An Ohio State Engineering Publication Since 1918

The Ohio State Engineer

Autumn 2012 Vol. 96 No. 1

In this Issue:

- Buckeye Current Electric Motorcycle
- Inside the Mind of an Engineer
- International Students' Dream
- IIE Leadership Summit
- Law School for Engineers
- History of the Buckeye Bullet
- Introducing Dr. David B. Williams

Scan this code with your smart phone to visit OSE Magazine Online!

An Ohio State Engineering Publication since 1918 Autumn 2012 Vol.96 No.1

Ohio State Engineer

FEATURES

4 **Buckeye Current Electric Motorcycle**
An Ohio State Student Project Team Highlight
Brendan Kelly

6 **Inside the Mind of an Engineer**
How Engineers think different than others
Angela Lawver

8 **Law School for Engineers**
Why engineers should consider law school an option
Phoebe Low

10 **History of the Buckeye Bullet**
An Ohio State Student Project Team Highlight
Austin Krohn

13 **Introducing Dr. David B. Williams**
An Interview with the Dean of the College of Engineering
Laura Matacia

14 **IIE Leadership Summit**
We hope to see you at the top!
Courtney Stuetzer

DEPARTMENTS

3 **Editorial**
New Experiences
by Amanda Krasowski

14 **Photographs**
Engineering Tools
by Angela Lawver

15 **Tilt Shift Photography**
Toy Campus
by Joseph Bertolini

15 **Comic**
You know you're an engineer if...
by Cecylia Daab-Krzykowski

On the Cover
The Ohio State University's Wexner Plaza
Photo by Joseph Bertolini

On the Back
The Ohio State University's Thompson Library
Photo by Cecylia Daab-Krzykowski

New Experiences

Scheduling classes. Oh no. I shudder at the mere thought of it. In fact, I always dread the day that I will solidify the course of my college existence that will forever change my life! Well, this may be a bit extreme... but the anticipation of the unknown can be pretty scary. I can't help but feel a bit nervous now that I see six or seven ECE courses - or whatever field of engineering you may be - sitting gloomily on my Buckeyelink Student Center for the upcoming semester. What happened to my GEs? And where on earth did these semesters come from? What is with all of these changes?

Then I recall the wise words of Mr. David Bowie from his song notably called Changes: "Turn and face the strain, ch-ch-ch-ch-changes." The strain? There's some hard work involved? Good grief.

Perhaps he has some wisdom in that stanza. We're all confronted with new experiences, and sometimes we come across them more frequently than we prefer and in a magnitude too large to be reckoned with. What do we do?

We are all struggling with the anticipation of new experiences. Maybe the semester switch still has not settled in yet, or maybe you are on the road to applying to your major. New classes may have you in a bother, or internship applications may be the bane of your student existence. Maybe this is your first semester on a college campus, or maybe you are finally enduring your last. You probably have never had to deal with these challenges before, but why not embrace them? Changes can be enjoyable, rewarding, fulfilling, eye-opening... you get the picture.

As engineers, architects, scientists, and other applicable majors, we strive for progress, whether in knowledge, technology, skill sets, and experience. That crucial first step needs to be taken to express this ingenuity. Many trials may need to occur, and many variables may be thrown in. In the finality of it all, the destination should be well worth the journey, as the results reflect one's intentions.

The students of the Ohio State Engineer community have worked hard to encounter the new changes that surround all of us. As the new Editor in Chief of this publication, I am excited to embrace the new experiences, as well as the past, and I am proud to present to you all a compilation of thoughtful work by our students. In this issue, you will find relevant observations of our community, large and small, and how they relate to engineering and the sciences. Student organizations are now featured to portray to you the objectives and achievements some of our peers have made for interest and advancement. Our website is up and running to give you a new perspective of our magazine. I can truly see how new experiences are definitely fruitful, and facing the strain has been well worth it! On behalf of our organization, I hope you are inspired, informed, and entertained by our Autumn 2012 issue.

Amanda Krasowski, Editor-in-Cheif
krasowski.1@osu.edu

STAFF

Editor-in-Chief
Amanda Krawsowski

Design
Jason D. Sustar, Editor

Web Design
Joseph Bertolini

Art
Joseph Bertolini
Cecylia Daab-Krzykowski

Writing Editors
Cecylia Daab-Krzykowski
Monica Roser
Elaine Mallott
Megan Ujvari

Writing
Mohamud Jama
Brendan Kelly
Austin Krohn
Angela Lawver
Phoebe Low
Laura Matacia
Courtney Stuetzer

Treasurer
Pheobe Low

Faculty Advisor
Ed McCaul

Location
122 Hitchcock Hall
2070 Neil Ave.
Columbus, Ohio 43210

Website
http://go.osu.edu/ose

Advertising
Rates and media kits available upon request.
For information contact:
Phoebe Low, Marketing Director,
low.68@osu.edu

The Ohio State Engineer is printed in the autumn and spring as an educational experience by students of The Ohio State University.

Please Recycle this Magazine

Buckeye Current Electric Motorcycle

By Brendan Kelly

THE ISLE OF MAN GOES ELECTRIC

Every May, the Isle of Man, a small island off the United Kingdom, closes the streets of its small town to host a series of motorcycle races, the TT series, which pushes man and machine to their limits. The course includes a vicious journey through the tightly wound city streets and a grueling climb and descent of the mountain on the island. Racers whip through this course averaging up to 130 mph, flying through the air at points. Simple mistakes or plain bad luck can result in grave injury or even death. It was this arena that the electric motorcycle chose to have its baptism in fire.

Starting in 2010, the TT series added the TT Zero race, entirely for electric motorcycles. The industry was young, and electric vehicle pioneers took on the challenge of this course with fledgling knowledge, but large ambitions. The taxing mountain and long course length in addition to technical failures plagued the racers and bikes, but in the end MotoCzysz, a premier electric motorcycle, company based in Portland, arose victorious averaging 97 mph. MotoCzysz continued its reign through the 2011 and 2012 race, where it averaged more than 100 mph, a significant milestone for the race.

ELECTRIC MOTORCYCLE AT OHIO STATE

Prior to the creation of an official team at Ohio State , two engineering students independently began converting gas powered bikes to electric. Sean Ewing converted a bike as part of a research project through Ohio State and then formed Square Wave Racing to race in an American all electric series. Ewing linked up with current technical team lead Kyle Ginaven, who was converting motorcycles in his garage. The two worked through the Center of Automotive Research to set up a team dedicated to designing, building, and racing electric motorcycles for the TT Zero on the Isle of Man. This team was sparked thanks to contributions from Lawless Industries, Aaron Equipment, and the American Motorcycle Association.

2010 brought a team of students pioneering the creation of an electric motorcycle without conventions or clear best practices. The bike was designed and construction began. As the deadline to ship loomed, the team was struck by tragedy when Ryan Williams, a senior Integrated Systems Engineer, died in a tragic motorcycle accident. The team, heartbroken, named the bike RW1 to commemorate his memory and spirit. The deadline to ship found the bike unprepared to take on the dangerous curves and brutality of the Isle.

The team overcame the failure to make the TT Zero by setting the record for electric motorcycles of 112 mph at the East Coast Time Association (ECTA). The victory was short-lived, as the RW1 began experiencing battery failures due to the quality of the cells used. These failures continued through 2011, preventing the team from reaching the Isle for its second year. Once again the team turned to breaking records to sharpen their claws. The team swapped out the ailing battery pack with a

drag oriented pack graciously loaned by Sean Lawless of Lawless Industries. The team went back to the ECTA in July and broke the record again with a speed of 144.5 mph. With the record under their belt, the team rebranded as Buckeye Current and turned their focus to the TT Zero 2013.

ENTER BUCKEYE CURRENT: THE DESIGN

The design of electric motorcycles is quite simple in concept, but difficult in fruition. The powertrain is identical to that of an electric car, composed of a battery pack providing energy like a gas tank, a motor controller that regulates the flow of electricity into the motor, and an electric motor that converts the electricity into the rotational energy of the back wheel. This system is considerably less complex and more efficient than one under the hood of a gas powered car, but the major disadvantage arises from the power source. Significantly more volume and weight of batteries is required to get an equivalent amount of energy from gasoline. This causes difficulty in cars due to the excess weight and resulting penalty on efficiency. The light weight of a motorcycle negates this disadvantage, but the small frame and delicate weight distribution makes fitting the volume of cells necessary quite the hurdle.

Buckeye Current's design overcomes this obstacle through a comprehensive design oriented on centralizing the battery pack to optimize the volume of the frame and balance the weight to preserve the handling. The team chose the CBR1000RR frame to form the base of the RW2. The frame has a large cavity for the batteries and superior handling, having been designed for racing. The OSU Honda partnership contributed a race ready frame, along with funds to power the conversion. To move the frame, the team selected a small, light, yet powerful motor. The motor was positioned outside of the frame's contour so as to free up space for the centralized pack. The pack itself will be composed of 432 highly energy dense battery cells that are traditionally used in a remote controlled plane application.

The use of batteries causes another problem in determining how much energy remains. Gas vehicles simply measure the amount of gasoline remaining in the tank, while electric vehicles have to determine the amount of energy remaining in the cells using a system called a battery management system (BMS). There are two basic routes a BMS takes to determine this: either by measuring the amount of electricity that has left the cells or by measuring the voltage, which can be thought of as the electrical pressure. A combination of these measurements is used to determine the energy level of the pack. Battery cells also inherently release energy at different rates, requiring the BMS to balance the cells to keep the energy levels across the cells even. Buckeye Current achieved this using an ingenious design on a Texas Instruments hardware platform, which was graciously donated by TI.

Team leaders Kyle Ginaven and Julia Cline along with faculty advisor Marcello Canova explain the bike and its goal to President Obama.

TT ZERO 2013

Current is currently pulling the design from the computer screen and whiteboard and creating RW2. The rest of this story will be written in the coming months in the Student Project Building then the course on the Isle as the team aims to be the first collegiate team to break an average of 100 mph per lap. If you would like to join the effort, or contribute in any manner, please contact me at kelly.730@osu.edu.

Inside the Mind of an Engineer

By Angela Lawver

Differential equations, thermodynamics, dry humor, awkward social tendencies, Call of Duty strategies, and the Star Wars soundtrack— I believe we have entered the mind of an engineer. Yet, this is not a frightening or obscure place to be as many of the world's most innovative technologies and process have come from these depths. While engineers should not be perched on an intellectual pedestal to taunt those business and art majors below them, they do possess an alternative, yet not better, method of thinking through problems. This method involves everything from the brain's anatomy to the individual's social behaviors, which is stereotyped as inept and insensitive. We will begin our plunge into the engineering gray matter by exploring the gray matter itself.

Above-Average Anatomy?

Based on common understanding of the brain's anatomy, most people would agree that engineers are classified as left or logical thinkers as opposed to the more creative right brain thinkers. With dominant left brain capabilities, people see the world in absolutes of right or wrong allowing them to think critically and problem solve. This idea is a common fallacy. While it is true that many of an individual's logic and reasoning processes occur in the left frontal and temporal lobes, this does not infer that engineers have a concentrated left brain function. Research has demonstrated that the corpus callosum and other connections keep both halves of the brain in constant communication. (Psychology: From Inquiry to Understanding by Lilienfeld, Lynn, Namy, Woolf.) Nevertheless, this myth has spiraled so out of control that universities such as Northwestern and others have designed engineering programs based on "whole brain engineering," which capitalize on the functions of the left and right brain.

A more accurate description of the brain function engineers display would be to classify the type of intelligence they possess. Three categories of intelligence, also called the triarchial of intelligence, exist—analytical intelligence, practical intelligence, and creative intelligence. And, I am sure it is not hard to guess that engineers have a mind for analysis. Analytical intelligence is classified as left brain thinking or "book smarts." In this broad category, engineers possess subcategories of spatial intelligence and logico-mathematical intelligence. However, engineers also utilize their creative intelligence, in developing new processes and products while applying their "book smarts" in to current problem by practical intelligence.

Who knew that signing up to be engineering major meant a student had to tap into their triarchial of intelligence? Psychology notes aside, how do the mechanics of an engineer's mind affect what everyone else observes?

Social Squandering

Before you read the embarrassing idiosyncrasies of engineers, take this quick test to see if you are one.

You walk into a room and notice that a picture is hanging crooked. You...

A. Straighten it.
B. Ignore it.
C. Buy a CAD system and spend the next six months designing a solar-powered, self-adjusting picture frame while often stating aloud your belief that the inventor of the nail was a total moron.

If your answer was C, I am afraid you might qualify for what's next.

The "you know you're an engineer if,…." blogs are a dime a dozen, but no one can say that engineers do not have a sense of

humor or cannot identify their social patterns as well as anyone else. Although the cast of the show includeds only one engineer, The Big Bang Theory is a fairly accurate depiction of the non-engineering culture's perception of the profession, but this perception has developed over decades of education and industry.

In James L. Adam's book, *Flying Buttress, Entropy, and O-Rings: The World of An Engineer*, he quotes a study by Robert Perruci and Joel Gerstl about the origins of the engineer. They resolved that engineering students emerged into a higher social standing than their parents and were extremely high-achieving in high school. Once beginning their major, their course work was concentrated in their field out of requirement and interest. They became dedicated to their field and began to lack interest in extra-curricular activities and other studies nonessential to their major. And, their interest in technology superseded their interest in people.

As easily observed by chatting with many Ohio State engineering students, this generalization is somewhat outdated as many are engaged in fine arts and liberal arts activities, yet it is not entirely false. The analysts from engineering.com attribute the lack of eye contact and awkward small talk to a passion for the field. They stated, "An engineering career is often a result of a passion rather than a logical or practical decision. [...] However in doing this we are sometimes failing to engage with people on a personal level." Therefore, the stereotypical awkward engineers enjoy their work so much that their analytical minds get buried in the work , and they forget to come up for air and socialize.

Everyday engineers are required to collaborate with a variety of different people to accomplish a goal; however, this does not mean they are actually getting to know the individual with whom they are conversing. Yet, never fear, universities and engineering programs are doing everything they can to combat this stereotype and produce fully functional engineers with networking skills to boot. The University of Minnesota recently started its Gemini Project to coach students out of their comic book comfort zone while Ohio State has its Tau Beta Pi seminar.

Dave Typinski, from *How Things Work*, explained it best as he tried to defend the engineer's social ineptitude. "Ah, social skills. So, engineers must not only be able to perform differential calculus and build a tricorder from bear skins and stone knives, but must also author the Great American Novel, attain a James Bond level of self-assuredness at dinner parties, and negotiate peace between the Arabs and Israelis should the opportunity arise." Although, perhaps engineers are not suave conversationalists, their profession is changing every aspect of human life from transportation to water purification.

See, an engineer's cranium is not that scary at all. Just a few Harry Potter spells and some old Yu-Gi-Oh! cards mixed in with a heavily analytical thought process and a deep passion to improve the technology in the world around them. Engineers might not be the life of the party, but they can hook up a crazy sound system for the party.

Law School for Enginners

by Phoebe Low

As most of you know, graduating engineers get the benefit of high entry-level salaries. This easily makes engineering one of the fields with the highest payback and opportunities with just four years of college education. With over 15 specialties, engineering careers are diverse and the impact of innovation in engineering is clearly visible. However, these impacts do not go unchecked. Rather, changes that are made within a company have to comply with laws, regulations, and permits.

In my last article, "Conflicts of Construction: Columbia Gas Pipeline," I had mentioned that some construction plans were restricted based on laws—specifically land-use laws in regards to historical sites such as the Union Cemetery. To many engineers, laws are an inconvenience; however, by trying to understand law and why these laws were implemented, engineers might be able to expand on their technical skills and gain valuable insight.

I suppose that I am a bit biased, since I am seriously considering law school after I graduate this Spring. A lot of engineers have usually had enough with school and would like to move on with their life—get a job and try to build a professional career out of it. After all, if an engineering job pays $40,000 annually, it would make sense to stick with that plan. However, a lot of other engineers would like to go on to do their masters in an engineering field or go to business school, though very few engineers even consider law school. Why? My guess is that most people associate lawyers with defense attorneys and prosecutors.

Contrary to popular belief and media portrayal, not all lawyers work in forensics labs or deal with murder cases. In fact, there is so much more to lawyers than criminal law—there are lawyers for bankruptcy, environmental issues, corporations, divorce, public interest, intellectual property (patents), and so much more.

How Does Law Relate to Engineering?

Again, television programs tend to show the more suspenseful aspects of law—the courtroom. What most people don't understand is that lawyers only spend approximately 1% of their work hours in a courtroom. Rather, they spend their time researching court cases and the related laws. Yes, a lawyer should be a strong and competent speaker, but that is not the crucial part of the job. Passion is not the winning characteristic of a good lawyer—analytical skills are. A lawyer can be as powerful and passionate a speaker as he wants, but his case is not going to hold up in court if he cannot refer to specific laws and evidence that can support his claims.

In addition, law schools focus on finding students that have an understanding of science, economy, political science, etc. Only a handful of students could ever really have in-depth knowledge of all of the above areas, so do not feel discouraged. While some law degrees focus on political science or a background in business, there are several law degrees that depend on scientific knowledge.

Intellectual Property Attorneys

Perhaps one of the most popular and renowned of these law specifications is intellectual property law, also know as patent law. The reason why patent law is a strong suit in engineering is because they both work on levels of critical thinking and technicality. For instance, in order to evaluate a patent for a new invention, a lawyer would have to understand its mechanisms, the way it functions, the way a design can still be altered, etc. By already having dealt with this technological know-how in college or previous job experiences, the engineer's mind is already primed for such critical thinking processes.

Environmental Law

As an environmental engineer, I can appreciate its potential for environmental change and impact. From my undergraduate degree, I have the scientific background of environmental problems and the types of changes that science can offer. Pairing that up with the new environmental laws, and I think that I have a lot of

valuable skills at my disposal. But what do environmental engineers do? It could be a multitude of things, since environmental law does have overlap with international law, public health laws, etc.

For engineers, one of the more likely routes to take with an environmental law is to go work for a manufacturing company. Today, industry is under a lot of pressure to be green and environmentally friendly. If a manufacturing plant wants to change something in the system while keeping up with EPA regulations, an engineer with a degree in law would be able to fill those dual roles.

How Do Law School Admissions Work?

One of the most important things about law school admissions is your Law School Admission Test (LSAT) score. Think of it as the ACT/SAT of law schools. This test is also taken in a similar style to the ACT/SAT as well—booklets, bubble sheets, No. 2 pencils, writing portions, etc. The test consists of five 35-minute segments and one 35-minute writing segment.

Though many people might assume that the test involves knowledge of laws and interpretations, it is more comprehensive and functions more like the reading portion of the ACT/SAT. According to the Law School Admissions Council, the LSATs are "designed to measure skills that are considered essential for success in law school: the reading and comprehension of complex texts with accuracy and insight; the organization and management of information and the ability to draw reasonable inferences from it; the ability to think critically; and the analysis and evaluation of the reasoning and arguments of others."

In other words, law schools want to gauge how a student thinks, not how much he knows. By administering reading comprehension questions, the LSAT highlights students that are skilled in critical thinking and analysis.

Logic games also cover a 35-minute segment of the test. These games are essentially brain exercises where people have to find combinations and possibilities when given certain rules in a situation. I'm sure that you have happened across something similar at least once in your life—if A, B, C live on the same block but if B does not live between A and C and C does not live next to A… etc., etc. In short, these games require analysis skills different from that of reading comprehension and give law schools a peek at how a student evaluates and eliminates information.

As for the writing portion, that is not scored, though it is submitted to law schools as a writing sample. However, it is important to note that these writing portions do not weigh very heavily in applications, since the law schools usually refer to personal statements or application essays for writing capabilities. In addition, law schools typically understand that students are probably exhausted after taking the test for 3 hours.

How Would Engineers Have an Edge in Law School?

For the most part, engineers and science majors usually pull off higher LSAT scores than many lawyer-inclined majors (political science, criminal justice, etc.). This is because engineering majors are constantly exposed to critical thinking problems throughout their curriculum. In addition, engineers tend to "think outside the box," which is crucial to the LSAT.

In addition to the LSATs, law schools do look at undergraduate GPAs. Needless to say, the higher the GPA, the better off you will be. But, that is not always the case, as law schools also consider the applicant's major, career experiences, essays, leadership, reference letters, etc. In many law schools, a GPA of 3.2 in mechanical engineering would be comparable to a 4.0 in English. Plus, law schools aim to be diverse in backgrounds, and as engineers are quite rare in the world of law, applying engineers would probably get an edge.

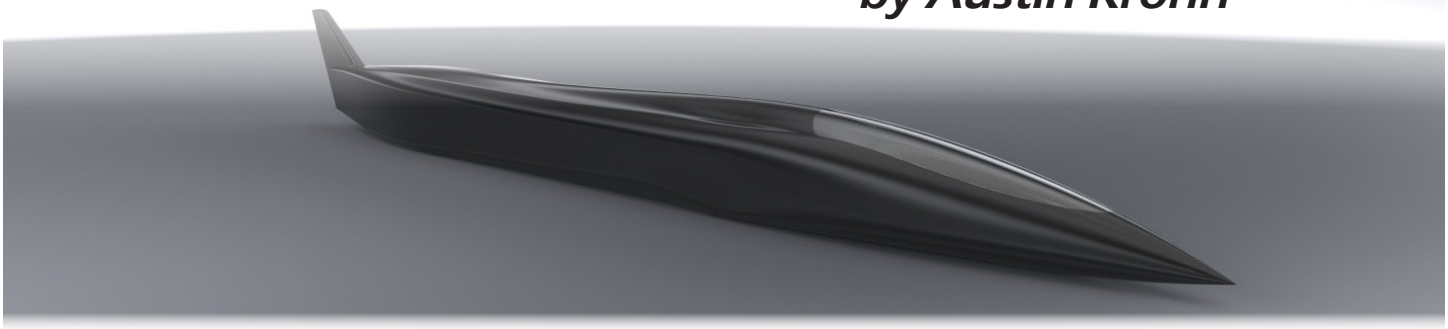
Conclusion

If you are considering graduate school, I would suggest that you look into law school. You do not need to be a pre-law major and you should not be discouraged by the low numbers of engineers that enroll in law school. As I have stated before, most engineers do not pursue a higher education because they already get good salaries and job opportunities from just a bachelor's degree.

Because it focuses on a different set of skills with multiple functions, a degree in law has a high potential to open up many career paths and raise salaries. After all, considering the low number of engineers with a law degree, I would say that experience in law would set job applicants apart. Plus, like engineering, an education in law is applicable everywhere and anywhere.

History of Buckeye Bullet

by Austin Krohn



Twenty years ago, Ohio State University entered into the world of electric vehicle racing at the beginning of an intercollegiate series know as Formula Lightning. With three national championships under its belt Smokin' Buckeye, as it became known, was the most winning Formula Lightning Vehicle throughout the ten year history of the series. When the series dissolved in the early 2000's many capable engineers at OSU's Center for Automotive Research (CAR), who had developed a passion for high performance electric vehicle racing, were left without a project to work on.

At a farewell dinner commemorating the Smokin' Buckeye team, a new idea was already emerging. Without much more than a sketch on a napkin and the question 'Just how fast can an electric car go?', the inception of a land speed vehicle had begun.

In 2001, after convincing the university to support such a seemingly dangerous project, students began making designs for the world's fastest electric vehicle, The Buckeye Bullet. At the time, the world electric land speed record was held by a vehicle known as "White Lightning". At 245 miles per hour, White Lightning did not have much competition. However the Bullet team was planning to not only surpass White Lightning, but also be the first electric car to break 300 MPH. With such lofty goals, the Bullet team was faced with many challenges.

The biggest challenge was how to start. Having a rough idea of the necessary horsepower, the team was able to derive the most important parameters for a land speed vehicle, the motor specification. With advising from Rotary Motion, the team was able to help develop a single motor capable of 450 kilowatts, or 600 horsepower. For reference, 600 horsepower is about the same power output as a Lamborghini Murciélago. Powering such a motor purely by electricity is not a trivial task.

With a little creative thinking and a lot of research, the team came upon a company called SAMINCO, who is a leader in electric traction/propulsion controllers that are typically found in large industrial mining vehicles. SAMINCO had already developed an 800 horsepower inverter which was perfect for the Buckeye Bullet. The next step was to find all of the batteries that would power the car to international recognition. Working with Sanyo Electric Corporation, the Bullet team was able to accumulate over 13,000 rechargeable nickel-metal hydride battery cells. All of these cells were than used for building the main vehicle battery pack.

Meanwhile other projects were going on; work in aerodynamic studies for body shaping, design of a transmission to help control the power to the ground, specialized suspension, parachute deployment systems, fire suppression systems, driver safety compartment, and many others.

The Buckeye Bullet raced for three consecutive years, 2002, 2003, and 2004. Each year slight variations were made to the car which attempted to increase performance with the hope that

Buckeye Bullet Team August 2003

these variations would allow OSU to take home the title of "World's Fastest". In October 2003, the Buckeye Bullet took the record from White Lightning with speeds of 271 MPH, but that was not enough for the team. One goal had yet to be achieved and the following year, the Buckeye Bullet reached a top speed of 315 MPH for a national record.

By the fall of 2004, the Buckeye Bullet had reached it performance limits and industry interest in battery powered vehicles was waning. But, while batteries were no longer of interest, Hydrogen Fuel Cell vehicles were becoming a hot topic in the automobile world. Leading to the proposal of Buckeye Bullet 2.

The same process started again, except that this time the team was not starting at square one. Instead, the team had years of experience and knowledge in land speed racing as well as partners in industry. Because it was very much in a class of its own, the Buckeye Bullet 2(BB2) only had two goals; the first - to break all BB1 records and the second - to become the fastest hydrogen fuel cell vehicle in the world.

The motor and inverter from BB1 were carried over. The fuel cells were from a reclaimed city bus. New peripheral systems became extremely important in the operation of BB2, such as onboard cooling and high pressure hydrogen lines. An all new chassis was designed and built to package this new vehicle and a new body was designed with far superior aerodynamics to complete the design.

After three years of design and testing, the BB2 was taken out to the Bonneville Salt Flats for an attempt at the record. In August of 2007, the team was unable to break any of the previous Bullet records. The team went home, not defeated, but more determined now than ever. They returned in October to try the record again at an event known as World Finals, but again, no luck. The team stayed after World Finals to hold a private meet, overseen by the International Automobile Federation (FIA), to attempt to break two world records, the electrical engine record at 245.54 MPH and the fuel cell vehicle record at 83.484 MPH.

While getting a fuel cell vehicle to travel over 200 MPH would be considered a great accomplishment by most, the Bullet team was not satisfied. Over the next year, the team developed all new hydrogen gas delivery systems, cooling systems, parachute systems, and fuel cell modules which reduced the weight of the vehicle by over 400 pounds. After the system overhaul was complete, months of testing took place, first at the fuel cell level, then at the powertrain level, and finally at the vehicle level. Feeling confident in the vehicle, the team went out to Bonneville again, this time recording a top speed of 297 MPH. Unfortunately, during the FIA record attempt the team experienced a motor failure as well as an overpressure event in the fuel cells. This sent the team home once again without breaking 300 MPH.

The following year much effort was spent rebuilding the vehicle, tuning control parameters

and trying to reduce the vehicle weight even further. When the 2009 race season came around, the team was running well over 200 MPH by the second run and prospects were looking good. However, by the time the Bullet was up for its 3rd run the inverter had blown and the motor had shorted to its case. Three days later the motor and inverter were completely rebuilt. With the motor and inverter fixed, the team was once again at the starting line and this time the vehicle hit a top speed of 298.9 MPH. Excitement was filling the air, 300 MPH was in sight! The following run BB2 reached 300.9 MPH, the first time ever that the vehicle had surpassed 300MPH. These two speeds, however, left the team with an average speed of 299.9 MPH, a record that was simply unacceptable. After two very long days including sleepless nights, in the final run of the day, on the final day of the event, in what would be the final event for BB2, BB2 became the first hydrogen fuel cell car to achieve an average speed over 300 MPH with a new world record of 303 MPH.

BB2 was retired because the team had already started work on the next vehicle, BB3. Before BB3 could run, the team had to re-learn everything they had once known about battery powered electric vehicles because BB3 was to be a lithium ion battery powered vehicle. As a test vehicle for BB3, the team completely gutted the insides of BB2 replacing all of the fuel cell system with batteries. The motor, the same one that was used in the beginning with the original Buckeye Bullet, was kept. After a year of retrofitting, "Buckeye Bullet 2.5" raced and set a new world speed record for a Li-ion battery powered vehicle at an average speed of 308 MPH - not bad for a test vehicle.

Since then the team has been actively designing the proposed BB3. They have been able to create a much more powerful vehicle that will have two symmetric drivelines powering both front and rear axles. This will be capable of propelling the car to speeds well beyond 400 MPH. BB3 is scheduled to race in August 2013. BB3 is not simply more powerful than all of the other vehicles (over 1 megawatt of power) but it is more aerodynamic and safer. This shows that the team has been able to stand on the shoulders of those who have come before them, allowing for the ever continuing progress of electric land speed racing.

For the students involved, this project has become the world to them because they are the designers, they build the vehicle, they are the ones working tirelessly for the chance at something amazing and, as a current team member, I know that I will never forget this car or what it has taught me about being an engineer.

Introducing Dr. David B. Williams
Dean of the College of Engineering
by Laura Matacia

I had the pleasure of interviewing the current Dean of the College of Engineering, Dr. David B. Williams. A native of Leeds, England, Dr. Williams attended Cambridge University. Heading into college with the intention to study physics, his initial plans changed after he was drawn to the hands-on aspects of metallurgy, materials, and crystallography. He graduated with a bachelors, masters, and PhD in Materials Science Engineering and moved to America for job opportunities.

Dr. Williams has a vast amount of prior experience in the engineering education field. He acted as a very successful leader during his previous positions at the University of Alabama at Huntsville as the former president and at Lehigh University as a professor of Materials Science and Engineering.

Not a stranger to Ohio State, Dr. Williams had connections to the city of Columbus before moving here. He visited many times for work related purposes and his eldest son also graduated from the university. He was very attracted to the city of Columbus, and the tremendous opportunities that can come with being in a city with many influential industries in the area. The large size of the university was also very attactive due to the potential for many growth and partnership opportunities. Along with the iconic university president Dr. Gordon Gee, Ohio State's wonderful faculty and students also attracted Dr. Williams to the University. As he stated, "Who wouldn't want to work in a place with great faculty and great students".

On a daily basis, Dr. Williams makes a presence in the community of Columbus. As engineering drives job growth and therefore the economy, he visits many companies such as Honda, Batelle, and GE to grow partnerships. He is very involved and constantly in communication with industry, alumni, and other deans throughout the state. A main focus for his job is meeting with other OSU leading faculty to come up with the strategic plan for the college. Under Dr. William's leadership, ideas and opportunities for the future of the college are kept on track. It is also his responsibility to make sure the college is being led in the right direction to reach the goal of our university to become the top university in the nation. Dr. Williams explained it by saying "Don't mess around in the weeds when you need to tend to the flowers," meaning it is important to stay on task with the main objectives and not get caught up in things that are not vital to reaching our goals.

It was very interesting to me to learn what the responsibilities of the dean were. At the end of the day, Dr. Williams left me with a piece of advice for all students and that was to "explore and learn by failures." By making mistakes, you can learn to overcome challenges. Make sure to find your limits and push to them. Dr. Williams used the example that he failed his first physics class, but it led him to find a new love in materials science. By overcoming this challenge it led him to find success. So make sure to explore your passions today, push yourself to your limits, and great success may be in your reach!

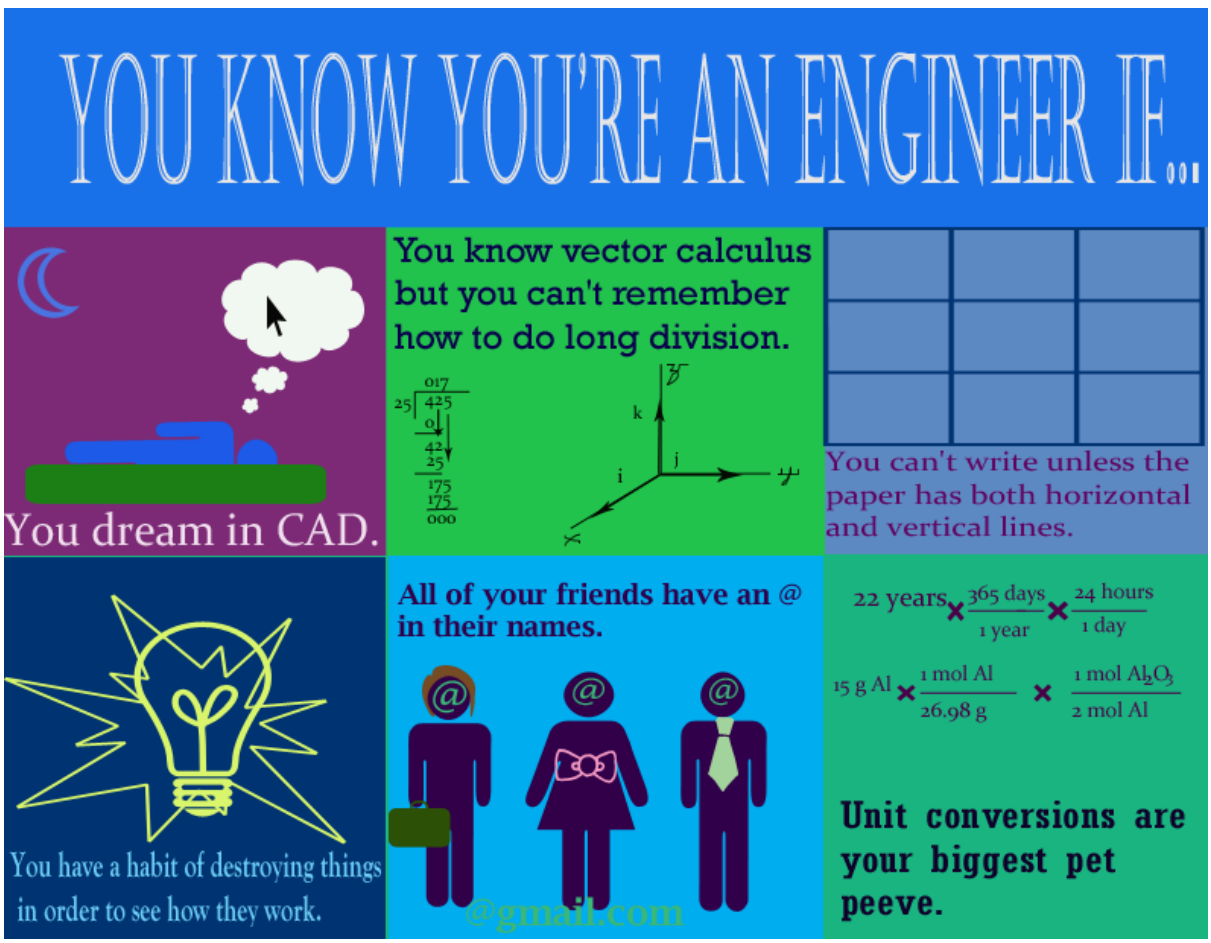
LEADERSHIP SUMMIT See you at the top

By Courtney Stuetzer

Do you strive to be a leader in life? What about being a leader in industry, your academic field, or your student organization? Would you like to enhance and translate these leadership skills into an exemplary peer network or a potential career? On February 2nd, 2013, the first annual Leadership Summit will convene in the Ohio Union and is open to all majors on campus. Unlike a traditional career fair, the 2013 Leadership Summit is a great way to make professional and personal connections in a personalized and casual environment. No matter where you are in your journey the 2013 Leadership Summit, our speakers, and attending companies are committed to helping you reach your summit. The day will begin with an opening speech by none other than OSU's own Archie Griffin, and will follow with engaging breakout sessions taught by business and industry professionals. These breakouts will cover the following topics: Today's Work Life Balance, Investing 101, Entrepreneurship: How to Turn an Idea into a Business, How to Brand Yourself, Climbing the Corporate Ladder: Tricks of the Trade, Making the Leap: College to Career, and What to Expect in your Internship. The Summit will end with an etiquette presentation and a plated dinner with company recruiters, giving you the opportunity to interact, get more information on, and potentially land a job with companies are leaders because they hire leaders! If you are interested or have more questions about this best in class event, please visit *http://www.ohiostateiie.org/leadership-summit.html* to register as well as receive additional information. Attendance is limited, so reserve your spot today! We hope to see you at the top!

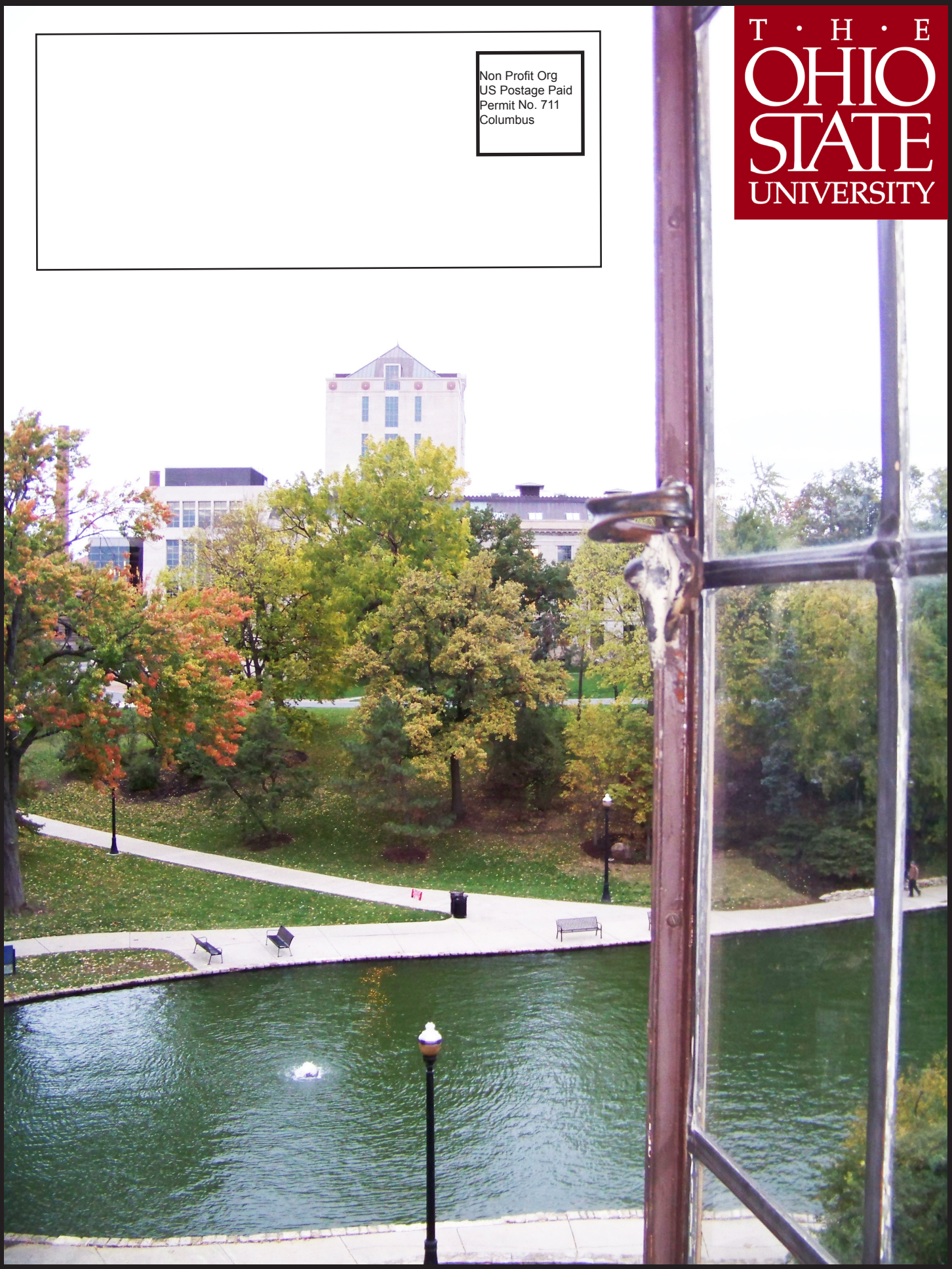
"Leadership will be the most important resource an organization can possess. After all, it will be leadership that determines whether organizations successfully harness the emerging opportunities and overcome the perils that await."

Jay A. Conger- Professor, London Business School


YOU KNOW YOU'RE AN ENGINEER IF...
You dream in CAD.
You know vector calculus but you can't remember how to do long division.
You can't write unless the paper has both horizontal and vertical lines.
You have a habit of destroying things in order to see how they work.
All of your friends have an @ in their names.
@gmail.com
22 years × 365 days / 1 year × 24 hours / 1 day
15 g Al × 1 mol Al / 26.98 g × 1 mol Al2O3 / 2 mol Al
Unit conversions are your biggest pet peeve.

Non Profit Org
US Postage Paid
Permit No. 711
Columbus

THE OHIO STATE UNIVERSITY



Thompson Library