Salem, Va., a senior in engineering science and mechanics, and authored the new paper, “The collective motion of nematodes in a thin liquid layer.”

“…This is an interesting behavior that has not been studied very widely in the biolocomotion field,” Jung said.

“The result implies that nematodes gain neither a mechanical advantage nor disadvantage by being grouped together. The capillary forces merely keep them together after a chance encounter. This result also extends a better understanding of capillary effects in colloidal particles in engineering systems such as pickering emulsions. These emulsions are stabilized by solid particles. An example would be homogenized milk.”

Virginia Tech helmet study gathers data on youth

by Sarah Bruyn Jones

Decorien Hargrett, 7, stood on the sidelines, his dad’s hands on his shoulders, his mother hovering…. It’s his first year playing tackle football, and he has stood out, memorizing the plays and executing them well enough to earn praise from the spectators in the bleachers.

But while cheering him on, his parents have also had their concerns.

So when they learned that the Eagles were going to be part of a research study to calculate just how hits impact a child’s head, they were thrilled at the chance to know more — and possibly to contribute to improving the game for the littlest players. The study has been quietly taking place throughout the season, which ends Saturday.

In August, eight players, including Decorien, received new helmets lined with sensors that measure and record the direction and magnitude of each hit the player sustains. It’s the same test that Virginia Tech has been running since 2003 on its football team. …

Virginia Tech engineer Stefan Duma is the professor behind the study, which has informed the national conversation surrounding football-related concussions.

In the spring, Duma made headlines when he revealed data from his study of college football players and suggested that not all helmets offer equal protection. …

Preliminary results, however, show that the 400 impacts recorded have generally been lower than what would be seen in adult players, although some hits have been ranging higher than expected, Duma said…. 
Researchers Employ New Test to Estimate Concussion Risk for Helmets

by Alan Schwarz

Football equipment managers nationwide will receive yet another reason to reassess their helmet inventory on Tuesday, when a Virginia Tech research report reveals that two models popular among teenagers might be allowing high rates of concussions.

The Riddell VSR-4, a recently discontinued model still worn by about 75,000 high school and college players, and the Adams A2000, a less prevalent helmet now available for purchase, were the lowest-ranked models in a new testing regimen designed to estimate concussion risk. The full results were to appear on a Virginia Tech Web site as the first publicly available objective data on football helmet performance.

“Currently, if you go to buy a helmet, all you’re looking at are aesthetics and price, and whatever the manufacturer tells you to try to convince you it’s good,” said Stefan Duma Virginia Tech’s lead biomedical engineer on the project. “We wanted to develop a system to quantify which helmets perform better specifically with risk of concussion.”

The only standardized test on helmets today assesses whether a helmet might allow a skull fracture, not a less serious injury like a concussion. ...

Tourney Combines Sports and Mining

by Jesse McKinley

RENO, Nev. — Burly, bearded and beer-loving, Kris Strickland is not your average student-athlete. He doesn’t use a ball, a mitt, or a racket to show his skills.

He uses a four-pound hammer.

Mr. Strickland, a Virginia Tech senior, was just one of scores of competitors who took part in the weekend’s 33rd International Intercollegiate Mining Competition, an annual tourney that combines the passion of college sports with the grit of hard core — and hard rock — mining.

“Tourney,” as it’s known by the 1,200 participants who come from as far as Australia to compete — and not as easy as it looks...

But on Friday, concrete seemed plenty hard to those young men and women competing in the handsteel, as they repeatedly slammed their hammers atop the chisel, boring into a three-foot tall concrete block. ...

Study shows NFL players wore low-rated helmets

by staff

WASHINGTON (AP) — Nearly 40 percent of NFL players last season wore a helmet model that got the second-lowest rating for reducing the risk of concussions in a study by Virginia Tech researchers.

Riddell’s VSR-4 helmet received just one star in a study of football helmets led by Virginia Tech for students — an engineering-heavy group who come from as far as Australia to compete — and not as easy as it looks...

For example, half our team is in the VSR-4 — and there is a significant reduction in concussion risk in newer helmets, so by fall ball we’re going to be in new ones," Duma said of the Virginia Tech football team. A prominent college program having used outdated helmets would indicate how rural high schools might be affording players inferior protection. ...

U.S. Dept. of Defense supports study of brain, eye injuries in military personnel

The Virginia Tech-Wake Forest University Center for Injury Biomechanics (www.cib.vt.edu) has been awarded a $2.8 million contract from the U.S. Army Medical Research and Materiel Command for phase 2 of an overall project focusing on brain and eye injuries in military personnel.

Specifically, blast induced brain trauma will be investigated using experimental and computational models. Given improvements in helmet design and body armor and the resulting reductions in penetrating injuries, including penetrating head trauma, blast-related closed head injuries have become the signature injury of most military operations.

“By combining the excellent facility and capabilities at Virginia Tech and Wake Forest University, we were able to successfully compete for this funding. The Virginia Tech Transportation Institute provided the talent and resources to integrate these programs and succeed in a highly competitive funding arena,” said Duma, who is professor and head of the Virginia Tech-Wake Forest University School of Biomedical Engineering and Mechanics. The program will also involve new partnerships at the Radford Army Ammunition Plant, Duma said.

Design changes to the High Mobility Multipurpose Wheeled Vehicle, such as additional ballistic armor, have lead to a severe increase in rollover accidents. Specifically, rollover accidents account for 42 percent of accidents with these vehicles and over 70 percent of all fatalities suffered in these vehicles in Iraq. Performing research on the vehicle safety aspects in the military is a logical extension of the Virginia Tech Transportation Institute’s current research projects.

“I am happy to offer the Virginia Tech Center for Injury Biomechanics the opportunity to continue this important research,” said Institute Director Tom Dingus.
Study ranks 10 football helmets for concussion safety

by Sean Gregory

No magic football helmet can prevent players from sustaining concussions. But thanks to new research out of Virginia Tech, football players, and their parents, now know which equipment could reduce the risks.

Over the past decade, Virginia Tech researchers have compiled data from more than a million head impacts at Virginia Tech football practices and games. From these statistics, scientists were able to specify the speeds and tackling angles that would most likely lead to concussions.

The scientists tested the safety features of 10 different helmet models, measuring the acceleration distances and angles. The data were sped from these multiple models, measuring the acceleration features of 10 different helmet and tackling angles that would be able to specify the speeds football practices and games.

piled data from more than a million impacts at Virginia Tech engineering at Virginia Tech, and tackling angles that would most likely lead to concussions.

The results of a Virginia Tech study by environmental engineers and a virologist on the risk of airborne influenza A viruses is appearing today in the Feb. 2 issue of the United Kingdom's Journal of the Royal Society Interface. Linsey Marr, associate professor of civil and environmental engineering at Virginia Tech, and her colleagues are publishing research on infection in public places of influenza A viruses.

The results of a Virginia Tech study by environmental engineers and a virologist on the risk of airborne influenza A viruses is appearing today in the Feb. 2 issue of the United Kingdom’s Journal of the Royal Society Interface. Linsey Marr, associate professor of civil and environmental engineering at Virginia Tech, and her colleagues are publishing research on infection in public places of influenza A viruses.

STUDY (Continued from page 5)

According to Riddell, 38 percent of NFL players wore the low-rated VSR-4 in 2010. The company also said 39 percent wore one of the various models that fall under the Riddell Revolution name or the new Riddell 360. Duma said in a telephone interview that this is the first time comparative test results on football helmets have been made public.

He said the star ratings provide “a prediction of concussion risk.”

“All of these helmets protect you from skull fracture, so what we’re doing is going to the next level and looking at how they protect you from brain injury,” Duma said.

“We’re basing this analysis off a million impacts we’ve collected,” added Duma, who called the study the culmination of about eight years of research. “We know how players are hit. It’s much more elaborate than anyone’s ever looked at, in terms of evaluating the performance of helmets.”

NFL spokesman Greg Aiello said the league’s head neck and spine medical committee would review the Virginia Tech research. He also noted that the league and NFL Players Association let players, trainers and equipment managers know last year that three helmet models — two made by Riddell and one by Schutt — met all three criteria for qualifying as a top-performing helmet when 16 were tested....

INFECTION CONTROL TODAY (UNITED KINGDOM) • February 1, 2011

Size of airborne flu virus impacts risk

Linsey Marr, associate professor of civil and environmental engineering at Virginia Tech, and her colleagues are publishing research on infection in public places of influenza A viruses.

The size of an infected person might cough or sneeze or just be engaged in conversation, and release the viruses into the air. However, these aerosols are quickly diluted to very low concentrations by the surrounding air. What happens is an infected person might cough or sneeze or just be engaged in conversation, and release the virus in the air. However, these aerosols are quickly diluted to very low concentrations by the surrounding air.

Several studies have measured actual concentrations of influenza A viruses in air and determined the size of influenza-laden particles, Marr says. "Size is important because aerosols affect various materials and his work has been applied in the manufacture of materials that will better protect troops from roadside bombs and similar attacks."

Also, Virginia Tech engineering studies professor Gary Downey will be honored in 2011 by Gov. Bob McDonnell and the Science Museum of Virginia.

Batra studies how extreme forces affect various materials and his work has been applied in the manufacture of materials that will better protect troops from roadside bombs and similar attacks. Also, Virginia Tech engineering studies professor Gary Downey has taught at Tech for 27 years, where he has designed several new courses and is an affiliated professor in engineering education, regional College of Veterinary Medicine, conducted their research in a health center, a daycare facility, and on board airplanes.

“Relatively important of the airborne infection route in influenza transmission — in which tiny respiratory droplets from infected individuals are inhaled by others — is not well known,” Marr said. "Size is important because aerosols affect various materials and his work has been applied in the manufacture of materials that will better protect troops from roadside bombs and similar attacks."

In addition to teaching, Downey is considered one of the founders of the field of engineering studies, the International Network for Engineering Studies and the journal Engineering Studies, the release stated...

(Chickenpox is a common childhood illness caused by the varicella-zoster virus. The virus is spread through the air by coughing and sneezing. It can also be transmitted through contact with an infected person’s skin. In the United States, chickenpox is usually acquired in childhood, usually before the age of 12. But it can also be transmitted through contact with an infected person’s skin. In the United States, chickenpox is usually acquired in childhood, usually before the age of 12. But it can also be transmitted through contact with an infected person’s skin."

...and similar attacks....

(The Virginian Pilot also carried an article on these awards.)
Blind driver to debut new technologies at Daytona

by Kyle Hightower

DAYTONA BEACH, Fla. -- It’s a cloudy morning at Daytona International Speedway, but Mark Riccobono can’t tell, nor does it really matter to him. He walks up to the driver’s side of a black, Ford Escape Hybrid parked on the start-finish line, opens the door, sits down and adjusts his seat. After a few minutes the car revs up and takes off.

None of that’s unusual at one of the meccas of motorsports racing, except for one thing: Riccobono is blind.

Saturday’s event has been in the developmental phase for the past three years thanks to the NFB’s partnership with Virginia Tech’s College of Engineering and TORC Technologies. The students developed the equipment Riccobono will use. TORC integrated those into a working vehicle.

Several Virginia Tech students teamed with TORC and won $500,000 when they placed third in a 2007 competition put on by the U.S. Defense Department to build a fully robotic vehicle. So when Dr. Dennis Hong, director of Tech’s Robotics and Mechanics Laboratory (RoMeLa), heard about NFB’s challenge, he thought it was a no-brainer to get involved.

“We said, ‘Hey, we already have a fully-autonomous vehicle, how difficult would it be to put a person inside?’” Hong said. “We couldn’t have been more wrong. They did not want a vehicle to drive a blind person around. They wanted a vehicle that a blind person could make active decisions in and actually drive the vehicle. So we had to start from scratch.”

Hong said the biggest challenge was figuring out a way to convey real-time information to a driver who can’t see. They came up with a combination of mounted laser and camera sensors around the vehicle, which scan the environment and feed information to sensors worn by the driver.

American Ingenuity at Work

by Phil Baker

…More than 30 percent of the returning troops from Iraq and Afghanistan suffer from hearing problems, including perforated eardrums, permanent hearing loss and tinnitus, a persistent ringing in the ears. It’s estimated that $1.2 billion a year is being spent by the government in treating these hearing-related issues of our returning military. It’s a problem that’s been with us for decades, going back to World War II.

In 2009, Dr. Mead Killion, a noted expert in audiology and founder of Etymotic Research, a company that makes products for the hearing aid and consumer electronics industries, was attending a meeting of the National Hearing Conservation Association, where these hearing injuries were being reported. The problem was not a lack of availability of good hearing protection, but that it just wasn’t being used.

Killion’s company had developed a chip twenty years ago for the hearing aid industry, that was designed to amplify soft sounds, but have no effect on loud sounds, as long as they didn’t exceed 105 dB of loudness (a tolerable level equal to the sounds that an orchestra can sometimes produce).

Another property of the chip was it didn’t amplify sounds louder than this level, and, in fact, limited them. Killion thought that these characteristics could be adapted to a new product he referred to as a blast plug, something that might eliminate all of these injuries.

Thus, this new invention, named the Blast-PLG Earplug, solves the problem: the ability to detect the soft sounds while blocking out the loud sounds.

Realistic field tests were conducted by John Casali, Ph.D. of Virginia Tech, an authority in human factors design, for their effectiveness in allowing soft sounds to be heard (detection) and for their directionality (which permits accurate localization).

Virginia Tech researcher seeks to improve emergency hospital, community evacuations

by Steven Mackay

When a hurricane or another major threat requires an emergency evacuation of a hospital, or an entire coastal community, the logistics can be a nightmare. In the first, hospital personnel must balance the risks involved in moving potentially hundreds of patients to safety while considering their individual medical needs, against the risk posed by the threat. In the second, regional or city officials may be tasked with evacuating hundreds of thousands of people in only a few days or hours, without creating transportation gridlock or leaving people stranded.

These efforts are fraught with dangers, missed cues, and the likelihood of traffic congestion and other problems that can halt or slow an evacuation. Douglas Bish an assistant professor in the Virginia Tech College of Engineering’s Grado Department of Industrial and Systems Engineering hopes to alleviate some of uncertainties.

He has won a 5-year, $400,000 National Science Foundation Faculty Early Career Development (CAREER) award to create mathematical-based computer models that eventually will help emergency managers better plan, train and carry out these logistical complex tasks. A CAREER award is one of the most prestigious awards given to creative junior faculty likely considered to become academic leaders of the future.
**Blind drivers test out vehicle at VIR**

_by Tara Bozick_

When Anil Lewis lost his sight, he sorely missed driving.

Now, technology and innovation allow him to drive again, as he did at Virginia International Raceway on Wednesday.

The vision that one day blind people would drive independently started with Marc Maurer, president of the NFB. In 2004, the organization called on innovative technology as part of its Blind Driver Challenge.

So far, Virginia Tech with its Robotics and Mechanisms Laboratory is the only university to step up and take on the challenge to develop non-visual driver “interfaces” or tools, like gloves that send vibrations to tell drivers how to steer.

Riccobono hopes more universities will get involved now that one hurdle was jumped — developing the vehicle or “vehicle research platform” — that could integrate the non-visual interfaces and test out ideas on how the car could communicate with blind drivers.

That vehicle was developed by TORC, a spin-off company from Virginia Tech specializing in unmanned vehicles and autonomous systems.

TORC developed a ByWire XGV (drive-by-wire) vehicle using a Ford Escape Hybrid, said TORC software engineer Jesse Hurdus. The collaborative team completed two prototypes vehicles....

**Electrical stimulation to give voice to stroke patients**

_by Steven Mackay_

A Virginia Tech College of Engineering researcher is seeking a new way to help those who are unable to speak to find their voice.

But this isn’t “The King’s Speech,” the Academy Award-winning film about a British royal undergoing speech therapy to battle a stammer.

Instead, Alexander Leonessa wants to help bring back the voice of stroke patients and others who have suffered paralysis of the vocal folds, through electrical stimulation.

Leonessa, an assistant professor of mechanical engineering, is developing a small device that could use functional electrical stimulation on the paralyzed vocal folds of stroke patients or others who have lost the ability to talk, or even swallow and breathe properly.

“The device has the potential of improving the quality of life for patients with vocal paralysis, or neuromuscular disabilities, including traumatic brain injury, multiple sclerosis, cerebral palsy and Parkinson’s disease,” he said.

Leonessa won a $480,000 National Science Foundation Early Career Development (CA-REER) award for this research effort....

**Why we made a car for blind drivers**

_by Dennis W. Hong, Special to CNN_

**Editor’s note:** Dennis W. Hong, an associate professor of engineering at Virginia Tech, leads RoMeLa, a robotics lab at the university that last week won a major worldwide competition in the field – RoboCup 2011.

Blacksburg, Virginia (CNN) – In our modern society, driving is really a necessity. It is a means of getting you to your destination wherever, whenever. Driving is also fun. Some people even consider it an expression of power. Most importantly, driving is really about freedom, about independence.

Sighted people, myself included, do it every day and take it for granted. Unfortunately, because of physical challenges, not everyone has the privilege to drive. My team of researchers wants to find a way to give the blind the ability to drive.

When we first announced that we were going to take up this challenge, many thought we were crazy, and most of the critics doubted that it could be done. Even some of my colleagues challenged us on the idea of developing a vehicle for the blind.

The car we’re developing for the blind uses a sensor to measure acceleration, cameras to detect the lanes of the road, and laser range finders. Drivers are fitted with special gloves with vibrating elements that can be used to control steering and a massage chair that conveys information about the vehicle’s speed and about how best to use the gas and brake pedal.

I’ve gotten hundreds of letters, e-mails, and phone calls from people around the world; many times these are to thank and congratulate us, but sometimes we get letters of strong concern and criticism.

First, many voiced their concern about the safety of this system. Some of these concerns were because people do not trust the technology, some of them because they do not trust the capability of the blind.

No system is fail proof. However, this is where true engineering comes in. I would like to ask those who worry about the system failing — when was the last time you doubted the autopilot that most likely was flying your plane during your last flight? But to reassure those who doubt the safety of the system, I say that the vehicle won’t be on the public roads until proven as safe as, or safer than, today’s vehicles for the sighted. And I believe this can be done....

Whenever we have new students come to our lab to work on this project, I always ask them this question: “How many times in your life do you really think you will have a chance to change the world?” I believe we are doing just that through this project. As I mentioned in my TED talk, this is just the beginning. Expect to see amazing things and technologies coming soon that will change the world.

The opinions expressed in this commentary are solely those of Dennis Hong.

(WTVR-TV of Richmond, Va., carried this commentary.)
Engineering professor combines mechanical know-how with creativity

**Dennis Hong is the U.S. star in humanoid robotics**

**by Daniel de Vise**

On a visit to the American Museum of Natural History in New York three years ago, [Dennis Hong](#) was captivated not by the giant blue whale, or the Tyrannosaurus rex skeleton, but by the ankle bone of a timid prehistoric deer.

The “double pulley” ankle gave the creature more bounce in its stride, an evolutionary advantage that enables today’s suburban deer to bound gracefully over vegetable garden fences.

Hong took out his iPhone and snapped a picture of the diagram. He thought the concept might work nicely on his next robot.…..

Hong, 40, the son of a famed Korean aeronautical engineer, is the Leonardo da Vinci of robots. Leonardo saw birds in flight and imagined a human flying machine. He studied human anatomy and in 1495 sketched what is considered the world’s first robot.

Like the artist, Hong innovates by connecting things that less creative types — meaning most people — might see as completely unrelated. His visions

Hong and his students are really trying to change the world,” said Daniel Lee, a robotics researcher at Penn who collaborates with Hong.

Hong’s dream, though, has always been to win RoboCup, a little-known international competition that is one of the premier academic events in robotics. RoboCup is an annual soccer tournament for robots.…..

For RoboCup 2011, in July in Istanbul, Hong and his students built CHARLI-2, stronger, lighter and more nimble than his ancestor. In Istanbul, Hong's DARwIn robots easily won their games. CHARLI didn't fare so well. In his first match, CHARLI kept losing sight of the ball and failed to score a single goal.

Between games, on the sidelines, Hong and the students racked their brains for a solution. They finally isolated the problem: CHARLI had a blind spot over his shoulder. They fixed it by hastily reprogramming CHARLI to approach the ball in a wide arc, so he could keep his sensor “eye” on the ball.

**FORBES • May 6, 2011**

Why Do Robots Play Soccer?

**by Elizabeth Woyke**

Robots can be programmed to do almost anything these days, from folding laundry to fetching beer from a refrigerator. Within the robotics community, however, a huge amount of time is dedicated to teaching robots a seemingly much less useful pastime – soccer.

The catalyst is RoboCup, an international robotics competition that hosts an annual series of soccer games. First established in 1997 in Nagoya, Japan, RoboCup pits robots from around the world in contests of skill including their capacity to provide disaster management and assisted living services.…..

The U.S. has never won the coveted humanoid contest. The country's greatest RoboCup hope may be a team from [Virginia Tech](#) led by [Dennis Hong](#), who oversees a robot-focused research lab named RoMeLa, has attended RoboCup since 2007. That year, RoMeLa's 18-inch humanoid, DARwIn, had the distinction of being the first U.S. robot to compete in the event's humanoid division. (The smaller robots play with a tennis, rather than a soccer ball.) Since then, RoMeLa has achieved respectable results but never won the competition.

In 2010, DARwIn placed 4th out of 24 teams in RoboCup's humanoid "Kid Size" sub-league while RoMeLa's five-foot-tall humanoid, CHARLI, placed 3rd out of 6 teams in the humanoid "Adult Size" event. This time, RoMeLa is determined to win.
FORBES • May 9, 2011

iRobot and Willow Garage CEOs on the Business of Robots

by Elizabeth Woyke

It is a fertile time for robots in the U.S., with academics like Virginia Tech’s Dennis Hong developing more sophisticated bots and promoting open-source robotics. But will any of these robots be commercially produced and make money for their producers?...

Selling robots is the main business for South Korean manufacturer ROBOTIS. One of its latest products is DARwin-OP, an open-source, 18-inch humanoid robot designed by Virginia Tech’s Hong. ROBOTIS Chief Executive Bill Kim pegs the market for small, do-it-yourself robots at $40 or $50 million. ROBOTIS aims to grab more than 20% of that market within a year with DARwin-OP, which it is selling for $12,000 ready-made or $6,000 for a parts kit. To manage maintenance costs, the company is using only one kind of actuator module (motor) in its DARwin-OP models. Kim anticipates the price of DARwin-OP to fall by half over the next three years and continue to decrease several more times over the next decade....

FORBES.com • May 5, 2011

Me and My Robot

by Elizabeth Woyke

In the not-too-distant future, your after work routine might go something like this: Walk in the door. Note that a robot is vacuuming the living room while another is washing the kitchen floor and another is folding laundry. Your robot Butler slides into view. After a quick update on the day’s events, it asks what you want for dinner and cues up your favorite music.

Of course this scenario has been in the not-too-distant future for decades, well before TV’s Jetsons and their robot maid, Rosie, were the rage of 1962. It has never been practical, particularly in the U.S., which tends to be skeptical of personal robots. But a flurry of factors, including the rise of open-source robotics, increased government support and media-savvy evangelists are bringing the “autonomous home” closer to reality.

The face of this latest robot revolution is Dennis Hong, a mechanical engineering professor from Virginia Polytechnic Institute & State University. Hong’s RoMeLa (Robotics & Mechanisms Laboratory) research lab has developed 20 kinds of robots over the past seven years. They resemble everything from snakes to spiders to Iron Man. Hong, who performs magic as a hobby, is a natural showman. Armed with his robot props and videoclips, he thrills audiences with creatures that crawl over rocky terrain, scale poles, type on keyboards, introduce themselves and play soccer. Hong has won invitations to appear at the TED conference, New York’s American Museum of Natural History and on the Discovery Channel....

A few years ago Hong’s ambition to humanize robots might have been dismissed. Following the emergence of the first commercially successful robots in the 1960s and 1970s, government support dwindled....

Then came a 2006 National Science Foundation-sponsored study that declared the U.S. embarrassingly behind Asia in humanoid robots. Since then Hong has amassed $5 million in grants from the Defense Advanced Research Projects Agency (DARPA), NSF and Office of Naval Research. ...

Hong’s lab in Virginia recently designed an 18-inch-tall humanoid that can be built in a few days with standard parts, including a 1.6 gigahertz Intel Atom processor, gyroscope and accelerometer for stabilization and 2-megapixel camera for object recognition. A ready-made version costs $12,000, a bargain compared with the fortunes typically spent on research robots. (Willow Garage’s PR2 costs $280,000 to $400,000.)

The world is about to experience the second coming of wireless technology. As this “disruptive technology” moves forward, said Jeff Reed, director of Wireless@VT, one of Virginia Tech will serve as the launching pad.

The next wave can and will contribute to the acceleration of the social and economic trajectories of the world’s poorest countries, Reed added. In evolutionary terms, radios today are developing brains. Experimentation with a network of 48 cognitive radios is under way via Wireless@VT, the nation’s largest communications network center. Progress is most evident in the cognitive radio test bed housed in the Institute for Critical Technology and Applied Science at Virginia Tech....

Popular Science

December 10, 2010

Build your own DARwin-OP, the open-source humanoid robot

by Rebecca Boyle

Meet DARwin-OP, America’s newest humanoid robot, unveiled this week at IEEE’s Humanoids 2010 conference. He is 18 inches tall, weighs 6 pounds and is ready to be messed with. It’s OK, he’s an open-source bot....

Designed by Dennis Hong’s RoMeLa team at Virginia Tech with collaborators at University of Pennsylvania’s Grasp Lab, Purdue University, and Korean company Robotis, DARwin-OP’s hardware and software are open-source — you can fabricate the parts, choose your own electronics and build one of your own. And why wouldn’t you? There’s something so cute about his Astroboy fins....

(MotorWeek featured the video, Blind Man Driving. The TODAY show had a segment on March 6, 2011 titled “Hope in sight for blind drivers?” and displayed a video on MSNBC. Wired authored two articles, on Feb. 15 and on Mar. 2.)

The Voice of Technology • October 5, 2011

Virginia Tech researchers forge the future of wireless

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Robots (Continued from page 9)

BRING home a trophy from the contest, which will be held in Istanbul in early July. Hong contends that this year marks the first that RoMeLa’s teams will truly be prepared for RoboCup. “The previous competitions were just learning,” he says. “Last year was the first time we tried to play a respectable game.”...

Winning will require besting teams from Germany and Japan, who have long dominated the competition....

(Projects in Higher Education, and TED of New York also ran article on Dennis Hong’s work.)
Specific silicon micro devices may provide new way to screen breast cancer cells

Research by engineers and cancer biologists at Virginia Tech indicate that using specific silicon microdevices might provide a new way to screen breast cancer cells’ ability to metastasize.

The Virginia Tech researchers are: Masoud Agah, director of Virginia Tech’s Micro- electromechanical Systems Laboratory (MEMS) Laboratory in the Bradley Department of Electrical and Computer Engineering; Jeannine Strobl, a research professor in the Bradley Department of Electrical and Computer Engineering; Mehdi Nikkhah of mechanical engineering; and Raffaella DeVita of engineering science and mechanics and the director of the soft biological systems laboratory. Nikkhah wrote that the method could provide important diagnostic markers unique to the tumor, and ultimately could be used to develop new tools to detect and treat cancer.

Influenza study

According to the engineering researchers, they worked with a specific fluid called silicone oil, often the base for hydraulic fluids or lubricants. This oil can also serve as an electrical insulator. …

“[The study can provide a better understanding of non-coalescence behaviors observed in many engineering systems such as oil separation, printing, and spray-cooling processes],” Jung said.

American soccer robots dominate at the world RoboCup 2011

Soccer fans, rejoice: America has won the World Cup. Well, the robot World Cup.

In the finale of RoboCup 2011, two Virginia Tech robots took top honors in the adult-size and child-size categories. The full-size humanoid CHARLI-2, making its public debut at RoboCup, won the adult-size robot soccer match with a penalty kick, beating RoboErectus of Singapore 1-0.

[Diary entry: Mr. Strickland was the anchor for Virginia Tech’s five person co-ed team, and showed why, speedily pounding the chisel bit with dozens of blows per minute. When time expired — each hard-steeeler gets two minutes — Mr. Strickland’s face was red and his sunglasses specked with bits of concrete. He said the award, considered the most prestigious honor for humanoid robots, will make its debut on U.S. soil.

The crystal trophy was in Japan for seven years before going to Germany for two years. Now Team CHARLI has captured the honors for the U.S. …

In an e-mail to friends and supporters, Hong said CHARLI was "the super star at the venue, with hundreds of spectators gathering at its games to watch its impressive performance."…

New screening for breast cancer; genetic marker points to tumors

Early research by Virginia Tech engineers and biologists has shown promise in creating a new way to screen for breast cancer. Faculty involved in the study include Masoud Agah, Jeannine Strobl, Mehdi Nikkhah and Raffaella DeVita …

The researchers are using silicon microdevices to compare and contrast the growth and behavior of normal breast cancer cells with metastatic ones. The researchers wrote that the method could provide important diagnostic markers unique to the tumor, and ultimately could be used to develop new tools to detect and treat cancer.

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L-3 and Virginia Tech Announce Partnership in Cybersecurity Research and Development

NEW YORK | L-3 Communications announced that it has formed a cooperative partnership in cybersecurity research and development with Virginia Tech’s Ted and Karyn Hume Center for National Security and Technology (Hume Center). A key element of this relationship will be the establishment of L-3’s Cybersecurity Solutions Center, which will be co-located with Virginia Tech’s Cybersecurity Innovations Lab in Northern Virginia. L-3’s STRATIS division, an industry leader in cyber, intelligence and IT service and solutions, will lead this effort.

This new partnership will enhance L-3’s ability to deliver innovative national security solutions. L-3 will offer, in collaboration with Virginia Tech and additional emerging technology and government partners, customized cyber solutions that enhance customers’ ability to secure critical networks against exploitation and attack. L-3 is focusing its efforts on the most pressing cybersecurity disciplines, including advanced analytics; cloud, virtualization, communications and mobile security; and cybersecurity training and education. …

The Hume Center is a unique organization at Virginia Tech focusing on developing future leaders for the U.S. Federal Government, and is part of the College of Engineering and is supported by the Institute for Critical Technology and Applied Science. With an emphasis on intelligence and defense sectors, the Hume Center promotes educational and research programs …

Distracted-driving citations low

BOSTON, Jan. 6 (UPI) – Massachusetts cited 245 people for texting while driving in the first 90 days of a distracted-driving law — a figure some politicians said was appallingly low.

“I think it’s abysmal, but it’s exactly what we predicted,” state Sen. Mark Montigny, a New Bedford Democrat, told The Boston Globe…. Drivers texting are 23 times more likely to crash than non-texting drivers, a study by the Transportation Institute of Virginia Polytechnic Institute and State University found. (CNBC, NYACK News and Views, Massillon, Ohio Independent, and WBNG of Binghamton, N.Y., also ran articles quoting this study.)

General Dynamics joins Cyber Security Industry/University Cooperative Research Center Site at Virginia Tech

Source: General Dynamics Advanced Information System

FAIRFAX, Va. — General Dynamics Advanced Information Systems, a leading provider of cyber security solutions to the U.S. Departments of Homeland Security and Defense, has joined with Virginia Tech as an affiliate of the newest Security and Software Engineering Research Center (S2ERC) founded with support from the National Science Foundation (NSF).

The NSF established the S2ERC program 25 years ago as the Industry & University Cooperative Research Center (I/UCRC) program dedicated to software engineering and recently re-chartered the center with an added focus on security.

The NSF awarded Virginia Tech a 5-year grant to support the center, which includes the participation of industry and academia. The new cyber security site becomes the third primary S2ERC location in the country.

Group will lobby General Assembly against uranium mining

by Anita Kumar

Officials at the Virginia Interfaith Center for Public Policy say they will be mobilizing activists across the state to lobby the General Assembly to continue a moratorium on uranium mining in the state….

The state’s Coal and Energy Commission has asked the National Academy of Sciences and the Virginia Center for Coal and Energy Research at Virginia Tech to review whether the uranium can be safely mined….
Quest for energy fix

by Staff Correspondent

Energy experts have suggested Bangladesh could adopt an array of solutions including the use of new technologies and alternative renewable resources to maintain its gas reserve and ensure long-term energy security.

The country should utilize its coal resources in a way that benefits the people.

The observations came from a foreign and five non-resident Bangladeshi experts at the first-ever The Daily Star Leadership Colloquium on Alternative Energy and New Technology yesterday. …

Dr. Saifur Rahman, director of the Advanced Research Institute, Virginia Tech… spoke….

On solar, wind and biomass technologies, Dr. Rahman said many countries in Asia, Europe and North America had gone for wind and solar power to meet their increasing energy demands. He said present global electricity generation from wind exceeds 150,000MW and countries like Germany, USA, Spain, China and India produce 10,000MW each from wind.

Even an oil rich nation like Kuwait aimed to meet a large part of its energy demands from renewable energy fearing its oil resources might not be enough to meet its domestic demand after 2020, the expert said.

Renewable energy sources can meet the demand for electricity in remote areas as well as large power plants, said Prof Saifur adding sources like the sun, wind, biogas and water extend the scope of using electricity by the disadvantaged.

“For Bangladesh, it’s a question of survival,” he said referring to the country’s energy issue. …

DOE funds carbon capture in Virginia

by Kate Taylor

Virginia Tech researchers plan to inject some 20,000 tons of carbon dioxide (CO₂) into a coal bed methane field in southwest Virginia, as part of a Department of Energy project.

Last week, the DOE said it planned to expand its research to make sure that long-term geologic carbon dioxide storage is safe and environmentally secure, and has allocated more than $45 million to the effort.

“The proposed research will test the ability to inject CO₂ into coal seams that cannot be mined, as well as the potential to enhance the coal bed methane recovery,” says Michael Karmis, director of the Virginia Center for Coal and Energy Research. The project is based on a number of earlier studies that have, says the team, identified promising methods for storing CO₂ in stacked underground reservoirs, and the ability to sequester it in coal seams.

The team hopes to find out which coal seams are good disposal sites, and establish the conditions under which the impounded CO₂ would remain stable...

(First Science of East Sussex, England and Carbon Capture of Great Britain also carried an article on this research.)

Virginia Beach hosts wind energy conference

by Scott Harper

Almost everyone agrees that harnessing offshore wind energy in Virginia is a great idea – it’s a clean, abundant, free resource. Problem is, hardly anyone can agree on just how to build, finance and properly regulate a wind farm off the coast….

George Hagerman, a Virginia Tech researcher and wind expert, described the biggest quandaries facing Virginia’s drive for offshore wind. They are mostly financial, he said: The cost for generating offshore wind is almost double that from natural gas and coal.

Furthermore, Virginia’s typical electricity bills are 31 percent below the average bill on the East Coast and 16 percent below the national norm, he said.

In short, Hagerman said, Virginia has cheap energy today and few investors see much incentive in spending hundreds of millions of dollars on a first-time offshore project to produce wind energy that would be hugely more expensive….
Big fuel savings demand new configurations

by Graham Warwick

Persuading operators to forsake time-tested tube-and-wing narrow bodies and wide bodies for new configurations will be hard. But if the upward trend in fuel price continues, or accelerates as global demand for energy escalates, the promise of dramatic fuel savings may force a shift.

Recognizing that manufacturers’ plans for the next 20 years — built around tube-and-wing designs — are largely set, NASA is focusing its aeronautics research on understanding unconventional configurations that could provide dramatic reductions in fuel burn, noise and emissions in the longer term. …

Researches at Virginia Tech using renewable energy for bridge inspections

by Ken Heineck

It may seem like light years since you wore them, but it is likely we have all seen shoes that light up with every step.

“Yes of course you imagine it’s a very cool technology being utilized,” said Dr. Shashank Priya, Head of Virginia Tech’s Center for Energy Harvesting Materials and Systems.

“Priya and his researchers are hoping to use similar stress-to-energy technology, called piezoelectricity to test the strength and safety of bridges.

Researchers plan to transmit data wirelessly or store information on a hard drive. …

“…the current application requires small power but it’s possible to conceive ideas where you could generate a large amount of power using this piezoelectricity,” said Dr. Priya.

Boffins build a robot that types

The dexterous anthropomorphic robotic typing hand (DART) was developed by Nicholas Thayer and Shashank Priya, study leaders and researchers in the College of Engineering.

US BOFFINS have designed an ultra dexterous robot hand that looks like a real one and can use a keyboard.

The dexterous anthropomorphic robotic typing hand (DART) was developed by a team at Virginia State Polytechnic Institute (Virginia Tech) in the U.S. and they claim it is optimized to be near-human in appearance and performance.

That’s a big claim for a hand that is capable of many precision tasks, but the team concentrated its biomimetic design on the ability to use a computer keyboard.

The boffins reckon that DART can type up to 20 words per minute, which is slower than the average human speed of 33 words per minute.

However, that’s one robot hand against two human hands and the Virginia Tech team said it will be possible to hook up two robot hands to type at 30 words per minute, though we’re not sure why they don’t go for 40. …

(Articles were also run in Daily Tech, Everything PR of Germany, AZO Robotics of Sydney, Australia, and Uber-gizmo, and this study was published in Smart Materials and Structures.)

SUCCESS (Continued from page 13)

to Decanter Machine Inc., of Johnson City, Tenn., which built the initial prototype unit that successfully dewatered fine coal to a level of 13 to 19 percent moisture at a rate of 30 gallons per minute. Coal recovery from the sludge was greater than 97 percent. …

Through the cooperative agreement with NETL, Virginia Tech’s development of the hyperbaric centrifuge, in combination with its related developments such as a clean coal technology called Microcel, has been able to remove both water and ash from fine coal discarded at impoundments. The Microcel technology uses microbubbles to separate fine coal mineral matter that becomes ash during coal combustion. As a successful example of technology transfer, the Microcel process has been used in Australian coal clean plants.
Feng leads renewal of interest in computer science

Dr. Wu-chun Feng, Associate Professor of Computer Science and Electrical & Computer Engineering at Virginia Tech (VT), Director, Synergy Laboratory Virginia Tech or simply Wu, as he likes to be called, is literally an idea factory.

His work in the field of efficient supercomputing and bioinformatics is credited in part for the renewed interest in computer science by the next wave of young talent making their career selections.

A true Renaissance man, Feng is not only a gifted musician, avid cyclist, and ultimate Frisbee enthusiast, he is also a philanthropist and the founder of MyVICE@VT, a project dedicated to introducing computer science to rural and economically disadvantaged children in K-12. As a driving force in the next generation of thought leaders in HPC, Feng is definitely a person to watch in the months and years ahead.

Highly regarded as a visionary of green computing, Feng first introduced the idea of “energy-efficient supercomputing” to the HPC community at SC ’01.

He also invented Green Destiny, a 240-node cluster supercomputer in five square feet that consumed a mere 3.2 kilowatts of power (when booted diskless). This cluster ultimately produced a Linpack rating of 101 GFlops, which would have placed it in the TOP500 List at the time. As a consequence, this green supercomputer achieved a level of notoriety that led to international news coverage by the New York Times, CNN, the International Herald Tribune, PC World, Slashdot, and BBC News.

Feng worked to establish a low-power supercomputing company, Orion Multisystems, and has been actively involved in architecting power-aware software that reduces energy consumption while maintaining performance. He is also credited with developing the concept of The Green500 List in 2006, which officially made its debut during SC ’07.

Creating adaptable computers

by Marlene Cimons

Throughout the 50 or more years of the modern computing era, virtually all machines ranging from laptops to smart phones have had one feature in common: a fixed, conventional “one size fits all” processor. This means that software developers must craft applications to match the inflexible design of the processor, rather than the other way around.

Within the next 10 to 20 years, however, scientists hope to have many computers moving in a new direction, one that will enable machines to adapt easily to a wide range of software applications. The researchers like to call it “morphing.” It is an advance that will make computers run faster, and save energy as well.

“It’s a new and innovative way to build and use computers,” says Alan George, professor of electrical and computer engineering at the University of Florida and director of the Center for High-Performance Reconfigurable Computing (CHREC) at four major universities with more than 200 researchers and government partners.

“With reconfigurable computing, the architecture of the processor is adaptive, and thus can be customized to match the unique needs of each application,” he adds. “By changing the mindset of computing, from processor-centric to application-centric, reconfigurable computing can perform at a fraction of the time and cost of traditional servers or supercomputers.”

The National Science Foundation currently supports this lab.

See ADAPTABLE, page 19

Latest Green500 List Shows More Top-Dog Supercomputers Going Earth Friendly

by Steven MacKay

BLACKSBURG, Va., July 1 — The newly released Green500 List shows a continuing rapid improvement in environmentally friendly supercomputers around the world, according to Peizhen Kathy Lu, associate professor of materials science and engineering at Virginia Tech.

The Green500 has ranked the energy efficiency of the world’s 500 fastest supercomputers since its debut in 2007, serving as a complement to the well-known supercomputer industry marker TOP500. The list was founded by Feng and Kirk W. Cameron, associate professor of computer science. The Green500 measures energy efficiency using a metric defined as millions of floating-point operations per second divided by watts, or MFLOPS/W. The list is released twice a year, in June and in November.

“The Green500 seeks to raise awareness in the energy efficiency of supercomputing, and in turn, drive energy efficiency as a first-order design constraint – one that is on par with performance or speed,” said Feng.

Virginia Tech’s Kathy Lu receives Humboldt Foundation Research Award

by Staff

Peizhen Kathy Lu, associate professor of materials science and engineering at Virginia Tech, is a 2011 recipient of the Friedrich Wilhelm Bessel Research Award presented by the Alexander von Humboldt Foundation. This award is for scholars, internationally renowned in their field, who completed their doctorates less than 18 years ago and who are expected to continue to produce cutting-edge achievements which will have a seminal influence on their discipline.

As an award recipient, Lu is invited to spend a year cooperating on a long-term research project with Ralf Riedel at the Technische Universitaet Darmstadt’s Institute for Materials Science in Germany.

Lu directs Virginia Tech’s Innovative Particulate Materials Laboratory and concentrates her research on nanomaterials, fuel cell material design, composites, materials design, and powder synthesis.
NSF Gives Three Life-Science Projects $1.2M in Grants

**by Uduak Grace Thomas**

Three life-science projects are among 13 teams that will have free access to Microsoft's Azure cloud-computing platform for two years as part of an agreement between Microsoft and the National Science Foundation.

The life-science projects, led by researchers at Virginia Tech; the University of North Carolina, Charlotte; and the J. Craig Venter Institute, were awarded a total of $1.2 million in grants under the program, ...

A team led by Wu Feng, an associate professor of computer science at VT, will use a $370,000 NSF grant to develop “a new generation of efficient data management and analysis software for large-scale, data-intensive scientific applications in the cloud.”

See GRANTS, page 17

New ethics program in the works

Two well-known Virginia Tech researchers from the College of Engineering and the College of Liberal Arts and Human Sciences who previously collaborated on studies involving lead contamination in water are now co-developing an interdisciplinary graduate engineering and science ethics course.

A $350,000 grant from the National Science Foundation will create a four-part ethics program based on a 2010 pilot course jointly developed by Marc Edwards, the Charles Lunsford Professor of Civil and Environmental Engineering and a MacArthur Fellow, and Yanna Lambrinidou, an adjunct assistant professor in the Department of Science and Technology Studies at Virginia Tech's National Capital Region campus, near Washington, D.C.

The course emphasizes the importance of seeking out and listening to the concerns of diverse stakeholders as a “best practice” for engineers and scientists.

In the class, Edwards and Lambrinidou taught an ethos of public engagement and care that emphasized the notion that engineers and scientists must first and foremost protect public welfare....

Sinha developing infrastructure database

Campus briefs:

Virginia Tech professor Sunil Sinha is developing a national database to collect data and resources to help utilities across the country monitor, assess and repair aging underground water and sewer infrastructure, the university announced.

The U.S. Environmental Protection Agency is funding the four-year project through its Aging Water Infrastructure Research Program, a university news release stated.

An estimated 2 million miles of buried water and sewer pipes could need repair or replacement, but information on the condition and location of older infrastructure is often limited, the release stated.

The public Web portal Sinha and his students are working on will include background documents; management practices; technologies; models, tools and standards; pipeline condition assessments; and renewal projects, the release stated.

The database will work similarly to Wikipedia, but will not allow public editing of information. The contents will be maintained through Tech’s Center of Excellence in Sustainable Water Infrastructure Management, housed within the Institute for Critical Technology and Applied Science, the release stated. ....

Study launched to look at softener effects on septic tanks

**SOURCE:**

*Water Quality Association*

A new study conducted through Virginia Tech will examine the effects water softeners might have on septic tanks, the Water Quality Association announced recently.

The investigation is being funded by WQRF (Water Quality Research Foundation), which also announced it is seeking funding for the project and other projects. The study is expected to be completed in summer, 2012.

Dr. John Novak of Virginia Tech is heading up the research. Novak has earned awards and recognition for more than 30 years for his studies on wastewater treatment and other projects.

The goals are to find out whether various water softener operation patterns might have a negative effect on septic tank performance, and if so, to develop operating guidelines to minimize any problems. ...
Researchers customize Android for lockdown

By Bob Brown, Framingham

Virginia Tech researchers for the past month and a half have been working to customize Google's Android software to lock down smart phones so that sensitive data isn't exposed once a user leaves approved locations. They're hopeful the technology — part of a project dubbed GhostBox — will be production-ready by year-end.

The software would be loaded on a smart phone or tablet computer and policies for hundreds or hundreds of thousands of devices could then be controlled remotely via a server.

One application might be to give medical personnel access to patient data from a smart phone within certain hospital rooms but cut off access outside such rooms, protecting the data in the event the device is lost, compromised by malware or if the phone user attempts to misuse the data.

Other applications could include safeguarding military data or putting parental controls on kids, according to project lead [Jules White](mailto:jules.white@vt.edu), an assistant professor in the Department of Electrical and Computer Engineering (at Virginia Tech). (NetworkWorld also reported on this technology.)

VT technology secures phones, apps to a physical location

by Mark Hachman

A team of Virginia Tech researchers said Friday that they have developed a way to wipe a phone or tablet of data if its leaves a predefined location, something that could benefit secured clients.

The researchers also claimed that certain components, such as the camera or even specific apps, could be enabled or disabled in response to a device’s location. If a general were to look at classified documents and then either lose his phone, or if he accidentally removed it from a secure location, either the phone or the classified data could be automatically wiped.

“This level of complexity and security, nobody else has,” said [Jules White](mailto:jules.white@vt.edu), assistant professor of electrical and computer engineering at Virginia Tech, in a statement. “There are commercial products that do limited versions of these things, but nothing that allows for automating wiping and complete control of settings and apps on smart phones and tablets.”

Using research underwritten by the Virginia Tech Applied Research Corporation, the team modified the operating system under several Android phones to make the necessary changes.

Students have a short list of PC, a rule that was established in 2006, long before the launch of the iPad. Students have a general student requirement, but departments within a college may have their own list of acceptable devices.

At Virginia Tech’s College of Engineering for example, students are required to have a tablet PC, a rule that was established in 2006, long before the launch of the iPad. Students have a general student requirement, but departments within a college may have their own list of acceptable devices.

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[PCMAG](http://www.pcmag.com) • October 14, 2011

**What to consider before buying a laptop for college**

by Leslie Meredith

Many universities require that students arrive on campus with a personal computer of some kind, and some universities are very specific about what types are acceptable.

Be sure to check the school’s requirements before your student heads off this fall. Some schools have a general student requirement, but departments within a college may have their own list of acceptable devices.

At Virginia Tech’s College of Engineering for example, students are required to have a tablet PC, a rule that was established in 2006, long before the launch of the iPad. Students have a general student requirement, but departments within a college may have their own list of acceptable devices.

If you are receiving financial aid, your eligibility may be increased based on computer requirements at your school. At Virginia Tech, students are eligible for as much as $2,500 in additional aid to purchase the right computer for their fields.

**Researchers fine-tune Android to lock apps based on location**

by Graeme McMillan

Admit it: Sometimes you like to pretend that you’re a spy who has some sensitive material on your cell phone that just can’t fall into the wrong hands. Well, if you have an Android phone, some Virginia Tech researchers can help you out with that.

According to [Jules White](mailto:jules.white@vt.edu), an assistant professor of electrical and computer engineering at Virginia Tech, in a statement, “There are commercial products that do limited versions of these things, but nothing that allows for automating wiping and complete control of settings and apps on smart phones and tablets.”

Using research underwritten by the Virginia Tech Applied Research Corporation, the team modified the operating system under several Android phones to make the necessary changes.

VT Researchers Win $100K Nvidia Award to Create Cancer Mutation Identification Platform

Two researchers from Virginia Tech have won an award from the Nvidia Foundation to create a genome analysis platform that will make it easier for researchers to identify cancer mutations.

The researchers, [Wu Feng](mailto:wufeng@vt.edu) and [David Mittelman](mailto:mmittel@vt.edu), will use GPU-accelerated alignment and mapping software in combination with sensitive mutation detection methods to deliver “an optimized and powerful solution” for cancer genome analysis that other investigators can build upon.

Nvidia gave the award as part of its “Compute the Cure” program, a pilot effort overseen by its philanthropic arm, the Nvidia Foundation, that aims to leverage GPUs to support cancer researchers in the search for a cure, as well as to promote cancer awareness and prevention initiatives.

Feng, an associate professor in Virginia Tech’s Computer Science department, said in a statement that the program aims to “revolutionize” the way that cancer research is done by providing “a framework and toolkit of personal desktop supercomputing solutions for the analysis of genome changes from next-generation sequencing data, as a first step toward seeking a cure for cancer.”

(See [Roanoke Times](http://www.roanoketimes.com) for an article on this research.)
Nuclear crisis solutions simple but not easy

by Brian Vastag

Time, power, water and people.
That's all that's needed to control the deteriorating seaside Fukushima Daiichi nuclear power plant in Japan.

It sounds so simple, yet each presents challenges.
Over the past week, the facility has careened out of control with a bewildering sequence of explosions, malfunctions, fires and, in all likelihood, partial reactor core meltdowns. ...

Getting electrical power

As for electrical power, restoring it should be "top priority," said Mark Pierson, a nuclear engineering professor at Virginia Tech.
Restoring power would dramatically enhance the facility's cooling abilities, nuclear experts said. The total loss of primary, backup and battery power — a blackout state long feared by nuclear plant operators — precipitated the crisis by crippling the facility's crucial pumps.

(WSLS also featured Mark Pierson in a segment on the nuclear crisis in Japan.)

GOOD MORNING AMERICA NEWS ONLINE • October 25, 2011

Android ‘anti-spy’ system created

by TJID, GMA News

Worried your Android phone or tablet may end up in the wrong hands? A group of researchers may just have the solution for it.
The researchers at Virginia Tech have made a customized version of Google’s Android OS that can secure sensitive data from an Android device based on the person's location.

Potential uses of the system include preventing hospital personnel from misusing patients’ personal information to military personnel who should not be carrying sensitive strategic information around, according to news site Talking Points Memo.

“A simple example would be, someone opens an app, opens some secure information, copies some information, and e-mails it to someone. We can defend against those kinds of things and prevent it from happening,” said team leader Jules White, an assistant professor in the Department of Electrical and Computer Engineering at Virginia Tech.

White said what they did was create an enterprise policy engine based on a custom version of Android. This engine allows a fine-grain level control of services and apps on the phone, he said....

LOCATION
(Continued from page 17)

professor in the Department of Electrical and Computer Engineering at the school, researchers have “created an enterprise policy engine... based on a custom version of Android that allows us on a really fine-grain level to control the services and the apps on the phone so that we can control these things on a really, really fine grain level.” For example, making information disappear if the phone is outside of a specific location....

(Supercomputing also ran an article on this work.)

SCIENCE MAGAZINE • February 9, 2011

Jumping Rope by the Numbers

by John Bohannon

Last year, applied mathematician Jeffery Aristoff and mechanical engineer Howard Stone, both of Princeton University, were at the gym waiting for a pickup game of basketball. To warm up, Stone started jumping rope.

As the rope whizzed over the head of his colleague, Aristoff wondered, “Is it known how jump ropes bend in the wind?” A few literature searches later, he concluded that the answer was, “not really.” Now, the two have solved the problem themselves....

Not only does their model capture the bendy behavior of a typical jump rope, it also helps explain the behavior of a range of similar materials, from reeds blowing in a breeze to lobster antennae bending in a current, the researchers report in the Proceedings of the Royal Society A.

Being able to bend significantly reduces the drag on such objects, they found. For a jump rope, bending translates to a 25% drag reduction, allowing it to spin faster than it would if it were still.

“It is an intuitive and convincing model,” says Douglas Holmes, a materials scientist at Virginia Polytechnic Institute and State University in Blacksburg. “As usual, nature has known this for a long time. Biological materials, while generally far less stiff than our engineered structures, can often survive in hostile environments by deforming to reduce the forces they’re exposed to.”

The next step, Holmes says, is to expand the model to more complex versions of bendy materials in fluids. For example, he asks, “Are some structures better suited for the swirling winds of a tornado while others are fit for turbulent ocean waves?” ...

EcoCAR (Continued from page 1)

“[Continued from page 1]

Wired Magazine, the Mother Nature Network, Roanoke Times, Campus Technology, and Energy.)

WASHINGTON POST • March 17, 2011

A week after disaster, doubts about Japanese government’s grip on crisis

by Chico Harlan, Joel Achenbach and David Nakamura

TOKYO — Reeling from a historic earthquake and tsunami, Japanese authorities struggled Saturday to deal with a humanitarian crisis, a still-untamed nuclear power plant and emerging doubts about the government’s credibility and competency.

Across the Pacific, trace amounts of the radioactive isotope xenon-133 lit up a sensitive detector in Sacramento, and scientists said it was likely from the crippled Fukushima Daiichi nuclear plant, but the amount was not nearly enough to affect human health. U.S. officials said the dose rate was about one-millionth of what a person “normally receives from rocks, bricks, the sun and other natural background sources.”

Japan, however, continues to suffer from the lethal combination of natural and technological disasters. The death toll from the March 11 quake and tsunami reached 7,197, with 10,905 missing, according to the National Police Agency....

In recent days, officials in Tokyo and Washington have sent different signals about the level of hazard posed by the damaged nuclear reactors....

Other nuclear experts expressed frustration with the amount of information the Japanese government and TEPCO officials have released. “I think the Japanese government is sometimes not as forthright as they should be,” said Mark Pierson, a nuclear engineering professor at Virginia Tech. Pierson speculated that U.S. officials have access to information via military satellites that enable them to collect information the Japanese don’t have. ....

WASHINGTON POST March 19, 2011
Quake doesn’t shake support for nuclear power in Virginia

by Paula C. Squires

There are plenty of lessons to be learned from the near meltdown of Japan’s tsunami-wrecked nuclear power plant, but abandoning nuclear power should not be one of them, experts say.

As Japan continued to struggle to gain control over its plant at Fukushima Daiichi that has been the reaction in Virginia from the halls of Congress, the Virginia governor’s office, the state’s largest utility and academia.

“It is irrational to rush to judgment after a major natural disaster on an industry which is actually so beneficial to this country and the whole world,” said Alireza Haghighat, a professor in Virginia Tech’s nuclear engineering program referring to the catastrophic earthquake and tsunami that struck northeastern Japan on March 9.

Instead, he added, the nuclear industry should assist Japan and learn from its experience.

Particularly in a state like Virginia where the nuclear industry has a strong presence, “It is important that the industry learns from its experience,” said Haghighat, a fellow of the American Nuclear Society and chairman of the board of the Southeast Universities Nuclear Reactors Institute for Science and Education. “Areva NP and B&W should learn from Japanese experience, and if necessary consider changes in their designs.”

(Virginia Business also ran a commentary that Ali Haghighat authored on this subject.)

5.8 m quake hits U.S. east coast, nuke plants shut down

by Ferris Jabr

A magnitude 5.8 earthquake struck northwest of Richmond, Virginia, on Tuesday afternoon.

The tremor was felt hundreds of kilometres north in Montreal and Toronto, Canada, and south to Hampstead, North Carolina.

The recent quake is the largest ever recorded in Virginia since a magnitude 5.8 quake shook Giles County on 31 May 1897.

Although earthquakes of this size are rare in Virginia, the 1897 event caused little structural damage, and researchers interviewed by New Scientist do not anticipate extensive damage following the new quake.

Civil engineer James Martin of Virginia Polytechnic Institute in Blacksburg, Virginia, says magnitude 5.5 is the threshold at which an earthquake typically becomes a concern for structural damage.

In this case the damage should be relatively minor; snapped chimneys and cracks in brick buildings.

The quake is “almost large enough to cause liquefaction,” he says – a phenomenon in which soil behaves like a liquid because of intense vibration. …

“I wouldn’t expect to see tremendous damage,” Martin told New Scientist. “But once we start to look closer I would not be surprised if we have more damage than we think as time goes by; damage that is not immediately visible, like broken beam-column connections and fine cracks in structures in poor soil areas.”

“We do have a risk for strong earthquake shaking on the east coast, which is not as small as some people might think,” Martin adds. “The probability of having an earthquake in this part of the world is less than somewhere like California, but it’s not insignificant.”

(MSNBC, the Richmond Times Dispatch, WVIR of Charlottesville, and NPR Public Radio also quoted James Martin in their earthquake reports.)

Virginia Tech professor says aftershocks could go on for a year

by Jarett Henshaw

Virginia Tech professor Russell Green studies earthquakes and the damage they cause. I met him in Mineral on Tuesday, where he showed up unannounced at Louisa County High School to research the aftermath.

“I wanted to get up as soon as possible in order to document as much damage as I could before clean up occurred,” said Green.

For the short time they let him in the crippled building, he took as many pictures as he could.

“Most of the ceiling tiles fell down on the edge of the wall at opposite ends, which actually gives us an indication of the shaking,” said Green.

Green says the biggest fail was in the cinder block walls. The researcher says even though the damage looks bad around the state, he says from an engineering perspective, everything held up well and no one was killed.

Now he’s studying the photos at Virginia Tech to help design more earthquake resistant buildings in the future….

(WTVC and WVIR also focused stories on Russell Green and Matt Ealherton’s work on earthquakes.)

Green leads team to New Zealand earthquake area

by Lynn Nystrom

Russell Green of the Charles E. Via Jr. Department of Civil and Environmental Engineering at Virginia Tech, is leading the National Science Foundation-sponsored Geo-engineering Extreme Events Reconnaissance See TEAM, page 20
Bat Ears Could Inspire New Sensing Technology For Robots and Autonomous Vehicles

by Rebecca Boyle

Bats — you know we love ‘em — have a remarkable ability to turn, swirl and dive on a dime while in mid-flight, dodging obstacles and grabbing food from the air. Engineers would like to give robots and autonomous vehicles this ability, and they’re turning to bat ears for inspiration.

Most bats use echolocation to find prey and to navigate, and biologists are learning that their handlings have a lot to do with their precise movements. But there is also growing evidence that bats can store and quickly compute sensory information, not unlike a bloodhound capturing scents in its wrinkled neck.

Bat ears in particular are designed to capture sounds and vibrations in the air. The geometry of these features could be useful for autonomous flight systems, according to Rolf Mueller, associate professor of mechanical engineering at Virginia Tech.

The ultrasonic waves that bats emit are bounced off these ridges and flaps and diffracted in a certain pattern, depending on the frequency of the sound wave and the shape of the ridge or flap in question. The bat is able to filter these inputs at the speed of sound, making split-second decisions about which way to turn or dive, Mueller explains in a Virginia Tech news story.

Mueller is studying bats’ use of “sidelobes,” secondary ear structures that point away from the most sensitive auditory centers. These structures apparently heighten their sense of hearing. In most radar systems, sidelobes are considered a noise-creating nuisance, but Mueller’s bat research suggests they might be useful. He says understanding bat physiology could lead to better biomimicry, leading to customizable sensing systems.

(Stefan Green also featured Russ Green’s work.)

Bats Lend an Ear to Sonar Tech

by Eric Niiler

Bats create a three-dimensional acoustic image of insects as they swoop through jungles, fields and forests.

Now, bio-engineers have put together a 3-D computer model of more than 100 bat ears as a first step in designing flying robots that may one day do the same.

The study by researchers in the United States and China in this week’s Bioinspiration & Biomimetics provides insight into how the shape of bats’ ears helps them send and receive pulses of sound that gives them information about their environment.

“What we have is a toolkit of components that we can mix together to explain bat ears in nature, and mix those components and make our own bat ears,” said Rolf Mueller, associate professor of mechanical engineering at Virginia Tech and lead author of the new report.

“If somebody says, ‘I need an antenna, and this is what I would like it to do,’ we can mix these components and it would spew out a little shape and this is your bio-inspired antenna.”

Mueller and his colleagues trekked through remote areas of China, Vietnam and Cambodia to capture the bats and take 3D digital images of their ears.

What they were really after is the shape of the pinnae, the visible part of the ear outside the head.

The images were analyzed using the same kind of computer program that analyzes human faces and fingerprints.

Mueller says the kind of delicate, ultra-precise sonar used by bats could also be used by farmers to determine whether their wheat fields are infested with destructive pests. Or perhaps to help navigate tiny unmanned drones into crowded neighborhoods looking for trouble.

Both of these applications would require much greater sensitivity of radar and sonar than current technology can muster.

The new 3D bat ear catalog has provided examples of the best shapes to be used for new kinds of antennae.

“If you wanted to build a self-controlled flying vehicle for operating in a forest at night, you would have to build things on it that look like ears,” said James Simmons, professor of neuroscience at Brown University. Mueller’s study “builds a family of artificial bat ears.”

Mueller agreed that his study is the first step toward such a design.

Even if researchers could build such an antenna, and figure out how to detect objects, there is still the problem of processing the signals in the robot’s “brain.”

“The auditory parts of the brain are organized to take advantage of the ear,” Simmons said. ‘That’s not going to be too easy for engineers to do without serious help from biologists. Digital methods will be fine, just not the ones we use now.”

(ABC online (New York) also ran an article on this topic.)

Perez-Quinones discusses success of Apple

by Mario Ritter

Manuel Perez-Quinones, a computer science professor, is interviewed on the success of Apple computers.

Changes are taking place in Silicon Valley in California. Larry Page will replace Eric Schmidt as chief executive at Google. And Apple’s chief, Steve Jobs, is taking another medical leave....

Steve Jobs has long been Apple’s public face. But some might forget that he left in nineteen eighty-five to form a computer company called NeXT.

Manuel Perez-Quinones ... says Apple has led the development of some technologies, but that explains only part of its success. ....

Manuel Perez-Quinones: “Apple has been a driver in some things and they have been a faithful adopter of good ideas in others.” For example, he says many development tools associated today with Apple came from NeXT. ...


**Bats Show Ability to Change Their Ear Shapes, Making Their Hearing More Flexible**

“Certain bats can deform the shapes of their ears in a way that changes the animal’s ultrasonic hearing pattern. Within just one tenth of a second, these bats are able to change their outer ear shapes from one extreme configuration to another,” said **Rolf Müller**, associate professor of mechanical engineering at Virginia Tech.

Müller and his students wrote a paper on their work that is scheduled to appear this week in the *Physical Review Letters*, a prestigious peer-reviewed journal of the American Physical Society. The students are: Li Gao of Shandong, China, and a Ph.D. student with Müller and Sreenath Balakrishnan of Thissur, Kerala and a master’s candidate with **Virginia Tech's Department of Mechanical Engineering**, as well as Wei-kai He and Zhen Yan, of the School of Physics at Shandong University.

Müller explained the significance of their work, saying, “In about 100 milliseconds, this type of bat can alter his ear shape significantly in ways that would suit different acoustic sensing tasks.”

(Articles on this work also appeared in *FirstScience, India News, Fars News Agency*.)

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**Growing research at Virginia Tech**

*By Tonia Moxley*

BLACKSBURG — Before the lump shows up on the mammogram.

Before the needle biopsy.

Long before the fright of surgery and the nausea of chemotherapy.

Before the disease develops — that’s when Virginia Bioinformatics Institute Director Skip Garner and researchers in his lab want to identify breast cancer risk.

And that risk can be determined today, Garner said, by analyzing human genomes. …

Similarly, challenges as varied as protecting soldiers from roadside bombs, developing safer highways and finding new ways to store power in electric car batteries are daily the subject of intense study at Tech’s seven research institutes: Virginia Bioinformatics Institute, Virginia Tech Carilion Research Institute, Virginia Tech Transportation Institute, Institute for Critical Technology and Applied Science, Fralin Life Science Institute, Institute for Society, Culture and Environment and the newly created Institute for Creativity, Arts and Technology.

Sponsored research contracts awarded through the institutes — which employ more than 600 — accounted for $65 million of the $252 million in total university research funding in 2010-11, university spokesman Larry Hincker said. …

At the **Institute for Critical Technology and Applied Science**, for example, faculty apply to pursue projects through the institute. More than a dozen applications per year are approved, director **Raj Mahajan** said. …

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**TREATMENTS**

(Continued from page 11)

that affects approximately 192,000 newly diagnosed American women, killing an estimated 40,000 each year.

Cancer cells are not able to replicate as fast with forced inhibition of estrogen known as endocrine therapy — in patients, said **Jason Xuan**, an electrical and computer engineering associate professor at Virginia Tech’s Bradley Department of Electrical Engineering.

**PROVIDE**

(Continued from page 11)

khah was Virginia Tech’s Outstanding Doctoral Student in the College of Engineering for 2009.

Their work appeared in two journal articles they authored in 2010 issues of *Biomaterials*, titled “Actions of the anti-cancer drug suberoylanilide hydroxamic acid (SAHA) on human breast cancer cytoarchitecture in silicon microstructures,” and “The cytoskeletal organization of breast carcinoma and fibroblast cells inside three dimensional isotropic microstructures.” …

This article also appeared in the *Medical Daily* (United Kingdom) on Jan. 13, 2011, and *Science Daily* of Rockville, Md., on Jan. 17, 2011.

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**SUPERCOMPUTING**

November 17, 2011

**Knowledge mining resource accelerates science, technology education, research**

*by Saqib Kazmi*

Interdisciplinary collaborations bring vitality and success to the nation’s research enterprise. Such interactions among disciplines also provide robust, real-life experiences for university students.

“If only HP knew what HP knows, we would be three times more productive.” This quote by Lew Platt, the former CEO of HP, motivated a pair of researchers from the **College of Engineering** and the Pamplin College of Business to ask “How can we know what Virginia Tech knows and how can this knowledge enhance future research and education?”

With funding from Virginia Tech’s strategic Institute for Critical Technology and Applied Science, which is interested enhancing research and education at the university, **Aditya Johri**, assistant professor of engineering education, and G. Alan Wang, assistant professor of business information technology, created Virginia Tech Knowledge Networks (VTKN) — and have gone on to partner in two multi-million dollar national projects as a result.

“VTKN is a repository of more than 5,000 publications by the College of Engineering faculty, which allowed us to test ideas and discover different kinds of interaction patterns across departments,” said Johri. The technical term projects through the institute. More than a dozen applications per year are approved, director **Raj Mahajan** said. …
Va. Tech gets three donations totaling $45 million

By Karin Kapsideli

Virginia Tech has received three donations totaling $45 million, including the largest gift in the university’s history and a $17 million bequest from a Richmond alumnus....

The largest gift is a $25 million commitment from an anonymous donor to be used for the Signature Engineering Building project.

The departments of mechanical and chemical engineering will benefit from the bequest from the estate of Robert “Bobby” Hord of Richmond, an engineer and successful investor who died in December at 90.

At more than $17 million, his gift represents the largest single bequest ever received by the university. It will be used to create four endowed funds totaling $45 million.

Hord, a World War II veteran, completed his bachelor’s in mechanical engineering in 1949 and the next year earned a master’s in power and fuel engineering. During his career, Hord worked in the mechanical department of the Norfolk and Western Railway before leaving to work for the Norfolk, Franklin and Danville Railway....

The second gift is a $3 million commitment for the engineering building from alumnae Michael J. Quillen, a coal executive, and the Quillen family of Southwest Virginia.

Quillen, chairman of the board of Alpha Natural Resources, was the company’s chief executive through the 2009 merger with Foundation Coal. He earned a bachelor’s and master’s of civil engineering from Tech.

The Signature Engineering Building is the top priority in Tech’s capital construction plan. The four-story building will be built using $50 million in state support and $50 million in private donations, with groundbreaking expected in July....

Two rockets set to launch from Poker Flat Research Range

Fairbanks, AK — Scientists from Virginia Tech and the University of Colorado are preparing to launch two NASA sounding rockets for two experiments at Poker Flat Research Range north of Fairbanks.

In the experiment set to launch on Jan. 26, if winds are favorable, researchers from the University of Colorado will use a rocket at the top of its arc 200 miles above the ground as a platform to obtain an electronic telescope image of a far-off galaxy.

The rocket carrying the second experiment requires similar weather as the first... Scott Bailey, associate professor of electrical and computer engineering at Virginia Tech is the principal investigator of a team that will use a NASA sounding rocket to measure nitric oxide, a molecule... See LAUNCH, page 23
Virginia Tech wins big at RoboCup, Britain suffers early defeat

by Mark Brown

In the riveting finale to the RoboCup 2011 adult-size soccer match, Virginia Tech’s CHARLI deftly dribbled the ball around the court before lining up its shot and firing the football into the back of the net with a strong kick. Luckily the keeper, Robo Erectus from Singapore, simply entered the fetal position, allowing the ball to trundle into the net unabated.

Those are the sorts of thrilling sights that dominated the RoboCup 2011 tournament in Istanbul this month. If certainly makes the cup’s grand plan — to develop a team of autonomous robots that can win against the human champion team, by 2050 — seem a tad ambitious.

Still, each year the robots get a little faster, a little smarter and a little steadier on their feet. Plus, while the fumbling footwork and constant stumbles are agonising to watch, the actual competitions can be quite engrossing.

This year’s runaway winner was Team RoMeLa (Robotics & Mechanisms Laboratory) from Virginia Tech. Not only did its adult-size CHARLI secure the win with a 1-0 penalty shootout, but its team of DARwIn (Dynamic Anthropomorphic Robot with Intelligence) bots beat Japan’s CIT Brains 8-1 in the kid-size final.


New technology can detect toxins in a person’s breath

by Steven Mackay

Breathing. Anyone reading this article is doing it right now. But what chemicals are we breathing in, and out? A group of Virginia Tech College of Engineering researchers has published a paper in the journal Environmental Science & Technology that details how to learn just that, using microelectromechanical systems to focus on toxins and everyday impurities that enter the body through the air we intake.

The research paper, “The Possibilities Will Take a Breath Away: Breath Analysis for Assessing Environmental Exposure,” was written by Andrea Dietrich, professor with the Charles E. Via Jr. Department of Civil and Environmental Engineering and Masoud Agah, associate professor in the Bradley Department of Electrical and Computer Engineering, with two graduate students, Heather Vereb, an environmental sciences student, and native of Kuwait City, Kuwait, now an associate research scientist at Kuwait Institute for Scientific Research.

... new technologies — including hair-thin sorption devices found in microelectromechanical systems — can detect trace amounts of possible toxins in a person’s breath on the parts per billion or the micro-particle scale, and have improved test performance in terms of identifying biomarkers, and reduced analysis time, sample volume, and consumables such as solvents and reagents. ...

Virginia Beach hosts robot-boat competition

by Elisabeth Hulette

Engineering students yelled and waved Sunday at a small boat on the Founders Inn pond.

It was making a beeline for the grassy shore — not for the water-gun target, where it was supposed to be. Its builders waved and yelled “Come on!” but the boat didn’t understand. Like any good, unmanned vessel in the International RoboBoat Competition, it listened only to lasers, color signals and GPS.

Student robotics competitions are getting more popular all the time, and one held this weekend in Virginia Beach is among the most prestigious — and the most complex....

Fifteen teams from universities around the world came to the competition, sponsored by the AUVSJ Foundation and the U.S. Office of Naval Research....

Military and commercial industries are increasingly using unmanned robots for everything from self-parking cars to taking water quality samples in dangerous places. That makes the roboboat competition a great resume-builder, said Tony Caiazzo, a Virginia Tech student.

His team spent Sunday morning outfitting last year’s boat with this year’s equipment. The carbon fiber hull they picked this time was very light, but that made the boat bob up and down, said Andy Wasilewski of Virginia Tech.

It was too difficult to navigate around buoys and attempt the four challenges at the course’s end, so the team went back to last year’s heavier model....

The University of Rhode Island still wasn’t able to hit the target in the finals, but the team took first place in the competition. Virginia Tech placed fourth.

Virginia Tech researchers design unmanned boat

by Ken Heinck

You might have to look twice if you are out on Claytor Lake, but there is no one on board a 16-foot inflatable boat.

Aditya Gadre is one of the researchers at Virginia Tech who developed the “autonomous” boat.

“We bought it off the shelf and put in hardware and software so that it can drive itself,” said Gadre.

The unmanned surface vehicle is equipped with sonar, lasers, and a 3-D imaging camera to identify hazards in and out of the water.

“We can operate in environments where it’s just too dangerous for hu-
Cells Talk to One Another, but How?

Inside the human body, an amazing amount of communication occurs constantly. But the dialogue is rather extraordinary. The orators are actually multiple cell types that make up the human tissues. And for biologists, the fundamental question remains as to how these processes occur within the complex environment of tissues and organs.

One avenue of research receiving support to answer this question is the use of systems biology, a field that promotes the study of the cell as a system using several different techniques to acquire information about its physiological processes.

The National Science Foundation’s Advances in Biological Informatics program area has awarded a three-year, $1.12 million research grant to Virginia Tech researchers with expertise in systems biology and tissue engineering: T. Murali of computer science, Padma Rajagopalan of chemical engineering, and Rich Helm of biochemistry.

All three are members of the Virginia Tech Institute of Critical Technology and Applied Science’s Center for Systems Biology of Engineered Tissues. Rajagopalan directs this center. Murali is the co-director of the center as well as the principal investigator on this new award. Helm is director of the Virginia Tech Mass Spectrometry Incubator, a collaborative resource funded in part by the Fralin Life Science Institute and the biochemistry department.

Rajagopalan is a past recipient of a National Science Foundation CAREER Award to fund her work on studying cell migration in complex environments, and in the past two years she has received more than $1.75 million in funding to create engineered tissues that mimic the human liver.... (The Telegraph of Calculutta, India, Science360, and Sciencecast also ran an article on this research.)

Transfection practices change with times

by John Russell

Transfection technology for inserting nucleic acids into cells is getting a boost from novel electroporation techniques, new reagents, and easier-to-use transfection platforms. One leading-edge example is work being done by Virginia Tech associate professor Chang Lu, Ph.D. Dr. Lu’s approach eliminates the need for expensive pulse generators, achieves uniform poration over the entire cell surface, and reduces toxicity. The result is reduced cost, higher transfection rates, and improved cell viability.

Dr. Lu’s work, presented at CHI’s recent “Bioprocessing Summit” is representative of a range of transfection innovations that have reached the market or are moving steadily toward commercialization. Gene delivery and gene-silencing applications in bioprocessing, drug research, and gene therapy are all benefiting.

Dr. Lu’s research differs from traditional electroporation in two ways. Electroporation requires cells to experience an electric field strong enough to cause pore formation and long enough to uptake nucleic acids, but not so strong or long as to kill the cells. In the past, doing this required use of pulse generators, which are expensive and tricky to use....

Using semiconductor-chip fabrication techniques and microfluidics, his group accomplished the pulsing by varying the width of the channels (wide followed by narrow) through which cells flow. The field intensity experienced by the cells varies depending upon the size of the channel, hence mimicking a pulse, and the duration in the channel is controlled by the cell flow rate.

“In our device we can constantly flow the cells so

Thermotherapy alternative to chemotherapy uses heat, not poison to kill tumors

by David Gutierrez, staff writer

Yet another study supports the use of heat to kill cancer cells without harming neighboring cells, in a promising alternative to chemo- and radiation therapy.

In a study conducted by researchers from Virginia Tech and Jadavpur University in Kolkata, India, and presented at the 63rd annual meeting of the American Physical Society, researchers injected...
WASHINGTON POST • March 6, 2011

Students charged to create real-life apps

by Jenna Johnson

BLACKSBURG, VA. — A Virginia Tech software engineering class in 2009 was discussing world problems and how computer science might offer solutions when a student piped up with a personal gripe.

"You know what I hate?" the student said, according to assistant professor Eli Tilevich who was teaching the class. "I never know when the bus is coming."

As Virginia Tech and other universities train a new generation of computer scientists, professors are asking students to create programs that address real-life problems, often through handy, smart phone-ready apps. It's a break from traditional coursework such as sorting lists of numbers or re-creating programs that already exist. …

The Virginia Tech student's concern about buses, Tilevich said, offered a chance to show students that coding can be relevant. By the end of the semester, the advanced software engineering class had partnered with the city transit system to obtain data from Global Positioning System devices on dozens of city buses. An algorithm soon was predicting arrival times and beaming the information to a prototype mobile application.

"Sometimes as faculty members, we have to step back. We have to let them run wild," said Tilevich, a former professional clarinet player who blogs about his teaching experiments.

Computer and math fields are expected to add 785,700 jobs between 2008 and 2018, a growth rate twice the average for all occupations, according to the U.S. Bureau of Labor Statistics. Computer science majors also will earn higher-than-average salaries.

Yet at Virginia Tech's computer science job fair last year, there were more open jobs than graduating students, said Barbara G. Ryder, head of the computer science department. "And I don't think that were unusual," she said. …

For the past few years at Virginia Tech, the computer science department has sent faculty members and undergraduates on high school recruiting trips across the state and hosted workshops for local teachers. The university also organizes engineering summer camps aimed at girls and underrepresented minority students. …

WASHINGTON POST • March 7, 2011

Why so few computer science majors?

by Jenna Johnson

The lives of college students revolve around technology — yet not enough are studying computer science to keep up with industry demand.

Computer science programs across the country are scrambling to change this, often by trying to make coursework more relevant to the lives of students. One example, which I wrote about in today's paper, is a professor at Virginia Tech who helped his students create a mobile application that tracks city buses.

But why the lack of interest in CS in the first place?

Here are just a few reasons, according to several professors and others I interviewed for the piece: …

"It's very important for those of us who are educators to convey how relevant to everyday life computing is. This discipline is really a way to make life better for people in many ways," said Barbara G. Ryder, head of Virginia Tech's computer science department. "This is really a way to change the world.‘‘…

This semester at Virginia Tech, assistant professor Eli Tilevich gave undergraduates in his introductory software engineering class choice of two assignments: Write a computer program that operates like the paint palette already installed on nearly every computer. Or create a mobile application that mashes GPS data from city buses with cafeteria schedules, happy hour specials or anything else students can think up.

"Why should we wait until advanced classes to teach them something cool and interesting?" said Tilevich, who teaches 120 students in four sections of the course. "There are a lot of freshmen or sophomores shopping around for a major. … It's very important that the entry-level courses catch their attention.‘‘…”

When Ryder, the head of Virginia Tech's computer science department, was an undergraduate at Brown University, computer science was not offered as a major. She happened to take an early computing class and found it "intellectually exciting." Other professors told me about discovering computer science not long after its birth and watching it grow as an academic field. …

VIRGINIA BUSINESS • June 29, 2011

Losing the geek image

Virginia engineering schools work to attract more graduates

by Richard Foster

As dean of Virginia Tech’s College of Engineering Richard C. Benson delivers presentations on a variety of technical topics, including aerospace, computer sciences and mining engineering. His favorite presentation, however, might just be the one featuring slides of Oscar-winning actor Michael Douglas.

See ATTRACT, page 26

ALTERNATIVE

(Continued from page 24)

a solution called a ferrofluid into both cancerous cells in the laboratory and into tumor cells inside living humans.

A ferrofluid is a solution containing nanoparticles that will become strongly magnetized if placed inside a magnetic field.

"These fluids can then be magnetically targeted to cancerous tissues after intravenous application," researcher Ishwar Puri said. "The magnetic nanoparticles, each billions of a meter in size, seep into the tissue of the tumor cell due to the high permeability of these vessels."

After injecting the fluid, the researchers exposed the tumors to high-frequency alternating magnetic fields, causing the nanoparticles in the ferrofluid to heat up rapidly. This technique is formally known as magnetic fluid hyperthermia, but the researchers have dubbed it “thermotherapy.”

Increasingly, researchers are looking to controlled hyperthermia, in which body temperature is deliberately raised above its normal level, as a way of killing cancer cells. …
Anitlock Brakes Aren’t Just for Four Wheels

By Joseph B. White

Motorcycle makers and federal highway-safety regulators are taking a harder look at whether advanced safety technology can help reduce fatal accidents and injuries for those who ride….

The National Transportation Safety Board has urged manufacturers to do more to make their bikes safer, and the Insurance Institute for Highway Safety released a study last year that concluded motorcycles with antilock brakes were 37% less likely to be involved in fatal crashes than those without them.…. The NHTSA is undertaking a new study to determine the causes of motorcycle accidents. And researchers at the Virginia Tech Transportation Institute are about to launch a study funded by the Motorcycle Safety Foundation — a nonprofit industry group — that will use bike-mounted cameras and other instruments to record riders’ behavior as they navigate through traffic. The group says this “naturalistic” study — recording how riders behave in real time, instead of trying to reconstruct their behavior from clues left after an accident — is the first of its kind.

Drivers will be recorded for safety

By Bruce Stieff

RALEIGH A few hundred N.C. drivers will be paid to let highway safety researchers put video cameras and other gear in their cars, as part of a $50 million national study to find out what drivers were really doing - gawking at a billboard? fumbling with a phone? - before they crashed.…

Every mile and minute of driving will be documented in a split-screen, multidimensional record with: front-bumper radar to measure the distance to the car ahead; five video cameras to see what’s behind and ahead of the car, what the driver is doing and where the driver is looking; a still camera to take blurry snapshots of the car interior, to see when there are passengers in the car; sensors to record speed, acceleration, turn signals and braking; an air sensor to check for alcohol in the car interior; and global positioning hardware to record the car location.

Experts at the Virginia Tech Transportation Institute developed the technology with unobtrusive cameras and sensors for what they call naturalistic driving studies, but until now they’ve never used it to observe more than 100 drivers at a time. Congress called for the new study as part of its strategic Highway Research Program to investigate the underlying causes of crashes and congestion.…. Earlier findings at Virginia Tech have helped fuel a campaign by the U.S. Department of Transportation to raise public awareness about the hazards of distracted driving..

Fatigue, distraction major factors in road crashes

A research symposium has been told fatigue and distraction are bigger factors in crashes than previously believed. The two day Automobile Association Research Foundation event into driver inattention, distraction and fatigue began in Wellington on Monday.

Keynote speaker Professor Thomas Dingu, the director of the Virginia Tech Transportation Institute says several studies conducted by the institute show human per- See FACTORS, page 27

Study of D.C. water sharpens understanding of lead threat

By David Brown

The latest research on the District’s decade-long effort to reduce lead in its drinking water is likely to reverberate well beyond the city’s borders and add a chapter to one of the more tortuous public health chronicles of the past century.

A report released this month by the Centers for Disease Control and Prevention said the water supplied to almost 15,000 homes might still contain dangerous levels of lead despite the partial replacement of lead pipes at the homes from 2004 to 2008. The findings called into question what was once one of the city’s chief methods of mitigating lead contamination of drinking water. The federal government ordered the District’s water authority — now called D.C. Water — to carry out those replacements, but the CDC study found that they didn’t solve the problem. …

Now, thanks to the new study, this much is clear: Even when the known exposures to lead are minimized and a city meets the federal government’s safety standards, some children may be getting a worrisome amount of lead from the water they drink. … See WATER, page 28
AZO SENSORS • August 20, 2011

Virginia Tech Researchers Develop Sensors for Predicting Falls for Seniors

by Cameron Chai

The U.S. Center for Disease Control and Prevention has revealed that Senior Americans aged 65 and more die mainly because of injuries from falls.

Researchers from Virginia Tech, with help from a $1.2 million funding from the NSF Smart Health and Wellbeing Program have developed a handy fall prediction monitoring device, which would help to detect fall risks early and also help in diagnosing and treating the patient before the fall occurs.

Karen Roberto, professor of human development and director of the Center for Gerontology and the Institute for Society Culture and Environment; [Thurmon Lockhart, an associate professor with the Department of Industrial and Systems Engineering]; and [Dong Ha, professor of electrical and computer engineering], all at Virginia Tech, are working on a project to stem elderly falls.

According to Lockhart, the users would fix the sensor on their clothes or on their ankles for measuring tiny changes in mobility, posture and gait, which are indicators of future falls. The research project was carried out by Lockhart along with a host of other researchers from Virginia Tech and the University of Virginia..

(WDBJ also featured Thurmon Lockhart's work.)

WHEC-TV CHANNEL 10 (NBC) Rochester, N.Y. • September 7, 2011

Virginia Tech researchers are making strides in preventing falls in the elderly

“People who are fall prone tend to walk differently, the mannerisms of our gait, for example,” explains [Thurmon Lockhart, an associate professor with the Virginia Tech Grado Department of Industrial and Systems Engineering].

Falls are simulated by a PhD student walking along a track that can “trip” her unexpectedly. Her movements are measured and relayed back to a computer. She wears the actual sensor, which can ultimately be worn as a piece of faux jewelry, above her ankle. Lockhart and a team of professors developed the sensor to monitor fall risk by pinpointing specific indicators. “That can be exhibited by our walking characteristics our transition characteristics as well as our mobility,” said Lockhart.

The information the sensor reads will be used to calculate the risk of a falls and ultimately, could help keep it from ever happening. “By understanding the risk, there are various types of intervention solutions out there to reduce fall accidents,” he said.

Within two years, residents of a nursing home will put the sensors to the test....

WSET-TV 13 (ABC) March 16, 2011

Virginia Tech engineering school among the best

Virginia Tech academics is reaching new heights as a new list puts that university’s engineering department in the top 25.

According to the most recent “America’s Best Graduate School Survey” found in the U.S. News and World Report, Virginia Tech ranks number 24....

(The Roanoke Times also covered this ranking.)

BIOINFORM • May 13, 2011

VT awarded $2.13M grant to merge ‘Top-Down’ and “Bottom-up” systems biology paradigms

by Uduak Grace Thomas

Virginia Tech researchers have received a $2.13 million grant from the National Institute of General Medical Sciences to integrate so-called “top-down” and “bottom-up” approaches in computational systems biology.

The team — [T.M. Murali, an associate professor of computer science] John Tyson, a professor of biology; and Jean Peccoud, an associate professor at VT’s Virginia Bioinformatics Institute — will develop a combined framework that draws from the two approaches and will use it to study cell division in yeast....

According to the project’s grant abstract, the researchers plan to develop algorithms to search databases to enhance models of cellular systems; come up with new principles to test how these improved models match experimental data; and design experiments to validate predictions made in the first two steps.

The goal is to fuse the top-down approach to computational systems biology — which automatically analyzes large-scale datasets for correlations between genes and proteins — with the bottom-up approach — which creates detailed models that can be simulated in silico and validated in the lab. “Hypothesis generation involves [identifying] potential paths by which this candidate protein might control the cell cycle,” Murali said. “The hypothesis-testing step actually adds these interactions to the cell cycle model and then simulates the augmented cell cycle model to see if it better fits the experimental data.”....

WASHINGTON POST • June 29, 2011

International Submarine Races attract 29 teams from around the world

By June Q. Wu

His wet suit undone to the waist, 21-year-old Josh Burton inspected the three-blade propeller of his 9.5-foot, one-person, man-powered submarine. Nearby, his sister sawdied chunks of purple-tinged foam to insulate the hull.

It was the third day of the 11th International Submarine Races in Bethesda, and Burton had heard that the United States Naval Academy’s team already had broken the competition’s record. Twice.

...But Burton, a Virginia Tech engineering student, was convinced the latest design changes would send Scuba Sub gliding underwater.

“We’re still waiting to get across the finish line,” said Burton, of Frederick, who was a third grader when his family built its first submarine. “It’s been a long time coming.”

This year’s International Submarine Races drew 29 teams of high schoolers, university students and submarine enthusiasts from as far away as Oman, Venezuela and France....

A panel of nine judges will award teams based on innovation, use of composite materials, design, team spirit and absolute speed, among other factors. Winners get bragging rights and, for some categories, cash prizes and trophies. ...
WDBJ.com (CBS) • October 10, 2011

Powered parachute takes crime fighting to new heights

by Karen Kiley

Planes and helicopters are routinely used in law enforcement, but Virginia Tech’s Police Department is putting something a bit different up in the sky. It’s not your typical police vehicle. “It’s almost like being in a balloon,” said pilot Kevin Kochersberger. “It’s very slow and peaceful.”

It’s called a powered parachute. It looks similar to a dune-buggy, with an open seat and a small motor, except there is a parachute strapped on the back to make it fly. …

Virginia Tech Police Officer Kenny Smith is one of two police pilots. He’ll use the powered parachute for aerial surveillance, search and rescue, and crime prevention. …

Kevin Kochersberger will fly the aircraft for research. The mechanical engineering professor will use the powered parachute for testing things like 3-D cameras used for mapping terrain. “In my case, I’ll be able to put imaging payloads on it and test the sensing capabilities that my lab is developing,” said Kochersberger, who works in the Unmanned Systems Laboratory at Virginia Tech. …

ROANOKE TIMES • June 29, 2011

Tech liver researcher wins EPA grant

The U.S. Environmental Protection Agency has awarded a three-year, $750,000 “Science to Achieve Results” award to Virginia Tech biomedical engineering professor Padma Rajagopalan to continue her research into engineered liver tissues, the university announced. T.M. Murali of Tech’s Department of Computer Science is a co-principal investigator, and Marion Ehrich of the Virginia-Maryland Regional College of Veterinary Medicine will serve as a consultant on the project, a university news release stated. …

“Water” (Continued from page 26)

“This is a really big deal,” said Marc Edwards, a Virginia Tech engineer who has warned of the hazards of the District’s water for years. “Meeting the EPA lead-in-water standard is not sufficient. Just because you’re meeting the ‘action level’ doesn’t mean that your child is not threatened.” …

A spokesman for the EPA said the agency still requires partial-pipe replacement when a water system cannot comply by other means. But, he said, “we are taking very seriously this new CDC study. It is eye-opening and shows that we need to continue assessing how this strategy is effective.”