

## USC Student Innovator Showcase

USC STUDENT  
INNOVATOR  
SHOWCASE

RE-DESIGNING  
INNOVATION

ARTS AND MEDIA

MEDICINE AND LIFE  
SCIENCES

ENGINEERING AND  
PHYSICAL SCIENCES

INFORMATION  
TECHNOLOGY

BUSINESS

SOCIAL SCIENCES

ENERGY AND  
ENVIRONMENT

ARCHITECTURE AND  
PLANNING

SEARCH FOR IP



Winners from the first annual USC Student Innovator Showcase and Competition shown here with Vice Provost for Innovation and Executive Director of the USC Stevens Institute for Innovation, Kristina "Z" Holly. From left to right: Bahman Elyassi, Nafiseh Rajabbeigi, Jenova Chen, Kristina "Z" Holly, Kellee Santiago, Kathleen Meek, Jeffrey Ashbrook, and Steve Avery.

Presented by the USC Stevens Institute for Innovation, the university-wide USC Student Innovator Showcase and Competition gave parents and students a highly interactive glimpse into the imaginations of USC student innovators, and a sneak peak at tomorrow's world.

These are some of the breakthrough innovations that were demonstrated during the Student Innovator Showcase and Competition on October 11, 2007

**"I skate to where the puck is going to be, not where it has been."**

Wayne Gretzky

The winners from the first annual Student Innovator Showcase and Competition:

### 1st place:

***thatgamecompany:***

Kellee Santiago  
Jenova Chen  
Martin Middleton  
Rick Nelson  
Vincent Diamante  
Nick Clark

### Runners-Up:

***The Windfall Fund:***

Jeffrey Ashbrook (USC)  
Kathleen Meek (USC)  
Steve Avery (USC)

***Oxygen Sensor with Solid State Reference for Automobiles:***

Bahman Elyassi (USC)  
Nafiseh Rajabbeigi (USC)  
Muhammad Sahimi (University of Tehran)  
Shamsoddin Mohajerzadeh (University of Tehran)  
Abbasali Khodadadi (University of Tehran)



GET CONNECTED!

### Health Protection/Monitoring

#### **Cushiwear**

Arash Motamed and Kaveh Motamed  
Graduate, USC Keck School of Medicine  
Undergraduate, UCLA

As the market for the aging population continues to expand, this innovative, inexpensive, easy to wear, safety device will protect those at risk for hip and pelvic injuries. Focusing on athletes and elderly as a target demographic, Cushiwear will promote an active lifestyle while avoiding the risk of injury. Consequently, aside from increasing quality of life, Cushiwear will also reduce mortality and the medical costs of morbidity associated with hip and pelvic injuries.

#### **Vital Step Footwear**

Ryan Goldston  
Undergraduate, Marshall School of Business

Vital Step Footwear provides adult consumers with a comprehensive selection of footwear with a unique plug-in diagnostic module to read specific vital signs of the body.

The Vital Step module would be able to monitor pulse rate, body temperature, blood pressure, blood oxygen level and blood sugar level, using a receptacle under the heel of the sock liner. Using a USB connection to upload the recorded data over the course of days, weeks, months and years onto personal computers, users could present a comprehensive medical history to health care providers. With a subscription-based 911 GPS feature, Vital Step Footwear could provide instant contact with a centralized operator center to dispatch the call to the local 911 operator. The concept of creating a removable onboard medical diagnostic device could be integrated across a broad range of footwear designed to meet the needs of one's daily life.

#### **EasyBreathe Motorcycle Helmet**

James Meiners  
Undergraduate, USC Viterbi School of Engineering – Aerospace Engineering

In today's world, smog and pollution are a growing issue, affecting the way we live. There have been many efforts focused on smog and pollution effecting the environment, it also affects our bodies. The EasyBreathe Motorcycle helmet institutes the use of an air purifier so riders will not have to inhale exhaust and smog.

Riding can be one of the most liberating experiences of someone's life, and in Los Angeles traffic it is one the most cost effective and timely modes of transportation. Creating a helmet of this nature would improve or help sustain the health of riders, while also increasing the popularity of motorcycle riding.

### Life Sciences

#### **NanoBioSensor For Early Cancer Identification**

Marco Curreli, Fumiaki Ishikawa, Hsiaokang Chang, and Rui Zhang  
Graduate, College of Letters, Arts and Sciences

Regardless of the cause, changes in a cell's genetic material can result in a change of certain biological function, sometimes causing in the cell becoming malignant. It might take years for the cell to reach the stage at which the damage causes tumor development. These changes also produce a unique molecular signature, or biomarker, which serves as a signal for some particular cellular state that precede cancer and later for the presence of cancer itself. Oncology researchers have been increasing efforts to identify proteins that reveal the presence of tumors before symptoms appear. Detection of trace amount of these cancer biomarkers, which are specific proteins found in abnormal levels when a tumor is growing, can be a valuable tool in the war on cancer.

We are developing biological sensors based on nanomaterials (NanoBioSensors) that can be used to identify early molecular signatures of cancer. The analysis using NanoBioSensors is based on simple electrical measurements, it is highly sensitive, protein specific, and the results are displayed within minutes and it requires only a drop-size blood sample for the analysis.

#### **Gene Therapy for Neurological Disorders**

Steven Froelich  
Graduate, Chemical Engineering

The application of molecular genetics to human biology and immunology has improved our understanding and ability to treat a variety of diseases. The construction of viral vector systems for targeted gene delivery has the potential to revolutionize modern medicine by introducing a gene into a target cell to produce a therapeutic response.

Lentiviral vectors are a promising tool for Central Nervous System gene transfer since they efficiently transduce the cells of the nervous system in the living. However, current lentiviral vectors have limited diffusion and safety concerns because they transduce all cell types within the CNS. The proposed lentiviral system would specifically transduce neuronal cell types and consequently be a safer and more effective vehicle for gene delivery.

#### **Role of Motor Neurons in Commissural Axon Guidance in the Developing Spinal Cord**

Robert Saddawi-Konefka  
Undergraduate, Neuroscience

At the forefront of developmental research is the complex process of neural formation, specifically, the development of the spinal cord into the highly ordered network we recognize later in life. My work in the laboratory of Samantha Butler, Ph.D., aims to aid in uncovering the mysteries of spinal cord development. Through two experimental techniques - *in ovo* electroporations in the chick embryo and genetic analysis with mice – we look to see the role of motor neurons in the guidance of commissural axons.

Understanding spinal cord development would mark an incredible step forward in both academic and medical worlds. To date, treatments for patients suffering from spinal cord damage, or substantial central nervous system damage are far from perfect. Understanding "why" the spinal cord develops in the way it does would mean a significant advancement in treatment and care.

#### **Perinatal Outcome in a Multiethnic Population of Pregestational Diabetics in Hawaii**

Janelle Lum and Jana Silva  
Undergraduate, College of Letters, Arts and Sciences and University of Hawaii

Pregestational diabetes, diabetes during pregnancy, has been associated with a range of adverse perinatal outcomes, including labor complications, fetal demise, macrosomia, hypoglycemia, and special care admission of the newborn. Although certain ethnic groups in Hawaii – such as Native Hawaiian/Pacific Islanders, Filipinos, and Japanese – are known to have significantly higher diabetes prevalence rates than Caucasians, no study to date has analyzed the pregnancy outcomes of this specific population. Therefore this research is aimed to examine perinatal outcome in a multiethnic population of women with pregestational diabetes

mellitus in Hawaii.

The objectives were to (1) describe characteristics of women in Hawaii with pregestational diabetes, (2) examine ethnicity and perinatal outcome, and (3) identify factors that predict adverse outcomes in ethnic groups with high prevalence rates of pregestational diabetes. The discovery of ethnic disparities in perinatal outcome for Native Hawaiian/Pacific Islander women and identification of several maternal characteristics predicting adverse outcomes in this population is an important first step in the development of an ethnic-tailored pregestational diabetes intervention to minimize or eliminate this health disparity.

#### **Studying Lambda Prophage Elements in the Bacterium *Shewanella oneidensis* MR-1, a Potential Bioremediator**

*Matthew Getz*

*Undergraduate/Graduate Dual Degree, College of Letters, Arts and Sciences*

Previous studies have shown that the Enterobacteria phage lambda, a type of virus, has the ability to infect and incorporate itself into the genomes of bacteria such as *E. coli*. Upon its insertion into the genome it becomes a prophage. It is also incorporated within the genome of *Shewanella oneidensis* MR-1, a bacterium that has been shown to have potential in bioremediation and fuel cell applications.

To further elucidate these prophage regions within different strains of *Shewanellae*, a study was conducted at the Wrigley Marine Science Center on Santa Catalina Island to search for the presence of *S. oneidensis* MR-1 in sediment and water samples and to determine the diversity of regions in MR-1's genome where the lambda prophage is inserted. Results from this study found that *S. oneidensis* MR-1 can thrive in several types of environmental conditions, and only some of these *S. oneidensis* MR-1 contain the lambda prophage. Aside from *Shewanella oneidensis* MR-1, two other strains of *Shewanella* were shown to potentially contain a lambda-like prophage element in their genomes. This investigation of the prophage regions in *Shewanellae* strains could prove to be useful in the process of possibly genetically modifying MR-1 and other *Shewanellae* to be effective bioremediators in different environments.

#### **Physical Sciences and Engineering**

##### **Fully Robotic Autonomous Vehicle**

*Andrew Stiegman, Gautam Nirula, Franklin Haynie, Anthony Christadoulou*

*Graduate, Viterbi School of Engineering*

Imagine getting from point A to point B without ever having to interact with your vehicle. Although the idea itself is not new, this concept has a grand amount of potential for future uses throughout global society. The fully robotic autonomous vehicle is a vehicle that is able to get from an origin to a set destination in a safe and efficient manner without any human intervention. This is a collaborative project between USC and Palos Verdes High School.

##### **3D LED Display**

*Chen Liang*

*Undergraduate, Viterbi School of Engineering*

The 3D LED display, a new, cutting-edge technology that is able to project a 3D image in the air, is creating greater visual impact where viewers will be engaged by greater detail in what they are viewing from all angles.

As a brand new visual effect, the 3D LED Display can be used in advertisement or exhibition and will attract more "eyes" because of the new, unique visual experience.

##### **Single-walled carbon nanotube-based fluorescent ink**

*Jeffery Tola*

*Undergraduate, USC Viterbi School of Engineering – Biomedical Engineering*

Exploring the synthesis and uses of single-walled carbon nanotube-based (SWNT) fluorescent ink for printed electronics and the fabrication of optical and electrical sensing devices. Nanoparticle inks have become very important because they have superior flexibility making them suitable for flexible displays and utilizing fewer materials than conventional inks.

Non-covalent functionalized carbon nanotubes used as an ink could offer a new age in circuit design. These new designs have the potential to render cheaper, smaller, more reliable and flexible electronics for optical and electrical sensing applications.

##### **Seabee II – Autonomous Underwater Vehicle**

*Randolph Voorhies, Chris Roth, Kevin Roth, Mike Montabro, and Andrew Chambers*

*Undergraduate through PostDoctoral, USC Viterbi School of Engineering*

The SeaBee II is an autonomous underwater vehicle (AUV) designed and built by a team of mostly undergraduate students to compete in a yearly International Autonomous Underwater Vehicle Competition hosted by AUVSI and the Office of Naval Research.

This year's entry is the University of Southern California Competition Robotics' (USCR) most ambitious project to date, featuring a powerful, actively water-cooled Beowulf Class I computing cluster composed of two Intel Core 2 Duo main computers. The design also boasts a brand new lightweight hull, a highly configurable external rack, and a 5 thruster propulsion system allowing easy set up of mission-oriented payloads without the need for constant re-balancing.

##### **Oxygen Sensor with Solid-State Reference for Automobiles**

*Bahman Elyassi, Nafiseh Rajabbeigi, Muhammad Sahimi, Shamsoddin Mohajerzadeh, and Abbasali Khodadadi*

*Graduate, USC Viterbi School of Engineering and University of Tehran*

Conventional oxygen sensors in the automotive industry employ air as the reference gas for their operation, making them expensive, bulky and resulting in long response time particularly during a cold-start period. This also adds to the consuming air pollution epidemic. Utilizing an oxygen sensor with solid-state reference which can act as an air reference and can be made in miniaturizing structures lowering costs and shorter response times will aid in creating a cleaner environment.

The materials used are proven to be stable in exhaust gas condition and the novelty exists because the reference is solid and self-rechargeable in exhaust condition. In a technical sense, faster response from the sensors will help to reduce air pollution and in a commercial aspect this is a very cost effective alternative to the conventional sensors.

##### **Lunar Entry and Approach Platform For Research On Ground (LEAPFROG)**

*Kristina Rojdev, Omair Rahman, Allison Anderson, Cassandra Raskin, and Michael Rudolph*

*Undergraduate, USC Viterbi School of Engineering*

Can USC student talent not only produce a working space vehicle, but an ingenious risk reduction platform for small companies to explore/develop revenue generating business on the lunar surface?

Astonishingly, a group project called LEAPFROG has been doing just that! Beginning in September 2006, a prototype module has been created and its full flight system tested, and then created and tested a second, more sophisticated follow-on unit, and work will not commence on the first generation vehicle.

While the context is educational, the project has already attracted wide attention because of its innovative approach, sophisticated and novel applications, and early success. The basic idea is to create a repeatable and low cost prototype flight vehicle that simulates the key techniques required to descend and land on the lunar surface. By doing this, new technologies and processes can be tested on Earth, reducing the significant risk of returning to the lunar surface. Further, the call for sustainable exploration on the lunar surface will ONLY be supported through development of revenue generating business ventures, which LEAPFROG will be able to test directly on earth.

### **Non-profit**

#### **Project:Possibility – A Software Collaboration for the Disabled**

*Christopher Leung, Henry Yuen, Ramya Venkateswaran, Rubaiz Virk, and Terra Giefer Graduate, USC Viterbi School of Engineering*

Project:Possibility is a non-profit, community service project committed to creating groundbreaking software for the disabled community. With several projects underway, Project:Possibility uses a broad range of knowledge from the fields of music, accessible technology, physics, software development and audio engineering to name a few.

Project:Possibility strives to inspire software developers to make a profound impact on the lives of the disabled by giving them access to emotional and physical experiences they could not otherwise have. The software created through this project is 'open source': it cannot be sold for profit, and is freely available for use, distribution, and modification.

#### **The Windfall Fund**

*Jeffery Ashbrook, Kathleen Meek, and Steve Avery Undergraduate, USC Viterbi School of Engineering, USC Roski School of Fine Arts, and USC Marshall School of Business*

Imagine making a small donation today that will have a large-scale impact on the future. The Windfall Fund will be a non-profit organization that allows anyone to make a minimal donation today and large-scale impact tomorrow.

Operating on the principle of compounding, The Windfall Fund recognizes that if a person donates \$1 today, in 150 years, that \$1 could grow to \$1.6 million. Those monies can be used in the future by charities and other organizations for the advancement of human-kind, and have a much larger impact than \$1 would be able to have today.

The Windfall Fund would, in effect, extend the impact of one person's contribution to society beyond their own lifetime.

#### **Ngomeni Eco-tourism Community Development Project (NECDP)**

*Jordan Reiff and Caleb Morse Undergraduate, Marshall School of Business and Pomona College*

The creation of a community based organization that manages an island eco-tourism venture, then uses the revenue generated for development projects in the surrounding village of Ngomeni, Kenya.

In a society based on fishing and/or small farming, the onset of global warming, salt farming, and large trawlers off the coast have directly affected the community. The community based organization development projects are run by community members, giving the community the tools to create a sustainable solution to their poverty.

#### **The Prometheus Institute**

*Matt Harrison and Rand Getlin Graduate, JD Candidates, USC Gould School of Law*

The Prometheus Institute is a public policy organization dedicated to discovering nonpartisan policy solutions to pressing national issues, and creatively and competitively marketing these ideas to the people of the United States and the world.

Existing policy organizations generally seek to forward their ideas only through elite scholarship, long and often vapid publications, and occasional lobbying and/or congressional testimony, but rarely through public means. The Prometheus Institute is the first public policy organization dedicated to changing this climate, becoming the first vehicle through which innovative and beneficial policy ideas can be disseminated directly to the people, thus empowering the citizenry with the tools and knowledge to advocate for policy change, and also engaging America in a vigorous yet civilized and intelligent debate over ideas of freedom, growth and prosperity.

#### **Motor City March**

*Christopher Roessner, Matthew Heins, Andrea Gleaves, Adam Anderson Undergraduate – College of Letters, Arts and Sciences*

Each spring, Motor City March sends seven USC representatives on a cross country road trip to Detroit, MI as an alternative spring break. Over the course of their weeklong journey, students meet with peers at four universities to speak with student leaders about faltering public transportation and how it affects their city and learn more from Detroit's leaders.

Once in Detroit, the students donate the very vehicle that carried them safely across the country as a symbolic gift of social activism that brings opportunity to the next generation of Detroit. This year the van is being donated to a batter women's shelter referred by United Way in Detroit.

### **Interactive Media**

#### **Star of Guitar**

*Morgan Brown, Greg Hernandez Undergraduate, Viterbi School of Engineering*

While video games are not usually thought of as likely to impact our society, work in interactive media has applications in simulations, training, and user interface design. Star of Guitar demonstrates the feasibility of a gesture-based interface even in an environment with limited resources.

Utilizing everyday mobile devices coupled with motion controls, these new game designs can harvest a positive impact throughout society. Offering interactive opportunities for simultaneous rehabilitation and entertainment. Star of Guitar is proof that mobile games can be as engaging and fun as games that use more powerful platforms.

**RagnaRøkk**

*Mike Brazil, Diana Hughes, Mike Rossmassler, Max Geiger  
Graduate and Undergraduate, USC School of Cinematic Arts – Interactive Media*

RagnaRøkk is a side-scrolling, platforming, puzzle-solving, action/adventure game using the Guitar Hero controller. Based in Norse mythology, the player navigates the hero through a Norse Cosmology that has been heavily affected by the early introduction of rock music.

Driven to give the user something different in their gaming experience, while still giving the user the feeling of playing guitar RagnaRøkk incorporates characters and schemes from mythology and rock and roll – the end result; a greater appreciation for both.

**ThatGameCompany**

*Kellee Santiago, Jenova Chen, Rick Nelson, Nick Clark, Martin Middleton  
Undergraduate and Graduate, Viterbi School of Engineering – Computer Science and  
USC School of Cinematic Arts – Interactive Media*

Since the birth of video games, there have been many innovations in technology, and yet there has been very little growth in emotional breadth or examination into how games communicate as a medium. For the last forty years, video games have mainly focused on high-stress situations, competition, and power-plays.

If you read reviews for films versus games, you will notice that films are evaluated on their emotional content, whereas games are most often evaluated as software – ranked by technical features as opposed to emotional experience. thatgamecompany's goal is to examine how games can communicate emotions, and change audiences' perceptions of what games are and what they could be. We encourage innovation and experimentation and believe that our creative games will appeal to new, yet untapped audiences.

**Errantry**

*Ben Sherman and Max Gieger  
Undergraduate, USC School of Cinematic Arts – Interactive Media*

Aimed to create the visceral and intellectual sensation of telling a story to an audience with in a player, "Errantry", deals directly with one of the large questions faced by interactive media: can players meaningfully participate in a narrative?

A game with the core design principal of giving a player the ability to tell a story has never been seen. Giving players the visceral experience of telling a story through the use of the Nintendo Wiimote draws players into the physical role of a public speaker while keeping their minds engaged in making creative decisions about constructing a story. As a relatively new artistic medium, interactive media is struggling to discover a communicative grammar. This project has the potential to contribute to and advance the language of interactivity.

**Subject Synced Life Logging**

*John Brennan and Ian Thomas-Bignami  
Graduate, USC School of Cinematic Arts and University of California Berkley (UCB)*

Subject Synced Life Logging is a personal, life documenting digital camera that accepts user physiology and behavior as input for the hands-off, intelligent picture documentation of daily life. The interval of time between shots and shot quality will be tied to tangible behavior, such as the rhythm of a heart beat signal, to form a picture archive that attempts to reflect the lived experience.

Using a tiny, bodily mounted, digital camera this technology enables an indiscriminate collection and storage of life data. Recognizing that experience is more than the arbitrary collection of data, this device syncs the frequency of data collection to basic physio-data that will maintain a fundamental similarity to our current understanding of experience: not a collection of images at uniform intervals but a representation of the hierarchies of significance.

**The Misadventures of P.B. Winterbottom**

*Matt Korba, Paul Bellezza, Jamie Antonisse, Dan Howard, and Phil Gregorchuck  
Graduate, USC School of Cinematic Arts*

The Misadventures of P.B Winterbottom is a game set in an early silent film world that plays with temporal space. Through exploration of non-conventional time mechanics players will experience game play in an entirely new way. The game is an experiment in exploring layered game play and altering physical reality through creating time paradoxes. Disrupt the space-time continuum (and eat tons of pie) in this fast paced, quirky, macabre adventure.

**Empire**

*Michael Stein  
Graduate, USC School of Cinematic Arts*

You too can be Gordon Gecko, from the movie Wall Street.

Gordon Gecko, the king of Wall Street - a man who knows how to get information from people, and how to use it. All Gecko needs to do what he does, is a phone. He picks up a telephone, makes some calls, and the whole economy shifts. Imagine a game that lets you be Gordon Gecko. A game that lets everybody playing it be Gordon Gecko. We all have cell phones; we can all be that power player.

Empire is a massively multi player game that's played between people, using their phones. Instead of sitting at a computer screen, I can pick up my phone and play the game from anywhere, any time. A fantasy stock market that you can play anywhere, as long as you've got a dial tone.

**Web/Internet****Kutchi Web Based Dictionary**

*Paras Mamania and Parag Gala  
Graduate, USC Viterbi School of Engineering - Computer Science*

Kutchi is an Indo Aryan language spoken widely in the Kutchi region of the Indian state of Gujarat. Taking the concept of heritage preservation into their own hands, this team of USC students is eager to publish a Kutchi (native language) interactive dictionary online which will contain a database of 4000 words. All words associated with this online dictionary will have an audio file and a digital image enabling the person to listen to the correct pronunciation of the word and better understand its meaning.

The Kutchi language does not have a written script and this project is an effort towards preserving Kutchi culture and heritage. Wikipedia quotes that there are 866,000 Kutchi's worldwide but only a quarter of them speak Kutchi so if no project is undertaken to preserve Kutchi language, it is predicted that the language will go extinct in the next two generations.

**UberOcean**

*Joseph So*  
 Graduate, MFA Cinema Production

UberOcean is a new online digital asset management system that organizes online media in a virtual library by specific company copyright. Organizing digital media, specifically video, in such a fashion will offer Television Networks and Studios a way to control, manage and monetize their digital content online. Fiscally supported by ad revenue, 90% of the revenue is distributed to the specific content company while the remaining 10% goes back to the website.

UberOcean functions much like YouTube where users can upload content to the site, but all content is organized and controlled by company. Currently no site exists that enhances the user experience by opening up the digital market so all digital entertainment is available in one place.

**[Flixya.com](#)**  
*Ivan Wong and Adam Oliver*  
 Graduate, MS Electrical Engineering and Multimedia and Creative Technologies

Offering similar elements of popular social networking sites and combining a monetization method for content producers in one solution, [Flixya.com](#) enables any individual who qualifies for Google AdSense a rapid and powerful method to publish and monetize their online content and keep all the revenue.

The true value of social networking is the community and promoting member ownership, by rewarding the community of contributing members at 100%, Flixya represents the second generation of social networking and raises the bar by setting the standard for the future of online social responsibility.

Unlike any other website on the Internet, Flixya combines a social media networking platform that leverages a long feature set for sharing digital media content. In addition, a scalable and effective method to monetize members content at 100%. Above all else, continual focus is placed on building tools for the Flixya community to consume, distribute and monetize digital media.

**Wholism**  
*Grant Nestor*  
 Undergraduate, Marshall School of Business – Business Administration (Entrepreneurship)

The information age can be described as a unification and proliferation of historically disparate human knowledge. Telecommunication is the technology accelerating this phenomenon. The Internet is innovative because it provides a networked and common medium on which to publish this information.

Wholism is a visual, self-organizing relational map of human knowledge. Taking Wikipedia to the next step, Wholism provides a platform for representing knowledge collaboratively and visually. Using interactive data visualization technology, Wholism provides a new and intriguing way to explore human knowledge multi-dimensionally.

**[Illumin Online Magazine](#)**  
*Farzana Ansari, Elizabeth So, Ilya Golosoker, Trevor Johns, and Michael Robinson*  
 Undergraduate, Viterbi School of Engineering and USC School of Cinematic Arts

*Illumin* is an online magazine dedicated to exploring the science and technology behind the things we encounter every day. Produced and published by the Engineering Writing Program at the USC Viterbi School of Engineering, *Illumin* features the work of talented USC undergraduate engineers along with submissions from universities across the nation. These articles, supplemented with innovative multimedia features, relate the far-reaching impact of the engineering profession, and provide a broader view of the socio-economic and political implications of rapid technological change.

*Illumin* has been established as a global source for scientific information, bringing forth a novel form of engineering communication that bridges the gap between the science industry and the public. The magazine is now beginning its 6th year of publication, and the editors seek to continue innovating methods to highlight and explain the technologies that society encounters on a daily basis.

## **[Communications](#)**

**Communicating Device for Dental Patients**  
*David Rands - PhD Candidate, USC Department of History*  
*Brent Brethers - Senior Dental Student, USC School of Dentistry*

Don't you wish you could speak to your dentist or oral health care provider while they are working in your mouth?

This device allows patients to communicate with their oral health care providers while under treatment. Through the use of a small keyboard such as those used for text messaging, or an electronic notepad and stylus, the patient is able to make notations which are then displayed on a small monitor visible to the oral health care provider.

This innovation has the potential to be of great benefit to society by providing an inexpensive solution to the problem of communicating with an oral health care provider while undergoing treatment.

**Using the Viterbi Algorithm to Clean Up Noisy Entanglement**  
*Mark Wilde – Ph.D. Candidates, Viterbi School of Engineering*  
*Hari Krovi- 2007 Graduate, Viterbi School of Engineering*  
*Todd Brun – Professor, Viterbi School of Engineering*

In 2004, the USC School of Engineering became the Viterbi School of Engineering in honor of Andrew Viterbi. Viterbi is known to many as the father of the cell phone. Viterbi developed his algorithm in 1967 as a scheme for identifying and correcting errors in noisy digital communication.

2007 marks the 40th anniversary of the Viterbi Algorithm. This team of USC Viterbi engineers has discovered a novel way to incorporate convolutional coding strategies and the Viterbi Algorithm to produce useful entangled bits from a set of noisy entangled bits. Quantum entanglement is a phenomenon in which the state of two or more objects have to be described with reference to each other, even though the individual objects may be spatially separated.

Devices of the future will communicate with entangled bits because they are the foundation for several quantum communication protocols. The research performed here at the Viterbi School of Engineering will help two parties secure a message using their technique for quantum communication.

**Text to Voiceover IP: Mass Messaging Framework**  
*Jegan Lingam*  
 Graduate, Viterbi School of Engineering

A framework developed to integrate voiceover IP and email. This framework provides the functionality to convert email or any text into speech and contact the list of recipients on their phones without any manual intervention.

Aiding in creating more efficient communications, this framework can be used to let masses know of last minute changes in scheduling.

### **Student Start-ups**

#### **The Aqceso Project**

Saul Silva  
Graduate, Marshall School of Business

The Aqceso Project™ is a multi-stage / multi-company distributed authentication system for protecting the digital storage of personal identity information and for securely processing Debit and Credit type financial transactions.

It includes:

1. The UltiCert™ Encryption and Encoding System™
2. The Multistage Authentication System for Identity Certification™
3. The Aqceso™ Payment Processing System™

#### **About Tomorrow Market**

Andrew Meyer  
Graduate, Marshall School of Business

Gartner estimates that 66% of business projects fail. How many of those projects could have succeeded if people viewed the project as a community effort? The About Tomorrow Market (ATM) enables you build communities around projects, allowing information to flow freely to where it is needed while focusing attention on what needs to be accomplished to make the project a success.

The About Tomorrow Market is a working application that combines input from the individuals involved in projects and illustrates to executives the potentials for problems or errors before they occur. Therefore, withdrawing knowledge from the future to use today. If businesses can decrease the number of failed projects and execute their current projects more efficiently, there is a greater chance for success.

#### **TicketClub.com**

Tyler Kurlas, Nicholas Kurlas, Chris Kerstner, Simon Burgess, and Philip Adams  
Undergraduate and Alumni, Viterbi School of Engineering and Marshall School of Business

TicketClub.com is an online ticket stop offering the latest and greatest sports and concert tickets at discounted rates. At any given time, there can be over 20,000 events on sale for sports and concert tickets across the US.

Offering highly competitive prices to events, many times TicketClub.com has better prices than the box office and competitors such as StubHub and Razorgator.

Utilizing mobile technology in their sales, TicketClub.com introduced mobile notifications for tickets to the industry.

#### **Vosotros**

John Gillian and Gabe Noel (with special assistance from Briana Bergland)  
Undergraduate, Thornton School of Music, Annenberg School of Communication

vosotros is a music collective and record label, embracing the power of community and digital distribution to bring our music to you-all.

Each month, our creative director forms a new band with different musicians in Los Angeles. Together they record a song and perform at our monthly concert in Little Tokyo. The music is distributed for free via our podcast as a chronicle of our work and as a promotional tool to drive concert attendance.

We embrace Creative Commons licensing, allowing anyone to download, copy, file-share, trade, distribute, and publicly perform our music. Vosotros is music for you-all.

#### **Clever Stool**

Artem Golestian  
Undergraduate, USC School of Architecture

Clever Stool is the portable, foldable, heavy duty, take anywhere stool.