Engineers' Forum

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Spintronics revolutionizing the electronics industry

Also Inside: EF Welcomes Dean Hassan Aref to the College of Engineering!

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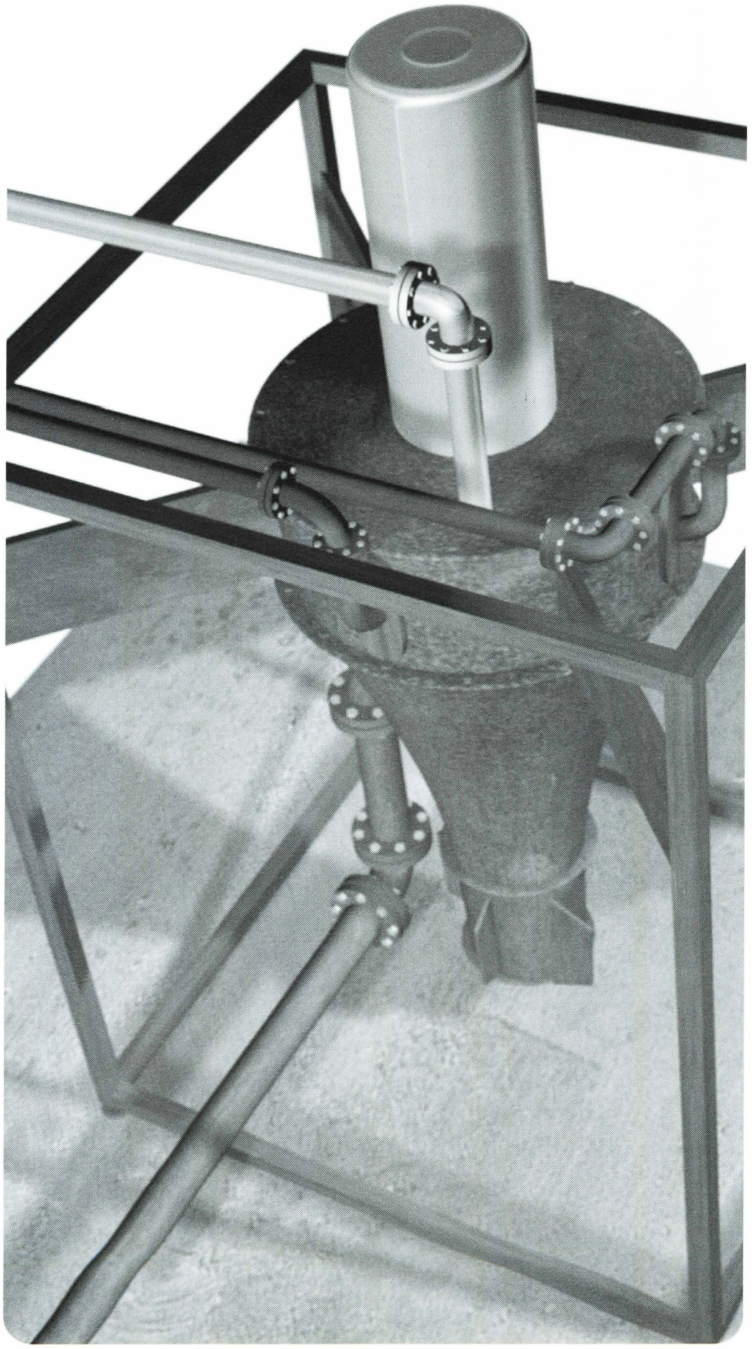


Cover Art by Brian McGill

New Dean Brings Enthusiasm

written by Kate Feild

Hassan Aref, previously head of the Theoretical and Applied Mechanics Department at the University of Illinois at Urbana-Champaign, took over the dean's position in the College of Engineering on April 1st. Dean Aref is dedicated to making Virginia Tech the Top-30 research institution it has the potential to be.

A major concern expressed by the students has been the recent budget cuts. Dean Aref wants to squelch those fears, especially dealing with the College of Engineering as a whole.

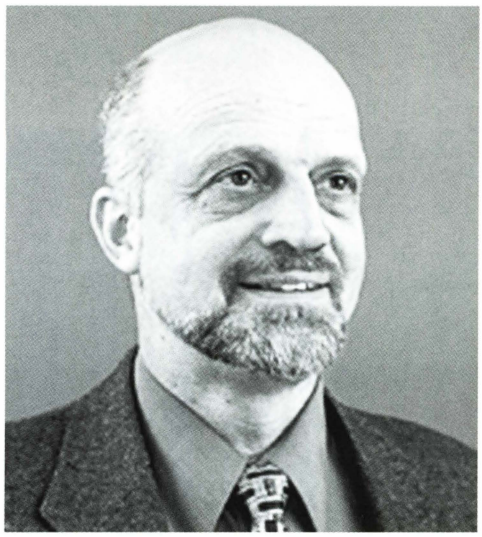
"In Engineering we have large resources coming from elsewhere that we can appeal to and draw on: the Federal government is investing record amounts in research and we should and can compete even more vigorously for those funds than we do today; we have a large, accomplished and intensely loyal alumni base who want to be part of our climb to greatness - and we intend to provide them every opportunity to help out," Aref states.

Dean Aref has a very enthusiastic attitude about the potential of the university and the College of Engineering. "The way you build excellence in a research university is really pretty simple: You recruit the very best faculty, staff and students that you can. You invest in superb labs and cutting-edge facilities so that you can do great things in research, and provide a spectacular education to your students."

The new dean expressed a desire to make a difference at Virginia Tech while keeping the lines of communication open between department heads, lab directors, faculty, and students, in order to make the College of Engineering more proficient. Aref assures students, "Over the next 1-2 years you will see a number of new initiatives, programs, and policies that will give new life to the College."

Dean Aref wants to build off his experiences at Illinois, as Assistant Professor in the Engineering Department at Brown University, and as Professor of Fluid Mechanics at the University of California at San Diego, in order to improve the College. "If we at Tech can combine the attention to undergraduates of a Brown U, the aggressive pursuit of research opportunities of a UCSD, and build the traditions for excellence of an Illinois, we'll be in very good shape indeed."

When asked about any general advice he could give busy engineering students, the new dean cautions against pulling all-nighters. "Sometimes I find sleeping for an hour or two early in the evening allows me to work for several hours at night. Continuing to work when you are exhausted I find to be counter-



Dean Hassan Aref looks to the future

productive," Aref advises students. "I did accidentally stay up all night working during one of the last days before the [Executive Committee of the Congress Committee of the International Union of Theoretical and Applied Mechanics] in 2000. I hadn't done this in years. I simply forgot the time, and suddenly it started getting light outside and the birds started chirping. It took me three days to recover however - not very efficient!"

If you want any advice about taking tests, take it from a man who earned his undergraduate degree in physics from the University of Copenhagen, and his doctorate in physics, with a minor in mechanical and aerospace engineering, from Cornell University. "On an exam, say, I tell [my students] to quickly look over all the problems, figure out which ones they feel they can do, and then concentrate on getting the stuff done that they know how to do."

The new dean will be an enthusiastic, as well as busy, addition to the College of Engineering. Dean Aref is a fellow of the American Physical Society, the American Academy of Mechanics, the Danish Center for Applied Mathematics and Mechanics, and the World Innovation Foundation. He currently serves as co-editor of *Advances in Applied Mechanics*, and associate editor of *Physics of Fluids.*

Currently, Dean Aref is a member of Executive Committee of the Congress Committee of the International Union of Theoretical and Applied Mechanics. The International Union of Theoretical and Applied Mechanics (IUTAM) is an international scientific union that holds scientific meetings in the mechanical sciences every four years.

"IUTAM itself has two main committees through which it conducts its business. One is called the General Assembly and consists of a number of representatives from each member nation. The other is the Congress Committee whose main function is to select the venue of the next congress and to oversee that it is conducted in accord with IUTAM's policies and procedures," Aref explains.

Dean Aref was elected to the Congress in 1992. He led the bid for the U.S. to host the year 2000 conference in Chicago and won. Aref, who was appointed president of the conference, was pleased with the results. "We had a great congress in August of 2000 breaking all kinds of records for attendance, quality of papers and what have you."

After the great work as president of the 2000 conference, Aref was elected to the Executive Committee of the Congress Committee, which Aref describes as "a small subgroup that really drives much of the Congress Committee's agenda."

At the moment, the Committee is planning the 2004 conference, which will be held in Warsaw, Poland. Because the meetings are held in different locations, a lot of travel comes into being a member of the executive committee. The meeting, scheduled in July, will be held in Estonia.

But what about free time? Everyone needs a hobby they enjoy when they just want to get away. "Fortunately, doing research and reading about technical subjects is my hobby so I do a lot of that just for fun," Aref assures this skeptical reporter.

On the other hand, the new dean may have something in common with those of us who enjoy driving around the drillfield at 15 m.p.h., windows down, listening to Eminem or Britney at highest volume. Although Dean Aref's taste in music is much better than most college students, he still likes his music loud. "I enjoy listening to classical music, often to opera, full blast," he says.

Movie Blues

written by Alison Lazarevich

When CDs first hit the market, the world of music was changed forever. A new format, capable of delivering un-paralleled sound quality, made all of us go out and replace our tapes with CDs. Similarly, when the DVD format hit the shelves, the world of movies was changed. We now can select chapters to watch, get Dolby surround sound at CD quality and watch motion pictures with an array of sub-titles in different languages. In addition to movies, DVDs can now be used to store data on computers and can replace CDs a reliable and long lasting digital music storage medium. So, one would ask, what technology has evolved in the past 10 years that allow us to use DVDs in stead of CD? What is so different about the two technologies?

The simple answer is that we can cram more information on a DVD than we can on CD. The data density on a DVD is much higher than on a CD. A CD, as most of you know, is written by burning pits into a plastic disk, much like the grooves written onto an LP. Instead of being read by a needle though, CDs are read by shining a laser on the disk. The pits that have been burned on the CD change the reflection path of the laser and a detector reads these differences in reflectance as a digital signal consisting of ones and zeros. The CD, consisting of a single layer of plastic, has pits that are around 830nm long and are written in a spiral pattern on the medium. The DVD however, has much closer spacing. Instead of being written in 830nm portion, DVDs are written with a minimum pit length of 400nm for single layer DVDs and 440nm for double layer DVDs. This decrease in pit length increases the DVD's data capacity from 650MB for a CD to 4.38GB for a single layer, signal sided DVD. If the DVD is composed of two layers, then the capacity increases to 7.49GB and if both sides of the DVD are burned (many of you have seen this for DVDs with both letter box format and standard format movies on one disk) then the capacity of the DVD medium goes up to almost 16GB.

But this still doesn't answer the question of why the CD came first. What new technology has evolved that allows the bits to be written closer together on a DVD? The answer is that improvements in semi-conductor laser technology have made it possible to make long lasting, cheap lasers that work at shorter wavelengths. Shorter wavelength lasers emit light that can be focused down to a much smaller spot size. To read a CD, a laser with a wavelength of 780nm, which is in the red region on the EM spectrum, is used. In contrast, a DVD burner/reader uses a laser with a wavelength of 640nm. To appreciate this difficulty, a short detour must be taken to understand how a laser works.

But, first, you have to understand how light is produced. Every material, if enough energy is introduced in the form of electricity,

light, or heat, gives off light. That is why light bulbs burn and the heating elements in your toaster glow red. The reason materials give off light is because the introduction of enough energy causes a population inversion of electrons within the material from the valence band to the conduction band. When the electrons are pushed up to the conduction band of the material, they naturally want to go back down to a lower energy state and when they do, a photon is given off.

A laser is based on this process of population inversion. The lasing material, which can be anything really, is excited until light is given off and the wavelength of the light is inversely dependent on the energy gap of the material. The light is then channeled back and forth through the material using a partial reflecting mirror on one side, to allow light to escape, and a fully reflecting mirror on the other. The reflections cause a chain reaction that makes more and more electrons excited and therefore more and more photons to be produced. At threshold, the laser is producing more photons that the material can absorb, and coherent light is emitted through the partially reflecting mirror. When lasers were first produced, they were very large, very heavy, burned out quickly, and only worked if you cooled them down to around 70K. But, your CD or DVD player is much smaller and works at room temperature, which means the laser size has had to decrease and the efficiency has to have increased.

These improvements have been made possible by the invention of the semiconductor laser. Semiconductor lasers use layers of doped semiconductors as the lasing medium with different band gaps to control the wavelength of the laser. The reason that the CD came first was that semiconductor laser technology at the time could produce a laser with a wavelength near 800nm. To reduce the wavelength of the light, the band gap of the material has to be increased and finding a material with the right properties is difficult.

The primary difficulty in choosing semiconductor materials for lasers is matching the lattice structure of the materials. Semiconductor lasers are made of crystals and are fabricated using a layered deposition process. However, it is impossible to make good crystals out of different materials unless the lattice spacing is very close for each material. If the lattice spacing is too different, then the crystal will have defects and the laser won't work.

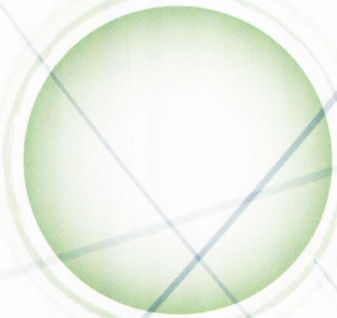
That said, there are advancements being made in material science everyday. Semiconductor lasers are being made with different materials that are shortening the wavelength of lasers from the red region of the spectrum down into the blue. New technology, which is being spearheaded by a Japanese firm called Nichia, is using Gallium Nitride as the base semiconductor for the new class of blue-violet lasers. And with the invention of a 400nm source (blue), comes the invention of optical storage medium that can be written and read by the new laser.

A group of 9 consumer electronics companies, including Panasonic and Sony, announce in February of 2002 that they are working on the next generation DVD system, named Blu-Ray. The new Blu-Ray system is tentatively offering over 25GB of storage space on a single sided, single layer disk. That is over 5 times more than the current DVD systems.

One has to ask, what does that mean for your DVD collection you've been working on so hard? Will the next generation of blue-light DVD systems include a red laser to read your old disks? Or, will you be like all those people who jumped into the LaserDisk market too early? Well, have no fear. If the manufacturers choose to do so, the new players will be completely reverse compatible because the shorter wavelength blue laser can read the longer pit sized DVD. However, if you're considering buying a DVD burner anytime soon, I would hold off if I were you because it is much less likely that the new systems will be able to read the non-standard DVD write technology out there. In any event, blue light is the wave of the future and we'll all have to shell out more dough if we want to ride.

written by Patrick Hummel

Electronics With A Twist



What is new in the world of electronics? Lately, it seems consumer electronics has reached a plateau of sorts. With all the cell phones, MP3 players, palm pilots, and plasma televisions being mass produced by manufacturers and enjoyed by consumers, it does not look as if the field of electronics could create another innovative gadget or revolutionary device anytime soon. However, if you are like me, you want to know what the next high-tech device will be. How about a quantum computer or a palm pilot capable of storing movies on it? An exciting new field of electronics, called spintronics, has emerged that could renew the public's interest in consumer electronics and produce the devices previously stated. It, unlike conventional electronics, deals with the spin of electrons in addition to their charge. This could lead to a multibillion-dollar a year industry that generates spintronic devices that are more powerful and smaller than current electronic devices. The interest and promise in the field is helping make futuristic spintronic devices possible. In fact, there is research here at Virginia Tech being done in this new field of electronics.

Spintronics is also known as magnetoelectronics and spin electronics because it deals with both magnetism and electronics. Electron spin has been known for most of the twentieth century. In fact, an electron's spin and orbit is the basis for magnetism. In order to understand how spintronic devices work, it is helpful to understand the principles of electrical current and magnetism. An electron possesses both a charge (negative) and a spin. An electric current is composed of moving charge carriers (i.e. electrons). A force (e.g. voltage) is used to set charges in motion. Every group of moving charges (current) produces a magnetic field.

Since an electron has a spin, it is already in motion and, consequently, produces a tiny magnetic field all of its own. Thus, spin and charge contribute to electrical current and magnetism. Yet, as stated by Colombia Encyclopedia, "in the case of many atoms, all the electrons are paired within energy levels, according to the exclusion principle, so that the electrons in each pair have opposite (antiparallel) spins and their magnetic fields cancel."

This is not the case for ferromagnetic materials such as iron, cobalt, and nickel. In these substances, a magnetic field can be produced inside the material by passing a current around the material, and thus, creating a magnet. However, Sankar Das Sarma, a physics professor who heads the spintronics group at the University of Maryland in College Park, states in Discover Magazine, "Exploiting the magnetic properties of the electron doesn't really qualify as spintronics until you start deliberately flipping the particle's spin back and forth and moving it from one material to another." As previously noted, conventional electronics ignores the spin of electrons and only focuses on an electron's motion due to some external force. Spintronics, on the other hand, makes use of the magnetic field produced by electron spin in electronic circuits; therefore, creating a more efficient form of electronics that can perform considerably faster and with less power.

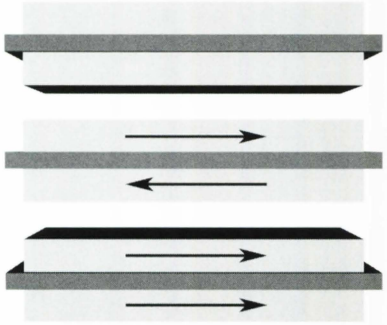
This theory is applied to create devices such as spin transistors, magnetic chips, and quantum computers. Spintronics has already been used to produce spin transistors since the early 1990's. Spin transistors have been used to replace semiconductor transistors. They are mainly used in magnetic sensors (commonly found in disk drives).

The driving principle behind spin transistors is called the giant magnetoresistive (GMR) effect. GMR materials contain two magnetic metals spaced by a non-magnetic metal. In one of the magnetic metals, the spin orientation of all the electrons are fixed. In the other, the electrons' spin orientation may be realigned when in the presence of another magnetic field. This arrangement allows the spin orientation of one magnetic layer to align itself parallel or anti-parallel to the other metal layer when the first layer's orientation is changed. When this happens, the total resistance of the GMR material changes for each parallel and anti-parallel state.

When the two metals' spin orientations are parallel, the total resistance is low, and the resistance is high when the orientations are anti-parallel. So, when this material is used as a magnetic sensor, spin orientations of the material change once a data bit passes beneath it. This, in turn, alters the resistance of the material. Finally, the data is determined by spin values that are assigned to the different resistances. This technology had a few problems in the beginning. The main problem was that there were only limited materials to choose from to create the device, and they were expensive. However, the technology has improved significantly through the years, and it is one of the reasons computers can now store many gigabytes of information versus megabytes.

Perhaps the most intriguing invention that could be produced from the field of spintronics is a quantum computer. A quantum computer would work by manipulating a quantum bit (also known as a qubit). A computer manipulates binary bits in a one and a zero state (corresponding to an electrical switch with a on or off status, respectively). A qubit is a mixture of the two states with electrons' spin being used to determine the state. Basically, this allows the computer to manipulate both states at the same time. Therefore, a quantum computer would perform calculations a great deal faster than a conventional computer. Quantum computers would not be useful for home computing, but would be beneficial for commercial use. This is because quantum computers are better at solving large-scale problems, as opposed to word

processing.



The main difficulty in creating a quantum computer is being able to hold atoms in stable state while observing the changes in their properties once they have been manipulated. A dependable quantum computer will not be available for mass distribution in a great number of years because of this. For now, work is being done to create magnetic chips that perform logic operations using just zero and one, where, again, electrons' spin (either up or down) is assigned as a one or a zero. Magnetic chips alone can revolutionize the electronics industry because they use significantly less power than conventional chips, which results in longer battery life in electronic devices.

Michael Zwolak and Massimiliano Di Ventra of the Department of Physics are doing research on spintronics at Virginia Tech. Di Ventra and Zwolak researched how DNA could be used to create spintronics devices. Spin information, which is determined from current, needs to be transmitted from one ferromagnetic electrode to another when creating magnetic storage devices. The research being done examines how DNA can be used to transmit the electrical currents. One major concern, however, is that electrons may become scattered traveling through DNA and, accordingly, lose their spin orientation. Magnetic semiconductors and metals are currently used to transport current. It is believed, however, that for short stands of DNA there will not be significant scattering. This research shows that there may be an opportunity to create magnetic storage devices the size of molecules.

To monitor microscopic devices, lasers can be used instead of an oscilloscope, which is typically used. According to Philip Ball of Nature Magazine, "it is not a far-fetched idea: the electrical conductivity of strands of DNA suspended between metal contacts has already been measured, and there are well-developed chemical and biotechnological methods for manipulating and arranging DNA strands into nanoscale structures." Thus, this research on spintronics is very exciting.

The field of spintronics looks to revolutionize electronics by developing new inventions and creating faster, less power hungry versions of current electronics. Research across the globe and here at Blacksburg is helping to make this possible. As is true with all new fields of science, the most exciting and revolutionary device to be created from spintronics is the one that has yet to be thought of.

E-Mail Bag

There was this male engineer, on a cruise ship in the Caribbean for the first time. It was wonderful, the experience of his life. But, it did not last. A hurricane came up unexpectedly. The ship went down almost instantly. The man found himself swept up on the shore of an island. There was nothing else anywhere to be seen. There were some bananas and coconuts, but that was it. He was desperate, and forlorn, but decided to make the best of it.

So for the next four months he ate bananas, drank coconut juice and mostly looked to the sea for a ship to come to his rescue. One day, as he was lying on the beach stroking his beard and looking for a ship, he spotted movement out of the corner of his eye. In a rowboat was the most gorgeous woman he had ever seen, or at least seen in 4 months. She was tall, tanned, and her blond hair flowing in the sea breeze gave her an almost ethereal quality.

She rowed her boat towards him. In disbelief, he asked, "Where did you come from? How did you get here"? She said, "I rowed from the other side of the island. I landed on this island when my cruise ship sank."

"Amazing", he said, "I didn't know anyone else had survived. How many of you are there? Where did you get the rowboat? You must have been really lucky to have a rowboat wash-up with you?"

"It is only me", she said, "and the rowboat didn't wash up, nothing else did." "Well then", said the man, "how did you get the rowboat?" "I made the rowboat out of raw material that I found on the island," replied the woman. "The oars were whittled from Gum tree branches, I wove the bottom from Palm branches, and the sides and stern came from a Eucalyptus tree." "But, but," asked the man, "what about tools and hardware, how did you do that?" "Oh, no problem," replied the woman, "on the south side of the island there is a very unusual strata of alluvial rock exposed. I found that if I fired it to a certain temperature in my kiln, it melted into forgeable ductile iron. I used that for tools, and used the tools to make the hardware. But, enough of that," she said. "Where do you live?" At last the man was forced to confess that he had been sleeping on the beach. "Well, let's row over to my place", she said.

So they both got into the rowboat and left for her side of island. The woman easily rowed them around to a wharf that led to the approach to her place. She tied up the rowboat with a beautifully woven hemp rope. They walked up a stone walk and around a palm tree, there stood an exquisite bungalow painted in blue and white.

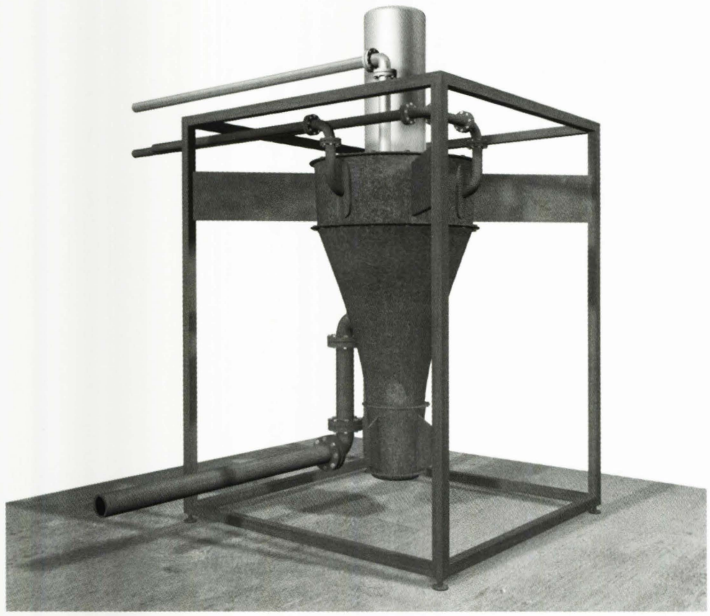
Trying to hide his continued amazement, the man accepted, and they sat down on her couch to talk. After a while, and they had exchanged their stories, the woman asked, "Tell me, have you always had a beard?" "No", the man replied, "I was clean shaven all of my life, and even on the cruise ship". "Well, if you would like to shave, there is a man's razor upstairs in the cabinet in the bathroom."

So, the man, no longer questioning anything, went upstairs to the bath room. There in the cabinet was a razor made from a bone handle, two shells honed to a hollow ground edge were fastened on to its end inside of a swivel mechanism. The man shaved, showered and went back downstairs. "You look great," said the woman. "I think I will go up and slip into something more comfortable." So she did. After a short time, the woman returned wearing fig leafs strategically positioned and smelling faintly of gardenia. "Tell me," she asked, "we have both been out here for a very long time with no companionship. Have you been lonely, is there anything that you really miss? Something that all men and woman need. Something that would be really nice to have right now."

"Yes there is," the man replied, as he moved closer to the woman while fixing a winsome gaze upon her, "Tell me ... Do you happen to have an Internet connection?"

Kansas Chicken Twisters

written by Sarah Lewis



Imagine standing inside of a barn on a Kansas farm, and hearing the ominous humming of a tornado. Usually, this image conjures up ideas of Dorothy and Toto whisked away by a tornado into OZ. The thought of these mighty monsters often instills fear across Tornado Alley.

Frank Polifka, a Kansas farmer, however, has tamed this tornado. Contained within his barn, Polifka built his Windhexe. This marvel, not only curious to admire, shows potentially multiple practical applications, from chicken to cosmetics.

Tornados

Tornados represent nature's fury in the Midwest and across the world. These powerful swirling vortexes of air, dust, and debris leave destruction in their path all around the world.

Tornadoes usually form out of supercell storms. Supercells are extremely powerful storm systems that frequently contain strong updrafts (a quickly rising column of air). These storm systems are the most destructive of storms.

They do not discriminate on location. Some geographic locations are less prone to their appearance, but no location is completely safe from these powerful storms.

Tornadoes form as furious inverted cones of air, either horizontal or vertical, under thunderheads or massive increasing cumulus clouds. They swirl in a counter-clockwise direction in the Northern hemisphere, and clockwise in the southern hemisphere.

The Windhexe

Kansas farmer, Frank Polifka, however, tamed these ferocious monsters of the air. Inside his barn, Polifka built the Windhexe. The Windhexe is a "tornado in a can"; an eight-foot cone-shaped steel container pulls in compressed air and spins it into a vortex as a miniature tornado.

When the machine begins to spin and become a tornado, it sometimes creates an ear-piercing squeal. The engineers present during the demonstration quickly confer, asking what causes the sound and how to fix it.

In this short amount of time, however, Polifka grabs a broom handle and pokes it at a metal flap inside the machine. Then,

when the Windhexe starts up again, the only sound heard is the humming of the tornado inside the cone.

To test exactly what his Windhexe can do, people introduced several different substances and objects to its power. To test some of its possibilities, everything from diapers to Oreo cookies enter the tornado. They even tried a dead bird.

Pharmaceuticals and Cosmetic ingredients?

Gib DeBusk, the retired Florida St. head biologist, introduced the Windhexe to its first jellyfish. Because the jellyfish are rich in collagen, if the tornado mixes them with the "secret ingredients" correctly, the result could be worth a fortune. As an ingredient for arthritis drugs, sports products, or even bandages that heal wounds, millions of dollars in possible profit appear.

Once DeBusk poured the jellyfish concoction into the Windhexe, the twister's ferocity dehydrates and pulverizes it into a white powder that falls out of the bottom, into a waiting wheelbarrow below. DeBusk hopes this mixture will combine the jellyfish and egg membranes into a "super-collagen."

Earlier, out of curiosity, Polifka dumped several eggshells into the Windhexe to see what would happen to them. The bucket of powdered eggshells and separate membrane amazed DeBusk. Normally, separating eggshells from the membrane involves an extremely complicated chemical process. Until the Windhexe, there was not a mechanical option.

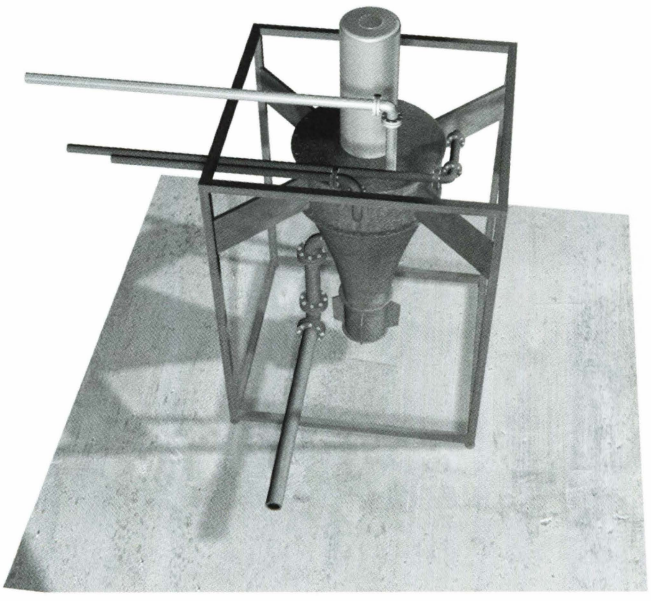
When these two ingredients combine in the Windhexe twister, $12.00 / hour and 200 Kilowatts of electricity later, the compressed air swirling inside the Windhexe turns the membrane and jellyfish into a fine white powder. A superheated air column inside the machine evaporates all the moisture from the original ingredients.

DeBusk estimates this product to be worth at least $2.50 / Kg to cosmetic and pharmaceutical companies. These companies usually use several tons of this product each year. This could translate to a large amount of wealth for Polifka.

Poultry waste eliminator?

When Polifka first finished his project, he recorded a video tape for friends. The tape did not create much interest until a few Maryland men found it. It happened that they worked in a business related to the poultry industry.

Currently, poultry waste presents a major problem to the poultry industry because of new environmental laws and media attention. On average, the United States alone creates around 4 million tons of byproducts (the feathers, blood, feet, heads, entrails, skimmed fat, and empty eggshells). Because of government



It's a bird! It's a plane! No, it's a tornado in a can!!

regulation, these are expensive and difficult to dispose of. They used to become fertilizer, new laws in some areas, however, make this practice much more difficult. Therefore, the poultry industry has been researching new waste handling methods.

The poultry industry is now one of the Windhexe's greatest supporters. When these waste products enter the tornado, they are beaten and evaporated so that only a powder remains. This powder potentially becomes flavoring or additive for pet food, or as a fertilizer, according to David Winsness. Winsness is a equipment distributor for several poultry companies, such as Tyson Foods and Perdue. Winsness said, "The single most important quality of the tornado in a can is whatever goes into it comes out with its nutritional value. You can get four times the price of non-edible waste."

In November 2002, Polifka got a patent for his Windhexe. The explanation behind the workings of the Windhexe is a mystery that even Polifka does not know. After fifteen years in development, his final product is what he considers the ideal atmosphere for a tornado. He designed it resembling the tornadoes he saw and experienced growing up on the Kansas planes, in Tornado Alley.

To build the Windhexe, Polifka capped a conic cylinder with four openings. These openings serve as entrances for the compressed air he sends at high speeds into the cone. This addition of compressed air creates the small tornado vortex contained inside the cone. In this upside-down cone, Polifka harnessed the power of one of nature's most powerful and terrifying shows, contained in his barn.

Who knows what else this dramatic invention could mean, but we will see it again in the future. Its possibilities limit only on the edge of the imagination. Already visitors have come to see what it can do and find out if it could help them. There have been questions if it can dehydrate duck droppings, separate out gold from gravel and sand, or even dry large amounts of underground coal supplies. Polifka, however, only wants to build another Windhexe that works to his well to his standards. For now, the rest of the world must just watch and wait.

Editor's Letter

written by Kate Feild

Plagiarize. According to Dictionary.com, plagiarize means "To use and pass off (the ideas or writings of another) as one's own. To appropriate for use as one's own passages or ideas from (another)."

I know the scenario. I've heard it a thousand times. You haven't slept in days. The homework is piling up. You have a paper to do on some boring topic you don't care about for some class you just want an A in to boost your GPA. So you just happen to come across a website that has information for your topic, and you decide to "borrow it." There's nothing wrong with that, right?? WRONG.

The worst part about the whole idea of plagiarism is the apathy people feel about it. For example, there is a well-known scandal that occurred at Piper High School in Kansas City, Kansas in 2000. Christine Pelton, a tenth-grade biology teacher, gave her students a major project which would compose most of their grade for the last semester. She explained to them that if they plagiarized, they would get a zero on their project and fail the class. Twenty-eight of her one hundred eighteen students plagiarized, and received a zero.

Parents threw a fit over this, and the school board reduced the punishment. Pelton resigned as a result of this scandal. The change in punishment not only gave the students who plagiarized higher grades, but lowered the grades of twenty students who had not plagiarized. Explain to me why this is fair.

There are many solutions, however. Professors in the English Department, I learned last semester, have an opportunity to submit their papers online to a website which compares the papers to other papers available online. This website highlights areas of your paper that are the same as other papers. Though it can be a time-consuming process searching through the highlighted sections, I'd like to think that one person caught in a class is worth the time.

If you have ever taken a programming class taught through the Computer Science Department, the first thing you learn in class is that anyone who copies code will be harshly punished through the Honor Court. I know for many of the Intro classes, the CS Department uses an automatic grading system, known as the Curator, to test code from one student against another's.

If you knowingly steal work, whether it be words, ideas, or code, from another person, then you are taking away from your own education. I hate to sound like a parent, but in the end you are only harming yourself. If you don't care enough about a class to put time and effort into an assignment, then maybe you don't belong in that class.

The best way to avoid plagiarism, of course, is to read your Hokie Handbook. If you have any questions about what plagiarism is, you can always talk to your professor. Is it really worth an Honor Code violation so you can get two more hours of sleep?

editor-in-chief