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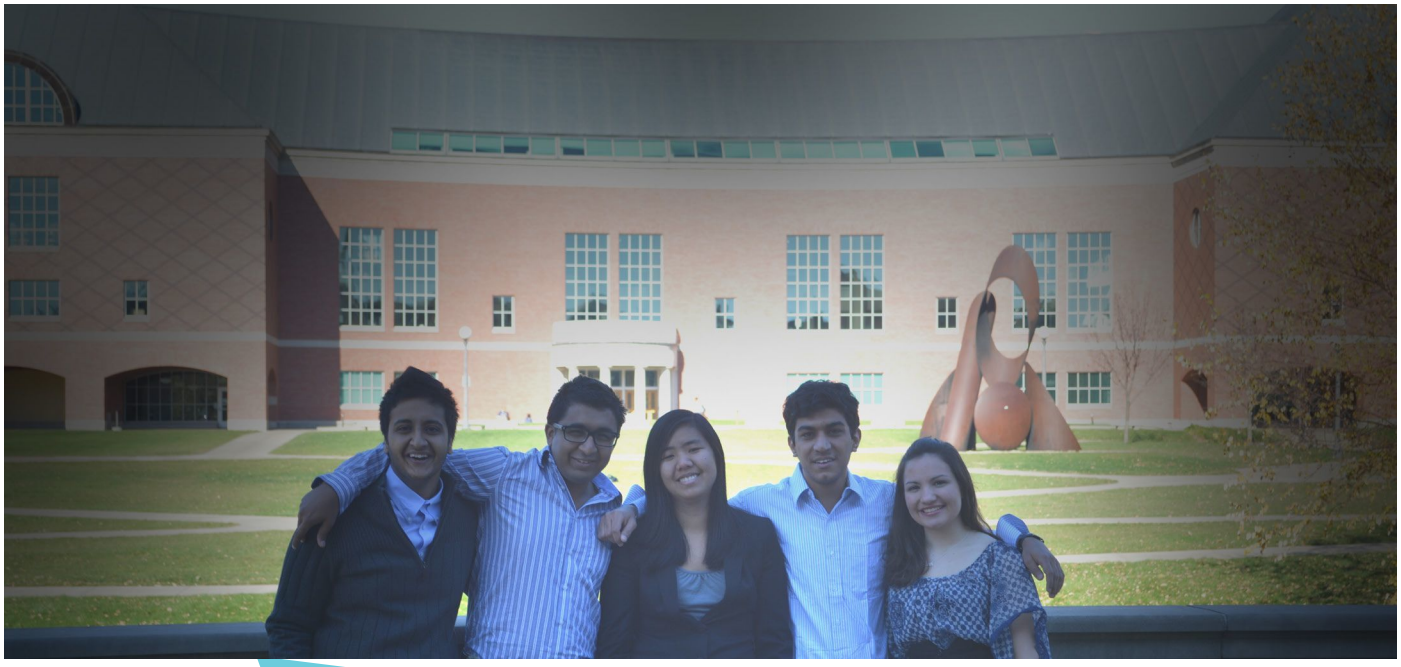
FALL 2013

CANGELLARIS

ONE ON ONE WITH THE NEW ENGINEERING DEAN

SCIENCE OF SUPERHEROS • CLOUD COMPUTING • THINK CHICAGO • ENGINEERING OPEN HOUSE



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INDEX

HOT: HYPER FOR THE HYPERLOOP

If you think that bullet trains are the closest form of transportation to bullets firing out of a gun, you're probably right, as of now. Using the principle of having a metallic body zooming through a tube at an extremely high speed, Elon Musk (the real world's Tony Stark), has come up with a fifth mode of transportation- the HYPERLOOP! This form of transportation can be vaguely described as a train, but it is way cooler than that. According to Musk's predictions the hyperloop will travel at over 600mph, faster than any other passenger transportation currently.

HOT: NEXT STOP, MARS

Looks like we've got another space race on our hands!

In the first week of November, India launched its first mission to Mars. If successful, they will be the first Asian nation to reach our red neighbor.

Though they deny it to be a race with China, many prominent people disagree. Looks like we'll need to watch to see how this plays out.

HOT OR NOT

NOT: NO SPACE FOR MYSPACE

Myspace?
Making a comeback? **LOL 4lyf**.
It was bought by Justin Timberlake and other investors for $35 million to undergo a revival to attract a new fan base and start fresh.

Is MySpace really worth the money though? Of course not. Not only will it be a challenge to steal from the Facebook crowd, but they also angered many of their loyal fans by deleting blogs with no warning.

Not. Cool.

HOT: JARVIS INTERFACE

Remember that scene from The Avengers where Tony Stark examines a 3D model of the Tesseract using augmented reality?
Or the one in Iron Man 2 where he is studying his father's design for the perfect future city and runs into the configuration of a new metal to replace the palladium in his chest?
Now ask yourself, do you want that (the Jarvis interface, not the AI, precisely)?
The answer is something you and I both are well aware of and so is the team at Meta.

Meta is everything Google glass should have been, giving the user the ability to interact with augmented reality. The introductory video shows the users playing chess and 3D modeling using augmented reality. Greg Kumparak from Tech Crunch, who had the opportunity to use the glasses, describes the glasses as early and rough yet cool. "Meta hopes that people will someday be doing full-fledged 3D modeling with this technology", writes Kumparak in his article "Meta, The Crazy AR Glasses That Aim To Do What Google Glass Can't, Go Up For Pre-Order". In a nutshell, the glasses are epic awesome and might just be the future we are hoping for.

NOT: PHONEBLOKS

For those that don't know, **Phonebloks** is a viral social media campaign aimed for **'Lego'** styled phones in the future. This meant that certain hardware pieces of your phone could be upgraded with a newer module.

Even though it's everyone's dream to be able to upgrade parts instead of buying the next iOS or Android device, there is a lot of impracticality for this concept. On the technical side, this would mean that years of research on making many components into single chips would go down the drain, such as the iPhone 5C's A7 chip cramming everything from it's CPU to graphics. On the aesthetic side, each component would become bulkier thus leading to even larger phones.

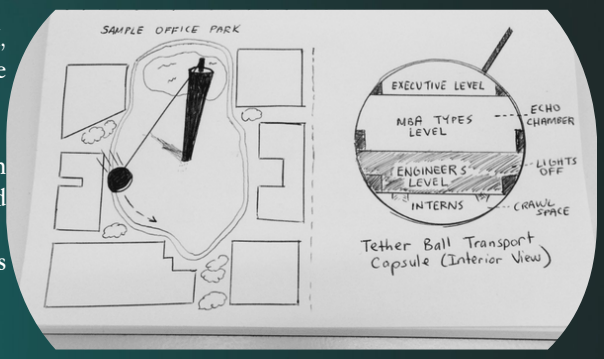
Imagine the new flagship Phablets getting even uglier and bulkier.
Now onto Power, this new concept would easily consume more power with the need for more and more components to communicateefficiently. On the producer side, this would mean less profit because you would have to make universal modules for every piece, as opposed to making new flagship phones.

This idea would be impractical in terms of the modern limitations, yet Motorola is willing to give it a try.

NOT: WHEN GREAT MEN BECOME BORED

Elon Musk is the man that started some innovative initiatives like SpaceX, Tesla Motors, and the Hyperloop Transportation System but what does he do when he's bored?

Parody Twitter account "BoredElonMusk" seems to be coming up with crazy new ideas such as the Tetherball Transportation system, which would revolutionize
travel around an office campus. Even if this idea doesn't pan out he has plenty
others…



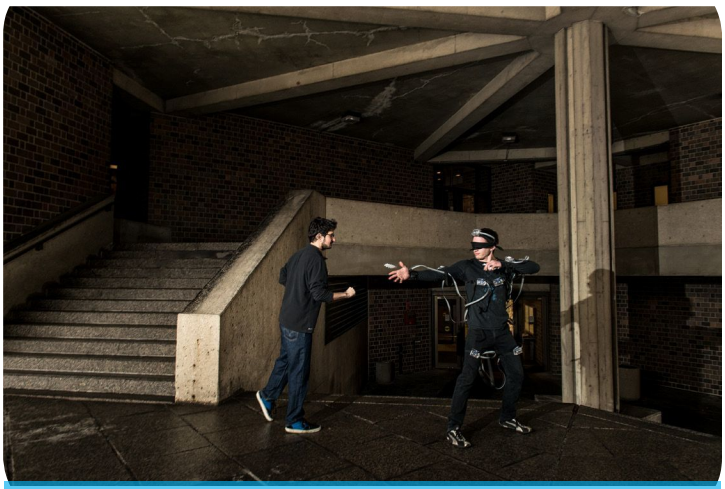
SCIENCE OF SUPERHEROES

SCIENCE OF SPIDERMAN

Humans have a wide range of senses that allow us to touch, see, smell, hear, and even taste our surroundings. However, that doesn't mean that we know everything that goes on around us. That level of detection would require special "spidey" like senses. Unfortunately, as impressive as the human body's senses are, they're not quite the best. People have blind spots; we don't do well tired; and there are many things we can't quite detect yet, such as radiation.

From comic books to the big screen, we see our favorite heroes react with lightning fast reflexes and have eyes on the back of their heads. Unfortunately for us regular mortals, it will be quite some time before superpower-endowing radioactive spiders become commercialized--however that didn't stop several student researchers at the University of Illinois at Chicago (UIC) from trying to use engineering to become a bit more super. They have developed their own electronic spider senses that can be strapped onto a person to give them a sixth sense.

Showcasing this suit in a real environment



The suit design as attempted by researchers

The design for the spider sense is fairly straight-forward. The system is an array of independent sensor modules with a servo. The researchers use ultrasonic sensors to gather distance data from the user's surroundings, and as objects get closer to the sensor module, the servo starts to turn and apply more pressure to the user. The user can then use the pressure feedback to determine how close things are to them, just like cats use their whiskers to determine if they will fit through certain passageways.

There were several challenges that the engineers had to overcome in order to make this work. First, the ultrasonic sensors were basically like sonars that emit sound and wait for a reply. Using multiple ultrasonic sensors caused interference with each other and created false readings. But in the end, they were successful. In their test experiments they have effectively demonstrated that when somebody is within their sensing distance, the subject can localize and describe the direction of movement.

Who knows… maybe in a few years we'll all have spidey senses. ■

SCIENCE OF SUPERMAN

The imagination of two high school students in 1933 gave birth to something that soon became a worldwide phenomenon. Superman, the Man of Steel, was born, making his first appearance in Action Comics #1.

"Superman", despite flaunting a bizarre costume, is the beacon of all powers man could ever imagine possessing. You probably already knew that, and so did everyone else. But something that has puzzled the greatest minds of the planet (apart from string theory and other stuff of little earthly consequence) is how he does it. The writers at DC Comics cleverly implicated all of his powers to our yellow sun and the difference in mass between Krytpton, his home world, and Earth. While this is a perfectly reasonable fictional explanation for a fictional phenomenon, astrophysicists were perhaps not so satisfied. If Superman's strength is a by-product of relative gravitational forces, then why do his muscles never atrophy? Why can he maintain sustained flight? How can he walk and run in a manner any Earthling could, if he should experience severe weightlessness like a man on the moon? Some scientists have spent large parts of their scholarly endeavors trying to make sense of Superman's powers. One example is Mark Wolverton, an author/science writer, who published a book in 2004 aimed to answer these questions called "The Science of Superman". Wolverton's speculation is that Kal-El plays host to a variety of different supernatural abilities as a consequence of both evolution and nature. Wolverton begins by readdressing the relative masses of Krypton and Earth. The mass of Krypton was six times that of Earth, which means that the inhabitants of Krypton had stronger muscles and bones in response to the larger gravitational pull. This also means that a person who weighed 'W' on Krypton would weigh 'W/6' on Earth. In Wolverton's opinion, the weight difference makes sure that leaping tall buildings is like a walk in the park for Superman, just like a man on the moon. However, to explain why after years of exposure to Earth's gravity Superman's strength never diminished, Wolverton claims it to be a feat of evolution. Superman may have grown up on Earth, but his race is not human. Superman's genes would still reflect those of his ancestors, which could imply an evolved basic level of strength, greater than that of an average human. Wolverton uses a similar theory to explain other super powers, such as likening his bone structure to that of an insect's exoskeleton or his heat vision to a conversion of sunlight similar to photosynthesis.

While Wolverton's theory conveniently coincides with the original comic book's explanation, it represents only a single school of thought with respect to the superhero. Ben Tippett, a theoretical physicist and mathematician who in his spare time does research on "black holes, gravity and… stuff", came up with a theory to explain the powers of the Man of Steel as a manifestation of just a single supernatural ability. In his opinion, all of Superman's powers can be explained by assuming that Kal-El simply has the ability to alter his inertia and the inertia of his surroundings. To illustrate this point, Tippet breaks down each of Superman's abilities and explains their relationship to the theory. For instance, flight can be achieved by lowering effective body mass relative to surrounding air; this can be further sustained by pushing the ambient "heavy" air under and around the body. The theory also gives explanation to why many of Superman's actions entirely violate the laws of physics. Such discrepancies arise frequently in the comic book series, such as the classic, free-falling Lois Lane example. At the rate at which Superman flies, it would actually be more deadly for a person to be caught mid-fall, assuming the catcher has any sort of upward velocity. By asserting Tippet's theory, Lane's free falling momentum is diminished greatly upon contact with the super being. The theory also explains why buildings don't collapse when lifted by a corner, why streets don't crack and dent when he runs over them, and even how he could manipulate an alter ego identity by sagging his cheeks and forehead or manipulating the emission spectrum of his eyes to change their color. Even the most abstract of abilities such as freeze breath and heat vision can be explained through this method, reasoning that a change in individual particle masses affects the overall temperature of a gas. This change could in theory result in an extreme cooling of air in contact with his mouth and lungs and extreme heating of air molecules bouncing off of his eyes Further explanations of these theories and more can be found online, and while, unfortunately, Wolverton's "Science of Superman" is no longer in publication, Tippet's entire research paper can be found at http://www.qwantz.com/fanart/superman.pdf.

What's your opinion about the explanations by Tippett and Wolverton? What's your theory about the Science of Superman?

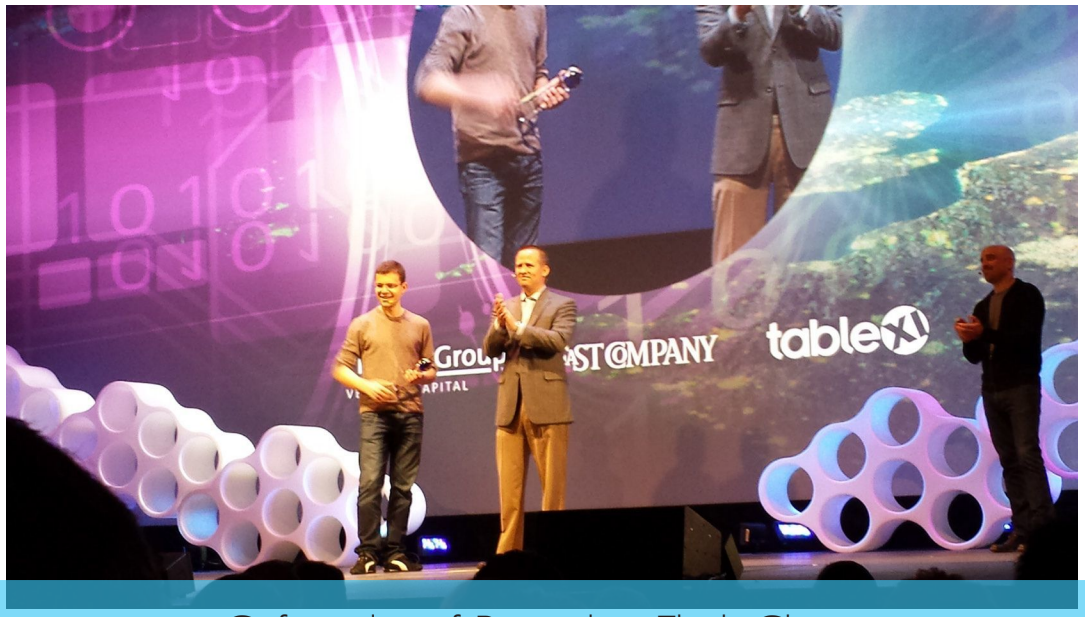
Post on our FB page (IEEE Spark at UIUC) or tell us at ieee.spark@gmail.com. ■

THINK CHICAGO

Presenters at the Think Chicago Conference

On October 17th through 19th the University of Illinois partnered with the City of Chicago to host ThinkChicago, a conference that presented outstanding college students from across the Midwest with a look at Chicago's fast-growing tech scene. The event connected students with leaders of pioneering companies and allowed them to attend Chicago Ideas Week. Students were given tours of popular companies, including Microsoft and Orbit, and were encouraged to launch their career in Chicago.

The first day included a look at 1871, a center for digital startups in Chicago. 1871 encourages entrepreneurs and gives them access to a knowledgeable community, possible investors, and educational resources. Adrian Holovaty, the co-creator of the Django Web framework, spoke about what it was like launching his startups and the difficulties he encountered. He founded Everyblock, a website that allows people to see everything that is happening in their neighborhood—from crimes to local events. Google Maps attributed creating an open API to Everyblock's effort in incorporating its maps on their website. Later that day, Andreas Cangellaris, Dean



Cofounder of Paypal at Think Chicago

Later that day, Andreas Cangellaris, Dean of the College of Engineering here at the University of Illinois, led a panel discussion regarding Chicago and its future potential in the tech scene. Afterwards, Microsoft showed groups of students the future of the technological world. Microsoft laid out their vision for incorporating technology into almost everything—from the windows of taxi cabs, to the kitchen counter, to the refrigerator screen.

The second day included a talk by Max Levchin, co-founder of PayPal, chairman of Yelp!, and former UIUC computer science alum. Levchin gave advice to students looking to start their own company. When asked about the anxiety and risk of starting a company he said he often thought, "What do I have to lose? I'm a computer scientist. I can always go out and find a job. Starting a company seemed like fun."

> *"What do I have to lose? Starting a company seemed like fun."*
>
> **-Max Levchin**
> **Co-founder PayPal, Chairman**
> **YELP!, UIUC Alumni**

He also spoke about creating a company later in one's career saying that "the more you acquire, the harder it is to let it all burn up in flames. Giving up the trappings of success is not easy at all." He also joked with the audience about how hard it is to name a company. In fact, PayPal was not named by anyone in the company. They got the name after hiring a woman who is a professional company namer. Actually, PayPal was very close to being named MoMo (which stood for 'more money')! ■

Governer of Illinois, Pat Quinn, presenting

CANGE

ONE ON ONE WITH THE

For the unaware, this year The College of Engineering at Illinois got a new dean:

Andreas Cangellaris

previously the department Head of ECE.

We had the pleasure of interviewing him.

Andreas Cangellaris

What does the Dean do?

What do you think the Dean does? There's always a perception and a reality, and coordinating the perception with the reality is very important in the learning process. Your colleague is in a position to function as the Dean. The dean looks down towards the college to see what the priorities of the college should be. At the same time he is responsible for supporting the administration in putting forward the right plan.

Let me take you through a typical week for the Office of the Dean. Keep in mind I'm not alone. I have a lot of assistants, Deputy Deans, and faculty to help me. As a student you're most familiar with the Office of the Undergraduate Dean where all your admissions were processed. The Dean is the one who makes all the mandatory decisions about the college. Anything that has to do with how resources are being spent or invested requires approval by the Dean before it goes to the next level. So I make recommendations to the College and I do this by listening very attentively to the plans of the College of Engineering.

What are some of the key things that go into making those mandatory decisions?

According to us this is the best engineering school in the world. If you look at it in terms of the number of students we educate, the quality of the student body, and the quality of the facilities, there are few places that can say they measure up to the University of Illinois. This happens in a way that has all the stakeholders engaged. Faculty members' success is our success as they strive to be the best in their careers. These are individuals that believe that engineering and innovation are important to the world. That's why you are here. Every student in engineering has a dream, an aspiration to do something with his or her career. We and everyone else in the College rely on that drive by the students. You cannot have a top engineering program without top students. It's impossible. So you can see that the stakeholders are not only the faculty, but also the students and those who hire the students, giving us the necessary resources by licensing the new technologies that come out of the University. So my responsibility as the Dean isto make sure that the groups of interest that make the excellence of the College happen are engaged.

What are some of the challenges you face in such a highly administrative position?

The problem when you're on the top is that the only acceptable direction is upwards. It's not easy to be at the top. The only way to stay at the top is to constantly aim for the next level. That is something I try to inspire in my department heads and through them in all of my colleagues in the College. Making sure they have resources and making sure we can get those resources. The most important thing is making sure that the things we do and the impact we have is broadcast visually and appreciated by everybody. It's very easy for us to say that the research we do, the contributions we make, and the quality of our students speaks for itself.But you know how information is exchanged today. You need to be visible and accessible by all sources and media outlets. That's another responsibility to broadcast our excellence to the broader society. There's nothing more persuasive than having an individual say, "I hired someone from the University of Illinois to work in my company and they're the best I have ever seen."

LLARIS

NEW ENGINEERING DEAN

"There's nothing more persuasive than having an individual say, 'I hired someone from the University of Illinois to work in my company and they're the best I have ever seen.'"

So making sure you go out there and are successful, and making sure people recruit you very aggressively, is one of the things my office does through career services. Appreciate the fact that even though the decisions are being made in the College, the departments are the ones who set the expectations for their individual units.

What are some of the advantages to being a Dean of all of Engineering as opposed to the head of just ECE?

We pursue and foster opportunities for collaboration between the units. In this day and age interdisciplinary research is the only way to solve some of society's most pressing problems. Take energy, for example. For energy you have to come up with a new way of producing energy, but unless you're successful in making sure that it is utilized then it is irrelevant. Establishing standards is a very tedious and complicated process that involves economists, standards committees, politicians, and of course the innovators. This is the type of multidisciplinary research we try to foster and we do that in aariety of ways. Faculty are the ones who, through great effort, put together the ideas. Our responsibility in the College is to make sure we provide them with the funding they need and help them take an idea and turn it into a successful proposal. In a nutshell, we're a facilitator in the College of Engineering administration. It is my responsibility to convey ideas to the next level.

In what ways does the College of Engineering interact with the rest of the school?

Any time I go and ask the university for something for the College of Engineering what do you think I do? I use as my ammunition the excellence of the College, the success the College has had through past investments, and most importantly I articulate why the investment of the University will help the College become even better. And as you can see from earlier, the Deans of the various Colleges are the ones who help the Provost and the Chancellor develop a strategy as we move forward to be more successful.

So it is a two-way job if you wish, coordinating with the administration above and coordinating with the administration below.

Why did you want to become Dean of Engineering in the first place?

Apparently your resume is 30 pages long! There's a lot of discussion about the process of becoming the Dean of Engineering but what in particular made you want to do so?

Let me answer this question by telling you what one of my faculty members here in the ECE department told me when he found out that I was going to be Dean. He said, "Andreas you gave up the best job on campus – Head of the Department of Electrical and Computer Engineering – for the second best job on campus." I know that even if I were the head of Computer Science a faculty member would have told me the same thing. It is this passion of the faculty for excellence, it is this belief that this College is the best and those rankings out there that put us in the top five are wrong. We are number one, that's what made them want to do this. The only reason we're not given number one is because of perception. MIT and Stanford are always above us on rankings due to other fields but I won't get into that. It is the passion of the faculty on this campus that made me want to do this and I believe that the excitement is making sure that that sets us apart. I'm sure you've heard the expression – if you want to be at the top, you have to set yourself apart.

You have to fine-tune the things that you do best, the things you know, your convictions, and set yourself apart from the competition. Make sure that they're highlighted as best as possible, and that their impact is described as best as possible. And at the same time continue to grow because in the end once you've set yourself apart people will recognize you for what you are doing.

So that is what really attracted me to this position. And I'll tell you it is one of the best things to be able to work with a group of faculty that you know feel the same way about this place as you do. And also looking at the students and seeing how excited they are about being here. The other day I was having breakfast at a conference, and there was guy who came over and said, "Professor you don't remember me but I took your class fifteen years ago and now I'm at NIIST and am going to get my PhD. Your class was the most inspirational class that I ever had as an undergraduate student." I'll be honest I didn't recognize him, but he was so sincere I don't think that I've ever felt better in my

r in my life than when I heard him say that. And that reminded me of how excellent this place is. By being excellent at what you do, your teaching or your research, you inspire many other people, not just one or two, to go ahead and do the same thing. And we do this so well at Illinois that it is worth every minute that you give to the job during the day. That'swhy I'm doing this, because I believe that the College Engineering at Illinois is the number one school in the country and I want to make sure that we communicate that effectively. We position ourselves so that our place as number one college in the country is global. It is not just limited to our friends or stakeholders, but includes the broader engineering community and the world in general.

You've answered all of our questions. Let's go off-topic a bit. What was your childhood dream? Did you always want to be in academia?

No. Academia was not a part of my early days. I wanted to be a tennis player. I was a very good tennis player, but financially my family could not afford it because I grew up in a small place. I grew up on an island in Greece and I would have to go to Athens to practice. My parents couldn't afford it and that was the end of my tennis career dream, and that was probably a good thing. I don't think I would have been a –
who do you like very much?

Federer? Nadal?

"***Academia was not a part of my early days. I wanted to be a tennis player. I was a very good tennis player***"

I don't like Nadal very much, so you can say that I wouldn't have grown up to be a Federer, but I'm still very fond of tennis. The other part was that I was very good in math. I knew that I didn't want to be a lawyer because I came from a family of lawyers, some of whom were very successful. But my dad was very concerned and he said that I have to get a job with some financial security, so why not engineering? It seemed like a good option. My sister was studying chemical engineering and I felt that if she was studying chemical engineering, which was very big at that time in 80's, I should go into electrical engineering. I'm telling you this because it's the truth. You sometimes make decisions randomly perhaps or through the influence of others around you. I'm not saying that you have to live with those decisions, but an engineering education is a very solid preparation for life. I did very well as an engineer.

We can see that.

I meant before I came to the United States. I was one of the best students in the ECE department of my school. My sister was already here at the University of Illinois getting her PhD in Chemical Engineering and the last thing I wanted to do was come here to the US to go to graduate school. I wanted to work. I wanted to go out and make money. That's why I became an engineer. But my father told me, "Your sister is in the United States getting a graduate degree, you should do the same." And I was very reluctant to doso. I had an amazing job lined up at one of the most important construction companies in Greece. But my father told me, "Go to the United States. It's an amazing country. They believe that the country progresses through the innovations of people. They never do the same thing twice." Which, by the way, is true in this country. I started to think about coming to Illinois for graduate school. When I came to visit my sister here during the winter of 1980 I told myself, "Forget it! I'm not coming here, this is too cold for me." So I went to California to get a master's degree. I was in Berkeley in 1981 and planned to get my MS quickly and go back. When I finished my master's my advisor told me, "You have done so much, if you spend a couple of more years here you can get a PhD." And you know Berkeley was very nice, beautiful weather, so I said "Okay, no problem." I then met my wife; she's an American. I finished my PhD and she said, "Why don't you get a job here?" and here I am. So that's how it happened. But I must tell you I've alwaysliked teaching. Throughout my undergraduate degree in Greece I worked two jobs, one engineering design for a design firm and the second tutoring math, both high school and college kids. So I've been teaching people mathematics and science since 1977. I was a TA as a graduate student, and I loved that too. I worked in industry for two years doing research and many of my colleagues from industry will tell you, I never missed an opportunity to teach people. So going into academia was pretty natural. I really enjoy it.

What do you think that students of engineering are lacking currently and how can they improve?

Lacking is the wrong word. Let me put it this way. You guys are extremely bright; people who go into engineering have a passion, but that passion is often suppressed for a variety of reasons. The most common one is that you get into the routine of hard work and engineering is demanding. So you forget that the reason you're doing engineering is because you want to do something that will have an impact. And so you get into that routine of doing your work and making sure you meet all your deadlines and you forget the fact that your inspiration is supposed to be fed by you yourself. And how do you do that? You do that by making sure that you share your dreams with others. By sharing it with another, some of the things you accomplish are that you excite others, and you test some of your ideas and the feasibility of some of your inspirations. Your colleagues then assess it and this is something that we do not do as much as we should. When we talk about leadership, the way that you practice those skills is by stepping up, opening up, and sharing those skills with others. Team projects: how do you do them? Sometimes we structure too much. I always liked the idea of having an unstructured team effort, where you decide who is going to be a member of your team as you move forward. And that has to be done outside the confines of your specific schedules. I would love to see our curriculum provide more facilities for you to do these things.

I am committed to making sure that we promote entrepreneurship, inviting people to take a step back and ask, "How might I do this differently?" It is challenging oneself to go beyond something that we take for granted, getting out of a person's comfort zone. That is something I see right nowin this day and age where everybody appreciates the importance of technology. There is this subconscious respect for the engineering community. It is not verbalized as much but I see people are in awe of things like this. Realizing that you are behind the things that can help people should be an inspiration to say, "Everyone give me an idea, I can make that idea happen and turn it into a reality." Being able to communicate your passion is really what leadership is all about. Bringing people to the table, discussing things, hearingyour idea be shot down because it's not good enough, and then learning from that and coming back with a better plan or making way for someone else to be leader. I believe weneed to find ways to work on all of these things. The success is there and the ability to succeed is there, but imagine if all of our students were willing to step

up to the next level. Not everybody will do that. But if they had this in them, the world would be a much better place than it is now. So I would say that is not something that's lacking, it's something that we don't inspire you enough to do. Some people do that naturally and some people need a push, but everyone can get there. Everyone can inspire others. You're here because you feel that responsibility to do something. Make sure that you share that excitement with others. There is nothing more inspirational, more persuasive, than your personal desire to step up and do something. So we're all in this together. I don't want you to expect your professors to do it for you, but as Dean I'm trying to work with the department heads in order to put together a structure to help.

Is there anything else about you that you would want the students to know?

Well I told you about my love for tennis but there's two others sports that I enjoy. One is soccer, I grew up playing soccer, and the other is American football. I love American football. I'm a 49ers fan because I was exposed to it in the Bay Area. I love it because of its strategy. Every time a new play is set up I put myself down there amongst the players in the offense or defense and ask myself what I would do. I love football. I hope that that doesn't change people's opinion of me.

Here's the cover photo for our magazine.

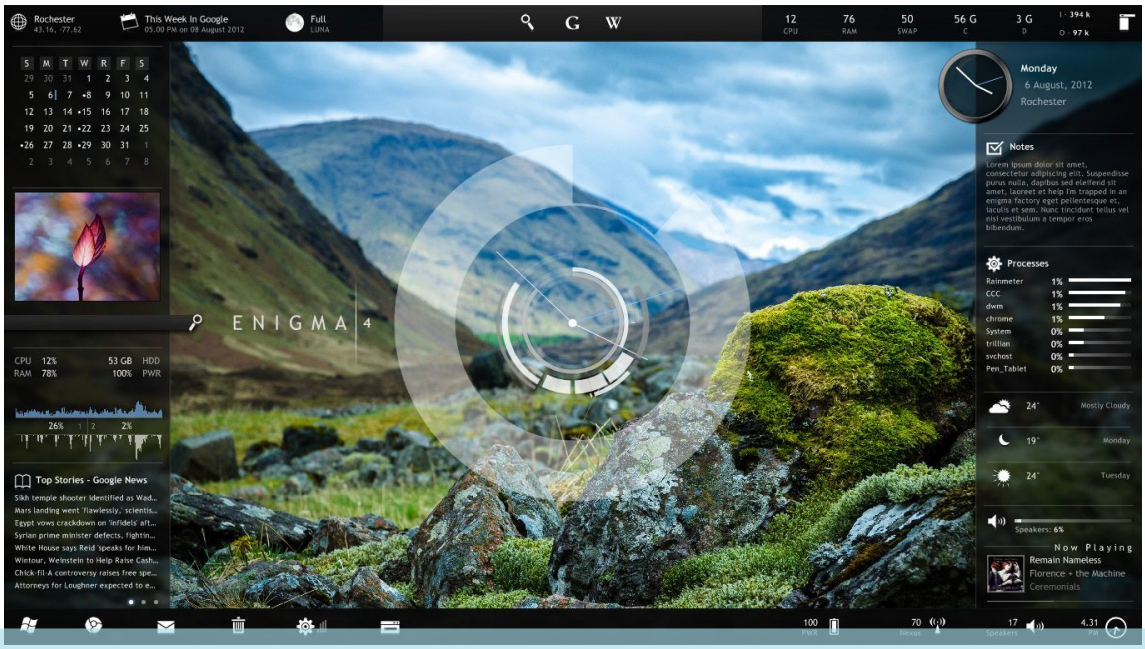
Oh I did not know that I'm on it. I really appreciate this. Please give me a copy so that
I can send it to my mother. This is very cool. ■

CANGELLARIS signing the new ECE building beam

INTELLECTUAL SNACKS

CUSTOMIZE YOUR COMPUTER

Most people spend hours upon hours staring at away at a computer screen, why not make it personalized. The following plugins and software will turn your desktop into another home.



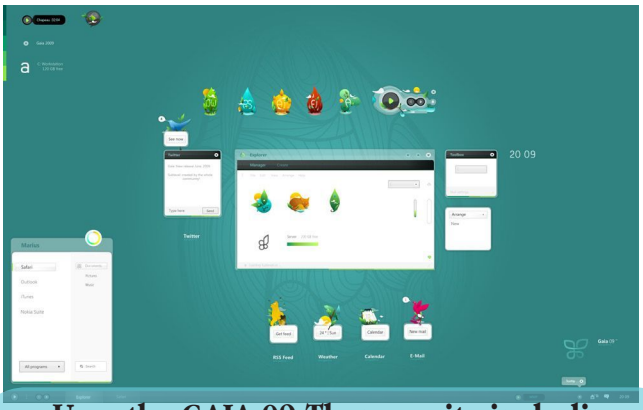
The above desktop uses RAINMETER on a Windows operating system to get this look

WINDOWS

Rainmeter: Forget the plain and boring widgets, upgrade to a new look. This application provides ease and flexibility in terms of adding control ranging from your weather to your music.

Rocketdock: Needed a launcher that wasn't as lame as the windows start bar? This dock sits on your desktop and provides unreal amounts of freedom as a launcher.

Okozo Interactive Wallpaper: Almost every new smartphone has 'live' wallpaper. With this application, you can turn your desktop wallpaper into an interactive one, just **as the name suggests.**



Uses the GAIA 09 Theme suite including ROCKET DOCK and RAINMETER

LINUX

Conky: This is a linux alternative to Rainmeter, but even more flexible in a sense through the freedom of Linux.

XFCE: A Desktop environment that's lightning fast. If you have a slower computer or like minimal aspects of design go for this environment.

KDE: A Desktop environment that's built around the classy factor. Need a classy look to your desktop?

GNOME: A Desktop environment that is a mix of everything.

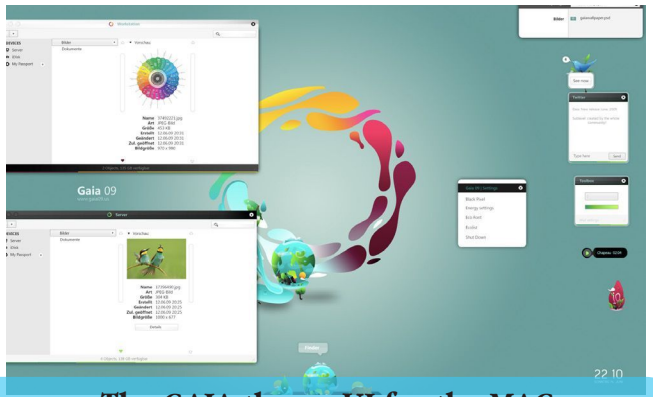
Compiz: The end all-be all for customization. 3D Workspace switcher? Check.
Efficient use of graphic card abilities? Check
Ability to combine with different desktop environments? Check.

This showcases COMPIZ-3D & GNOME in action.

MAC

SmartWall: The Rainmeter Equivalent for MAC. Add a new look to your widgets

Icon Changer: Make your computer fresh by adding different icons.



The GAIA theme UI for the MAC. Icon Changes & Smart Wall

FOR A FULL LIST OF DOWNLOADS OF THINGS LISTED HERE *GO TO* OR *SCAN*:
http://tinyurl.com/spark-custom

Demystifying the CLOUD

Cloud – one word, a hundred meanings, thousands of uses. While everyone tries to zero in on what exactly the Cloud is, to pinpoint one definition would not only be incorrect but also an injustice to the marvel that is cloud computing.

The term cloud came about as a metaphor for the Internet, commonly depicted as such in illustrative diagrams. As cloud computing has been a catchy word in recent technology media, most people incorrectly believe that cloud computing is a completely new concept. From simple e-mails, peer to peer hosting using torrents, sharing data among devices using the iCloud, or hosting applications on servers located at some unknown location in the world – it all falls under the cloud computing banner. To simplify things, we can say that cloud computing is accessing resources from a bunch of widespread servers using the internet as the medium. Almost every computer uses a cloud application at some point each day – email. When I first started using email, sites boasted that they offered 50MB of storage space. While it may seem small by today's Giga-standards, at that time it was huge. But whether it is the meager 50MB of 15 years ago or the colossal GBs of storage offered today, these chunks of data need to be stored somewhere. Even the most basic computer users know that this information is not stored locally but somewhere else. For without an internet connection this data is unavailable. So the question is where is this data stored?

Cloud data is stored on servers at some seemingly random but intensely secure location chosen by the email provider. Email data can be accessed by just a single click from our internet enabled device, may it be a laptop, desktop or a mobile phone. That's the basis, the simplest form of cloud computing.

Basic Cloud Requirements

Cloud services offered by any provider must meet certain requirements. The basic requirements create a convenient acronym:

C
Common / Multi Tenant

L
Location Independent

O
On Demand

U
User Controlled

D
Dynamically Scalable

Common/Multi Tenant

For the service provider to allocate a separate cloud for each individual user is technologically and economically infeasible. Instead, a common giant cloud needs to be divided into subsections where each user is allotted one or more sections. Each subscriber can access only the sections assigned to him and is not permitted to enter a section assigned to someone else.

Location Independent

Cloud services are offered using the internet as a communication medium. The service provider's servers can be located anywhere on the planet. The service provider must ensure that every user who has subscribed to his cloud services is able to access the resources entitled irrespective of his/her physical location. If the cloud services are confined to a particular zone (area, city, country, etc) the cloud loses its meaning.

On-Demand

When an individual or enterprise subscribes to a cloud service they usually expect continuous and reliable availability. The provider must try to take care of this and ensure that the service is accessible to the subscriber as and when needed. Unavailability or delay of the cloud for any reason is unforgivable; most users expect a zero to point five percent downtime (at max).

User Controlled

Most enterprise owned clouds need to be customized to suit the business's needs. Individual company requirements are different and the cloud often contains very sensitive data. Thus, many components should be user controlled. From the VMs and vRAM to the Fire Walls and Load Balancers, everything must be controlled by the user. Interference from the providers' side can often make cloud management complicated.

Dynamically Scalable

Often in the case of an enterprise expansion cloud requirements may increase suddenly. Providers must give options for the cloud's horizontal and vertical scalability.

Horizontal scalability is where the number of core components of the cloud is increased. Vertical scalability is where the existing components of cloud are upgraded. It is essential for any cloud service provider to offer dynamic scalability on-demand.

How safe is my cloud?

Internet hackers are always on the loose. Constant break-ins happen to the most secure of government and corporate data. As a result the CIOs of many enterprises are skeptical about whether critical data should be stored on the cloud. Concerns revolve around hackers accessing data, cloud providers misusing data, and the data suddenly vanishing. Cloud servers have multiple layers of virtual security. First, your data is often encrypted. Multiple layers of firewalls and password protected interfaces ensure that data is almost completely hacker proof. This intense security is usually on the same order as that which protects the servers of various banks and government institutions. If a hacker manages to break through this barrier, then chances are they can break through an individual firms IT security also. In addition to ensuring the security of your data cloud service providers also guarantee your privacy. Your data will not be visible to the outside world nor the employees of the cloud provider.When data is stored on a cloud provider's system, data is not stored on a single system. Multiple copies of the data are made and stored at various locations. In the unlikely event of a server failure, data can be retrieved and replicated from a backup. Additionally, cloud server rooms themselves have a state of the art security and maintenance system. The rooms are temperature controlled minimizing the risk of overheating. Smoke detectors release oxygen-capturing gases to prevent fires. Multiple security barriers, including biometrics, make sure that only the proper individuals are allowed access to the servers. The chances that critical information will disappear from the cloud are close to zero.

How is the cloud priced?

There are two basic payment models: pay-as-you-use and monthly billing. In the pay-as-you-use model a fixed amount of bandwidth is allotted and the customer just pays for the services he or she uses. This form of billing is simple and especiallyuseful for firms that may not be using cloud services on a large scale. On the other hand, the monthly billing model is more suitable for users who make constant use of their cloud services. A fixed fee is paid per month, and unlimited use of the cloud is sanctioned. Larger enterprises often choose to use this plan.

What is the future of Cloud Computing?

With ever changing technology, it is almost impossible to predict if various cloud services will remain in-demand.

As can be seen by the popularity of email services, it is doubtful that SaaS type services will go out of demand. Email will always have its place and will not be outdated any time soon. The demand for SaaS can further increase if governments can find a way to stop piracy completely. Most individuals and companies are averse to buying multiple copies of all the software they use. By signing licensing contracts with software companies, cloud providers can lease out software for short term periods benefitting all parties involved.

The future of IaaS is more doubtful. With modern computing advancing at a phenomenal rate, the scalability that cloud services offer is a great benefit to subscribers. On the other hand, as modern technology continues to become faster and cheaper, it may be less of an investment for a firm to handle its own IT internally.

Lastly, PaaS has limited applications as of right now as compared to other cloud offerings. It seems pretty stable and is a convenient tool for software developers, so it will be interesting to see how PaaS grows over the coming years.■

CONGRESSIONAL VISIT DAY

Last March a group of four students from the University of Illinois traveled to Washington D.C. to participate in the eighteenth annual IEEE-USA Congressional Visits Day (CVD), an event with the purpose of educating congressmen and women on the effects of sequestration of funding in STEM research. The lobbyists' primary purpose is to express the importance of research and development activities to the nations' economic growth and stability.

Gloria See, a Ph.D. student in electrical engineering and an experienced CVD lobbyist, headed the effort to bring an enthusiastic group of students, ECE undergraduates Alex Hsu, Anthony Shvets, and James Su, to Capitol Hill. See states that while she does revere the powerful efforts of senior and retired engineers' political appeals for STEM funding, she thinks "it's important to have student engagement, especially if you're talking about engineering education, because the people who are experiencing it firsthand are the tudents."

Joined by more than 150 scientists, engineers and business leaders who made visits on Capitol Hill, Congressional Visits Day is a two-day event sponsored by the Science-Engineering-Technology Work Group, which took place on March 12 and 13.

The first day is a training day to formalize the overall message the lobbyists must pursue and to prepare the participant's expectations of lobbying on the Hill. The participants come from all kinds of different backgrounds, most of whom are more than willing to share their experiences, making the event an "invaluable networking experience" According to Shvets. Shvets states that a couple of noteworthy political officials were Kent Hoffman, one of IEEE's specialists on medical technology, and Brett Berlin, who was a major figure in starting various supercomputers around the country and was a former vice president to Cray Research Inc.

The second day is for the visits to congressional offices. The group met for breakfast on the Hill to listen to Frank Wolf, a House

Representative for Illinois, speak about the importance of their contribution to the political system through the meetings they were attending throughout the remainder of the day. The group then met with the representatives' staffers, who would later forward the messages to the representatives. The goal for the team was to raise awareness on the necessity of STEM funding. Alex Hsu notes that the most important part of the congressional office visits was in providing a student perspective on the local and national impact of STEM programs and their significance to students' futures. Hsu and his partner, Russ Harrison, spoke about how thelack of funding to graduate and undergraduate research opportunities greatly affects students' technical skills, which, in turn, greatly influences the nation's ability to compete with foreign countries such as China and South Korea. "More than 50 percent of all industrial innovation and growth in the United States since World War II can be attributedto advances pioneered through scientific research, with publicly funded R&D," Hsu's report states.

And his message did not fall on deaf ears. "After meeting with my representatives… I now know that even though the nation is undergoing difficult times, our representatives still considered us as their main priority and there are people who cared about our nation's future."

Part of the experience was eye opening, especially for participant James Su. "It was indeed a revelation when I discovered that only one or two of our Senators have a Ph.D.…

I highly encourage those interested to participate in next year's CVD since while our leaders on the Hill are deciding our path towards technological advancement, their overall lack of a solid scientific foundation makes me uncomfortable with this system."

The nineteenth annual Congressional Visits Day will be held Spring 2014.

If you are interested in applying to be a lobbyist for the upcoming trip or if you would like more information,

contact

educationalevents@ieee.illinois.edu

Also, visit the CVD website at

http://ieeeusa.org/policy/cvd/

All majors and years welcome!

Members of IEEE at UIUC alongside with Lobbyists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Pārveidot savu pasauli
あなたの世界を変える
Transformez votre monde
તમારા વિશ્વમાં પરિવર્તન
改你的世界
TRANSFORM YOUR WORLD
transform your world.

ENGINEERING OPEN HOUSE

TRANSFORM YOUR WORLD

One of the largest engineering efforts the University of Illinois boasts annually, Engineering Open House (EOH) is a two-day event dedicated to featuring the brilliance and innovation that goes on beyond the hallowed halls of engineering campus. A vibrant collection of well-targeted science and engineering achievements, EOH is a unified endeavor promoting enthusiasm toward the engineering departments, the university, and technology as a whole. More than 20,000 visitors from high schools, middle schools, and even elementary schools turn the well-recognized buildings of academia to a fair of excitement and wonder. Most shockingly, the EOH project displays are almost entirely staffed by undergraduate and graduate volunteers; students, organizations, and research groups team up to present their year's worth of hard work to the next generation of innovators. And while the number of exhibits featured every year (250+!) certainly isn't sparse, the college is always looking for more, motivated individuals to participate. If you are interested in being a part of the EOH effort, you can register yourself at

http://eoh.ec.illinois.edu/exhibitor-registration.php

or contact a professor, research group, or registered student organization that suits your project. Many people are willing to help!

IEEE is a strong supporter of EOH, and this year, we are looking to revamp the role ECE plays during the exhibition. Students of all experience levels are encouraged to join, either through an existing project in IEEE or a project of your own. If you have any questions on how to get involved contact the **IEEE Technical VP Yang yang Yu at yyu@illinois.edu or IEEE Projects Director Daniel Chen at dechen2@illinois.edu.**

To get a look at some of the projects featured at EOH, take a look at the exhibits section in last year's visitor's guide at

http://eoh.ec.illinois.edu/wp-content/uploads/2013/03/visguide13.pdf

or check out the project picks from the Computer Science department that the Spark

(from left to right) are Luke Puchner-Hardman, Ryan Norby, Mike Malinowski, Danny Sapato, and Rafael Rêgo Drumond (bottom).

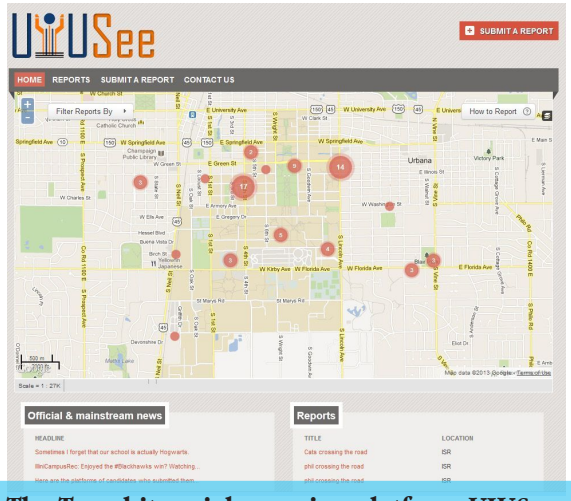
Ryan Norby is a freshman studying computer science. He has been interested invideogame development since he was 12 years old and is pursuing game development asa career. He was elected to be the chair of ACM Gamebuilders for the 2013-2014 school year.

A few other students and I are currently developing a 3D tower defense videogame through ACM Gamebuilders, a group on campus for students who are interested in videogame development. I am working on the game with Luke Puchner-Hardman, another freshman in computer science whom I met through Gamebuilders. Other members have also helped with the project in various ways, ranging from offering gameplay advice to implementing new features. For source versioning control, we use Bitbucket, a website for hosting Git repositories which also includes an issue tracking system. I got inspiration to develop the game from a Starcraft II custom map that someone made named MineralZ (which is the working title for our game as well, but we will change it before release). I used to play it often, but I felt that it was being limited by the Starcraft II map editor. For example, the only way to save progress across multiple custom games is to use special Starcraft II data banks that are stored client side. Occasionally these banks would get deleted or invalidated for no apparent reason, which was really irritating. The game was also multiplayer-

-only, and with games taking up to 4 hours, it was nearly impossible to play a full game without players leaving. I wanted to create a single-player version with shorter games that could be saved or loaded at any time.

The basic goal of the game is to defend yourself from waves of enemies that spawn periodically. There is a day/night cycle in the game; the player is safe during the day, but enemies spawn continually throughout the night. In order to survive, the player must harvest resources scattered about the map and use them to build defensive and offensive structures. There are three basic structures that the player can build: walls, turrets, and healers. Walls are good for absorbing damage, turrets deal damage to enemies, and healers repair damaged structures. Each of these structures require a different resource to build and upgrade. Unlike traditional tower defense games, where the path for enemies is pre-programmed, the player is able to create their own path by destroying rocks that populate around the map. Only the player can destroy these rocks, forcing enemies to follow the path created by them.

The most common strategy is to make a straight path, build a wall at the end, surround it with healers, and place turrets along the sides of the path. This way, the enemies can only reach the player by first going through the wall, which is constantly being repaired by the healers. The enemies take damage from turrets while they try to destroy the wall. As long as the wall, healers, and turrets are powerful enough, the enemies can't advance. Although this is by far the most common strategy, the player has the flexibility to try out other tactics. This freedom is actually responsible for our most difficult hurdle: balancing the game. Because the player can decide how they want to play the game, there are many variables that need to be accounted for when trying to balance gameplay. For example, how does the length of the path impact enemy AI? At what point does it become more beneficial to upgrade existing structures rather than building additional ones? What's stopping the player from making a circular path and just running away from the enemies indefinitely? Game balance is the biggest priority that we have right now. Unlike most other aspects of the game's development, there is no clear best solution to this problem. The game is being written in C++ for Windows and uses OpenGL for the rendering. We use Visual Studio 2012 to write the code, Blender to create the 3D models, and Photoshop to create the textures. We've done just about everything ourselves exceptfor the sound, which is being produced by my friends Dan Müller and Steve Pierce at Twin Raven Productions. The game engine we are using is something I've been writing for the past couple of years. Although it is unfinished, the engine became much more sophisticated as a result of this project. In the process of using the game engine we discovered areas where it was lacking, allowing us to develop the engine simultaneously. We wouldn't have this option with a closed-source engine. We showed a demo of our game at Engineering Open House 2013 and received terrific feedback from exhibit-goers. This is especially useful because sometimes we have trouble deciding which of our own ideas are actually good. By having strangers tell us what they liked and didn't like about the game, it gives us some insight. Once we finish adding the suggestions we liked, we will design a website which will host the finished game for download. Our plan is to finish by the end of the summer, as we already have some ideas for a new game to work on next year. ■



The Transbit social mapping platform UIUSee

The Push for Open Source in UIUC CS

Transbit.org is a non-profit collective of engineers dedicated to big data management. Within the confines of a dimly lit dorm room, Transbit explores ways to improve people's every day interaction with data.Composed of engineers from the University of Illinois and Carnegie Mellon University, Transbit focuses on creating quality, easy to use software that is entirely open source. The horizontal, leaderless structure promotes a fresh approach to writing platforms that are accessible and free to everyone. We aim to bridge the gap between theoretical proofs of concept and user-ready software by identifying the issues, and engaging the public to help solve them.

At Engineering Open House 2013, Transbit presented UIUSee, a social-mapping platform for Tweets and user-submitted reports Middleman, software for arbitrage of wholesale goods; Ether, a pre-alpha platform for encrypted political discussion based on region of the world; and Soapbox, a portable hardware launch meant to give everyone at the university a voice -- just load a Sandisk with your preferred playlist (may it be music, art, comedy, or political speeches), throw it in our box, and throw the box anywhere. It's secure, audible (but not too loud), and provocative. Our code, including the schematic for our box, is available on http://github.com/transbitDOTorg

We're enjoying ourselves and we look forward to working with all who would like to get involved.

Transbit.org
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