Senior Design

11th

Anniversary

Post-Competition Version
Winning Projects Listed Inside

Experience
excellence in innovation…

Fred and Harriet Cox
Spring 2012
Senior Design Competition
Thursday, May 3, 2012

UNLV
HOWARD R. HUGHES
College *of*
ENGINEERING

Fred and Harriet Cox Senior Design

Senior Design Experience

Part of every UNLV engineering student's academic experience, the Senior Design project stimulates engineering innovation and entrepreneurship. Each student in their senior year chooses, plans, designs and prototypes a product in this required element of the curriculum. Working in teams, the senior design project encourages students to use everything learned in the engineering and computer design programs to create a practical, real world solution to an engineering challenge.

Beyond the classroom...

Because of the requirement to work in teams, students also build good communication skills, presentation skills and even business writing skills. They also have to source and purchase the materials for the prototypes themselves, giving them real-world budgeting experience—all necessary skills to have in the business world.

Reward and recognition...

The rewards with Senior Design are great. A team of industry judges chooses winners in each category based on innovation, commercial potential, presentation quality and sustainability. A cash first prize and second prize are given in each discipline, as well as a prize for best interdisciplinary project and a grand prize. In addition, the College of Engineering—through the generosity of patrons Fred and Harriet Cox, as well as award sponsors—reimburses teams

for the costs associated with creation of their prototype. This ensures that teams are not working under unfair financial constraints, but have the resources they need to excel.

Awards are announced at an annual event in the spring, the Fred and Harriet Cox Senior Design Dinner. Nearly 600 faculty, staff, students and industry sponsors and partners attend to celebrate the achievements of these teams.

Taking it further...

Beginning in 2011, Senior Design teams were offered the opportunity to partner with MBA students from the Lee Business School who would create a business plan as part of their own curriculum. This collaboration has led to great success at both the Southern Nevada Business Plan Competition, and at the Governor's Cup. Two LLC's have been created from Senior Design projects in the past year.

In addition, Engineering alumnus Chad Miller has offered pro bono services to file provisional patents on Senior Design projects. Teams who file a provisional patent are offered an additional financial incentive to do so. In 2012, several teams took advantage of this opportunity and worked with Chad at Weide & Miller, LLC to file.

Get Involved...

Teams often get project ideas from industry partners or friends of engineering who have an interesting problem or concept they would like to submit.

Teams may also be looking for an industry mentor or coach to help them throughout the year as they work on a project.

Industry partners and individuals are also offered the experience of sponsoring an award category. To find out what categories are available, or for other sponsorship information, contact Director of Development, Sara Portzel at sara.portzel@unlv.edu or 895-2913.

Spring 2012 Senior Design Judges

Ary Benoualid

Mr. Benoualid is President of Marnell LLC. He is responsible for the projects and daily operations of the Construction Management Business Unit. He is also a member of the Steering Committee which provides direction and operational oversight to all business units of Marnell Companies. He leads the master planning process and oversees large scale projects. Mr. Benoualid's tenure with Marnell Companies began in 1999 where he started in the position of Project Manager.

Mr. Benoualid is a licensed General Contractor with certification by the Nevada State Contractors Board. He is a member of the InfraGuard Southern Nevada Members Alliance, Board Member for McCool Science Center Foundation, and a Member of UNLV Civil, Environmental Engineering and Construction Advisory Board.

Mr. Benoualid has earned a Bachelor of Science, Industrial Engineering degree from the University of Arizona.

Mike Brown-Cestero

Mike Brown-Cestero has been involved in the commercial low-voltage field – specializing in audio, video, lighting and control systems – since the mid-80s. Currently serving as Sales Director for Solotech US Corp, his projects can be seen in Texas, Illinois, California, and all over the Las Vegas area, from mega-clubs like Rain and Tao to casino-resorts like the Monte Carlo. Mike's work also includes museums, lounges, classrooms, performance venues and houses of worship.

In 2006, Mike was honored in Las Vegas' Business Press' annual "Who's Who" list, and he has been published in Las Vegas Food and Beverage magazine and Club & Casino magazine. He serves on the Advisory Board of the Entertainment Engineering and Design program at UNLV and also volunteers his time as Chairman for the City of Las Vegas' Neighborhood Partners Fund Board and as a Board member for the City's Youth

Neighborhood Association Partnership Program (YNAPP).

Eric Cox

Eric Cox is the founder and president of Telulex Inc., a manufacturer of precision test equipment. He was also the founder of TelOptics Corp., a solid-state optical switching company. He has a BS in Electrical Engineering from UC Berkeley and a MS in Electrical Engineering from Cornell.
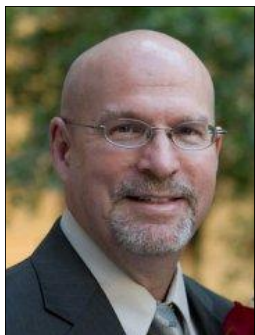
Mark Newburn

Mark Newburn is founder and owner of Vizics Inc., a small software company serving the Department of Defense. He has over thirty two years of experience in the areas of software development, computer graphics, and virtual reality. Mark has worked for some of the top commercial technology companies in America including Silicon Graphics Inc, where he specialized in large scale virtual reality systems. He has worked on such key projects as the Strategic Defense Initiative, the U.S. Customs Service Domestic Air Interdiction System, and the Cheyenne Mountain Operations Center. Mark has both a Bachelor of Science degree and a Master of Science degree in Computer Science from UNLV. He is the current chair of the UNLV School of Computer Science Industry Advisory Board where he co-founded UNLV's first scholarship in Computer Science. He also serves on the UNLV College of Engineering Advisory Board, the Chamber of Commerce Education Action Committee, the Northwest Career and Technical Academy - Engineering Advisory Board, and is President of the UNLV Alumni Association College of Engineering Chapter.

Clark McCarroll

Originally from Chicago, Clark attended the City Colleges of Chicago where he received a Diploma in General Business Studies, an advanced certificate in Data Processing, and an Associate of Arts in Engineering. Clark graduated with honors and was inducted within the Phi Theta Kappa Honor Society. Clark received his Bachelors and Masters degree in Mechanical Engineering from UNLV. His major concentration was in Engineering Management. Clark has been employed by several engineering firms within the Midwest and West coast. Most recently, Clark is employed as a Senior Engineer and Project Manager in Generation at NV Energy. Prior to joining NV Energy, Clark was employed as an engineer for Southwest Gas Corporation. Clark has been a NSBE member since 1991 and was a Charter member of the NSBE Las Vegas Alumni Chapter Clark has taught part-time at several universities as an adjunct faculty and is active in many professional organizations and served on the Alumni Board of Directors at UNLV. In 1997, Clark was named "Outstanding Alumnus" from the College of Engineering at UNLV and was named "Faculty of the Year-2007 at the University of Phoenix. In 2004, Clark served as the VP for Diversity and Outreach for ASME and currently serves as the Senior VP for Centers for ASME. Clark is a member of the Project Management Institute (PMI). Clark has served as the Chairman of the Advisory Board for the Howard R. Hughes College of Engineering as well as the Chairman for the Mechanical Engineering Advisory Board at UNLV. In 2011, Clark was named an ASME Fellow in Denver, CO.

Award Winners
Will be announced by the following sponsors
at the Senior Design Dinner on May 4, 2012
Cox Pavilion, 5:30 p.m. - 9:00 p.m.

Grand Prize
Dominic Anthony Marrocco

Civil, Environmental Engineering and Construction

NVEnergy

Computer Science

Bally
TECHNOLOGIES

Electrical and Computer Engineering

JT3

Entertainment Engineering and Design

CIRQUE DU SOLEIL

Mechanical Engineering

switch

Interdisciplinary Award

Zappos.com

Senior Design Instructors

Department of Civil & Environmental Engineering and Construction
Dr. Barbara Luke

Department of Computer Science
Dr. Evangelos Yfantis

Department of Electrical and Computer Engineering
Mr. Brandon Blackstone

Department Entertainment Engineering and Design
Dr. Joseph Aldridge

Department of Mechanical Engineering
Dr. Zhiyong Wang

Senior Design Competition

Presentation Schedule

	Department
	Mechanical Engineering
	Civil & Environmental Engineering and Construction
	Electrical & Computer Engineering
	Interdisciplinary
	Computer Science
	Computer Science
	Computer Science
	Civil & Environmental Engineering and Construction
	Interdisciplinary
	Entertainment Engineering & Design
	Mechanical Engineering
	Entertainment Engineering & Design
	Entertainment Engineering & Design
	Electrical & Computer Engineering
	Computer Science
	Computer Science
	Computer Science
	Mechanical Engineering
	Computer Science
	Computer Science
	Computer Science
Associated with the Proposed	Civil & Environmental Engineering and Construction
	Electrical & Computer Engineering

Senior Design Competition

Presentation Schedule Continued

	Department
	Interdisciplinary
	Civil & Environmental Engineering and Construction
	Electrical & Computer Engineering
	Computer Science
	Computer Science
	Interdisciplinary
	Mechanical Engineering
	Electrical & Computer Engineering
Demand of a "Smart" Home	Computer Science
	Computer Science
	Computer Science
	Mechanical Engineering
Maryland Parkway	Civil & Environmental Engineering and Construction
	Mechanical Engineering
	Civil & Environmental Engineering and Construction
	Computer Science
	Computer Science
Blvd at Bent Arrow Dr.	Computer Science
	Mechanical Engineering
	Electrical & Computer Engineering

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 7:45 am
Solar Autoclave
Department: Mechanical Engineering
Project Participants: Lisett Avelar, Derek Lennon, Sarah Trabia
Instructor: Dr. John Wang
Faculty Advisor: Dr. Robert Boehm
Technical Advisor: Rick Hurt
Community Advisor: Dave Zheng

Abstract:
In many developing countries, hospitals and clinics can be away from the power grid. Portable generators and fuel are also not easily accessible. Such deficiencies make the simplest medical procedure extremely difficult if not impossible because of the challenges associated with sterilizing medical equipment.

The purpose of this project is to develop an alternative to traditional autoclaves used for sterilizing medical equipment. Autoclaving is a method of using pressurized steam to sterilize equipment. Successful sterilization requires superheated steam at temperatures of a minimum of 123°C for approximately 15-20 minutes. This project proposes an innovative design that uses solar energy to generate superheated steam that can meet the strictest medical standards. A series of heat pipe solar collector elements are connected to collector header to heat the water. The design is simple to suit the needs of the least developed areas of the world; it contains no moving parts or valves. It could be operated with minimum amount of qualified supervision. Testing has shown that steam can be generated under different conditions. It is expected that a successful implementation of this project will help face medical challenges throughout the world. Additionally, this design can be used in areas of natural disasters such as Hurricane Katrina aftermath.

Left to Right: Sarah Trabia, Derek Lennon, Lisett Avelas

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

CE&C: Second Place Winner—$500

Time: 8:00 am
Pavement With Return
Department: Civil & Environmental Engineering and Construction
Project Participants: Jimmy Floyd, Sean Gann,
                                         Anthony Ramos, Ricky Zeedyk
Instructors: Dr. Karakouzian, Dr. Tian
Community Mentor: Paul Villaluz

Abstract:
The concept of using piezoelectric material to harvest the mechanical energy generated by traffic, which is normally dissipated through deflection of roadway materials, is relatively new. As world population continues to grow and natural resources become more scarce (and more expensive), creative alternatives for generating electricity become increasingly valuable. The most common sources of alternative energy, such as solar, wind and hydroelectric, have significant limitations imposed by their respective technologies and the impact has on our environment. Our team examines the possibility of supplementing or replacing solar generation with piezoelectrics to power bus shelters in the Las Vegas Valley. Site(s) for implementation of pilot studies are chosen strategically by analyzing traffic flows necessary to generate the power required by the shelter. An economic analysis compares the costs and benefits associated with each technology to recommend the best alternative. Implementation of this technology is in partnership with PowerLeap for the Nevada Regional Transportation Commission of Southern Nevada. The technology has potential for broader application at the large scale to supplement the grid, providing a revenue stream for roadway managers.

Left to Right: Jimmy Floyd, Ricky Zeedyk, Sean Gann, Anthony Ramos

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 8:15 am
Smart Toilet
Department: Electrical Engineering
Project Participants: Jose Hernandez, Kenderrick Taylor, Steven Wilson
Instructor: Brandon Blackstone
Faculty Advisor: Dr. Biswajit Das

Abstract:
The toilet is one of the most basic components to modern living. Whether for home use or public use, there exist concerns regarding the safety and comfort of restrooms. As the world evolves and becomes more modern, a higher standard of sanitation is held to toilets. Our product aims to reduce the amount of regular maintenance that is required in cleaning basic restroom facilities, and decrease the amount of contact that patrons have with the toilet. Our first goal is accomplished by using a steam powered seat cleaner to rinse and sanitize the seat. The latter involves raising and lowering the seat automatically, through use of sensors which are already utilized in automatic flush designs. The design should be environmentally friendly by replacing chemical cleaning processes with steam. This design should not change regular restroom routine by waiting for extended periods of time for the seat to be heated and dried.

Steven Wilson, Kendrick Taylor, Jose Hernandez

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 8:30 am
ProxyLok
Department: Electrical Engineering / Mechanical Engineering
Project Participants: Philip Dupree, Stephen McHargue, Mitchell Burton
Instructor: Brandon Blackstone (Electrical) / Zhiyang Wang (Mechanical)
Faculty Advisor: Yingtao Jang (Electrical) / Zhiyang Wang (Mechanical)

Abstract:
The ProxyLok is a passive keyless entry system, which is designed to be adapted to an existing lockset. This product, designed for use on household applications initially, provides the user with options for passive and remote keyless entry. The device works off of battery power and incorporates the following main devices: a pair of DC stepper motors, a bidirectional proximity sensor, a paired key-fob, capacitive touch circuitry and a door sensor. The system is attached to the inner face of the door, through existing door handle bolts and is not noticeable from the outside.

The user carries a key fob which is paired to the bidirectional proximity sensor. When the key fob is within a set proximity of the door and the user touches the handle, the motors retract the latch and deadbolt. The key fob also enables the door to be unlocked remotely at the press of the button.

While remote keyless entry is already commonplace in the automotive industry, our system is unique in applying this to a residential setting. Several companies currently offer household locks actuated by remote controls; however, the ProxyLok is the first to incorporate passive keyless entry. Existing designs also require replacement of the entire lockset while this device is designed to incorporate into existing hardware without altering any of the original functionality. A system designed to supplement the existing lockset reduces costs while allowing consumers to choose from a wide variety of locks to suit their security needs and aesthetic preferences.

Left to Right: Mitchell Burton, Stephen McHargue, Philip Dupree

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 8:45 am
YumCrew
Department: Computer Science
Project Participants: Ryan Huang
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:

This iPhone app that will do the following things:
    Show the restaurant near the user
    Show the top 5 popular dishes
            -Show the content of each dish
                Each dish will be rated based upon
                        it's taste
                                *Spiciness
                                *Sweet
                                *Salty
                                *Meaty
    Allow the user to order the dish
            -Generate points to future rewards
            -Ordering with picture
                    *More reward points
    This app will use the Google API extensively
    This map will require a MySQL user profile data-
        base
    Future plan:
            -Sell dining bucks to the customer with
                discount
            -Exchanging reward points with dining
                bucks
    Core purpose:
            -To promote new startup restaurant
            -To help local business gain diversity

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Time: 8:55 am
Collectors Log iPhone App
Department: Computer Science
Project Participants: Robert Snipes
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:

This application is a Collectors Log iphone App. Some people collect 50's furniture, baseball cards, pokemon, etc. The app will let the user record data about each item in their collection to help keep track of it all and carry the information where ever they go. The app will also allow a picture to be associated with each item. Lots of people are collectors.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

CS: Second Place Winner—$500

Time: 9:05 am
Vegacite
Department: Computer Science
**Project Participants**: Sassan M. Knight
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
Every year approximately 40 million people visit Las Vegas. That is an average of 10,600 people every day. Las Vegas is a major international vacation destination with a constantly changing landscape. Visitors new to the Las Vegas environment are unfamiliar with what Las Vegas has to offer. Vegacite is here to help with this problem. Vegacite is an app designed to provide visitors to Las Vegas access to ideas on, what to do, when to do it and how to do it. Some examples of help provided are a list of restaurants, casinos, clubs , shopping, points of interest, history, how to get into clubs, help to learn and play different casino games, drink guide, contact info to VIP hosts and concierges, access to tickets for shows, discounts and offers, restaurant (guide), clubs (nightlife guide), casinos (casino guide), transportation, and shopping etc. It will also include reviews of the previous examples. The app will be designed starting with the IOS platform and soon be ported to the Android OS to reach the most amount of people possible. The app will be offered for free for a small trial period(1 Day) then cost 99 cents on IOS platform and for free on Android with advertising support from Google. The price is subject to change since this can be an advertising outlet for the industry.
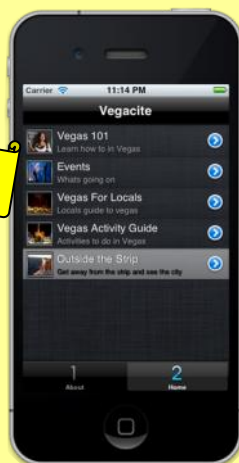
CE&C: First Place Winner—$1000

Time: 9:15 am
Smells Like Money: Anaerobic Digestion
Department: Civil & Environmental Engineering and Construction
Project Participants: Cory Dow, Steven Winfree, Myron Fikse, Steven Matti
Instructor: Dr. Barbara Luke
Faculty Advisor: Dr. Jacimaria R. Batista
Technical Advisor: MWH, Carollo
Community Advisor: Clark County Water Reclamation District

Abstract:
Anaerobic Digestion is proposed for implementation at the Clark County Water Reclamation District (CCWRD) Central Wastewater Treatment Plant utilizing available resources to create a renewable energy source. The CCWRD currently treats approximately 95 million gallons of wastewater every day. This process is energy intensive, totaling more than 74,000 megawatt hours annually. The CCWRD is actively seeking methods to reduce energy costs and recently released Request for Proposal (RFP) 913-11 calling for methods to do so. In the process of treating wastewater, CCWRD generates 310,000 gallons of primary sludge per day and 215,000 gallons of thickened waste activated sludge per day. This sludge could be digested into methane gas and used as an energy source. This project compares three alternatives to generate methane from CCWRD sludge: 1) Design a pipeline to transfer primary sludge to the City of Las Vegas Water Pollution Control Facility to utilize available capacity in existing digesters. 2) Design anaerobic digesters on CCWRD property for the same amount of primary sludge as in alternative 1. 3) Design anaerobic digesters on CCWRD property with capacity to treat all available sludge produced, as well as, incorporating fat, oil, and grease to produce maximum amounts of methane. All three alternatives have advantages and disadvantages which were evaluated based on economics, feasibility, and maximum energy production.

Left to Right: Steven Winfree, Cory Dow, Steven Matti, Myron Fikse

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 9:30 am
SBMD
Department: Mechanical Engineering and Electrical & Computer Engineering
Project Participants: Bongjun Mun, Nelson Nakata, Julius Cervana
Instructor: Dr. John Wang and Brandon Blackstone
Faculty Advisor: Dr. Woosoon Yim
Community Advisor: Harvey Janelli

Abstract:
Today's technology allows a person to routinely check their health in the comforts of their own home and without the need of a trained professional. The availability of various devices enables a person to check their blood pressure, blood oxygen, and their blood glucose.

The goal behind the Singular Blood Monitoring Device (SBMD) Team is to design and develop a device that would incorporate the functions of many devices into a single, easy to use device, and to improve upon the current method of measuring blood pressure by replacing the air bladder. The development of the device is broken down into stages. Each stage reaching completion once a new function is incorporated into the device. The planned functions for the SBMD are to measure blood pressure, blood oxygen, and blood glucose through non-invasive methods.

Left to Right: Bongjun Mun, Julius Cervana, Nelson Nakata

EED: First Place Winner—$1000

Time: 10:00 am
Boom Ease
Department: Entertainment Engineering & Design
Project Participants: Alan Holton, Jeremy Knowles, Kelly Tsadiasi
Instructor: Joe Aldridge
Faculty Advisor: Joe Aldridge

Abstract:
When it comes to making movies, one of the most important aspects is recording high quality audio for use in post-production. Gathering this audio is the primary job of the boom operator, who usually uses a telescoping pole or "fish pole" to position a microphone just above the actors and out of the frame of the camera. The boom and microphone weigh several pounds and must be held in an awkward position over the operator's head which can cause fatigue, especially over long takes.

In order to alleviate this problem, our team is developing a boom holder and harness that will allow the operator to position and steady the microphone with minimal effort. The padded harness has a pivoting, open-ended cradle for the boom that allows it to be moved in almost any direction by the operator with only one hand and is suitable for both right- and left-handed operators. Also included on the left and right harness straps are clips that the boom can snap into, securing it in position and allowing the operator to go completely hands-free. These features will allow anybody to act as boom operator with ease comfort while still finding the ideal location for the microphone.

Time: 10:15 am
Phase Change Material Enhanced Turnout Coat – (PETOC)
Department: Mechanical Engineering
Project Participants: Jacob Albright, Karina Saenz, Jeremiah Boles, Darren Benn
Instructor: Dr. Zhiyong Wang
Faculty Advisor: Dr. Yitung Chen

Abstract:
The thermal environment in which firefighters perform their duties is an extreme one. As a result, the personal protective equipment, PPE, worn by firefighters is designed to protect from injuries that can be caused by heat and flames. The protective clothing worn by firefighters is a coat and pants ensemble known as turnout gear. Turnout gear is composed of stratified layers designed to protect the fire fighter from radiant and convective thermal exposure, flashover conditions, and to a limited extent, punctures. A significant amount of research and material technology has been invested in the advancement of the performance of turnout gear; however, most of the advancements have addressed the issue of the thermal environment on the 'fire side' of the turnout gear. A potential augmentation to the current design of turnout gear could be to incorporate a layer to help reduce the thermal stress of the environment on the 'firefighter side' of the turnout gear. The premise of this concept is to enhance the micro-climate *within* the turnout coat, in particular, the stratum between the firefighter and the inner lining of the turnout coat; consequently, allowing the firefighter to stay in the fire attack staging areas for longer time periods.

Left to Right: Jacob Albright, Karina Saenz, Darren Benn, Jeremiah Boles.

EED: Second Place Winner—$500

Time: 10:30 am
Go DJ
Department: Entertainment Engineering & Design
Project Participants: Emily Black, Miles Caporicci, Max Godges
Instructor: Joe Aldridge
Faculty Advisor: Joe Aldridge

Abstract:
A single disc jockey (DJ) is responsible for providing their entertainment equipment, which includes but is not limited to two turntables, a mixer, and a laptop. A DJ is required to carry at least 60 lbs of equipment from their vehicle to the venue. Providing that every venue is different in terms of space and amenities, most DJs have to work with whatever is given upon arrival. Many times, DJs have to set up their equipment on top of standard tables provided by the venue. Our DJ case is designed to be an all in one case that allows for easy transportation and setup. This case is intended to act as a housing for the equipment as well as a stand upon which to provide music and entertainment.

This case is capable of housing two Technics MK 1200 turntables and one 10" standard sized mixer. In addition to this, we have provided 8 ft^2 of storage for laptops, headphones, table space, etc.

Left to Right: Miles Caporicci, Emily Black, Max Godges

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 10:45 am
RetCast Road Case
Department: Entertainment Engineering and Design
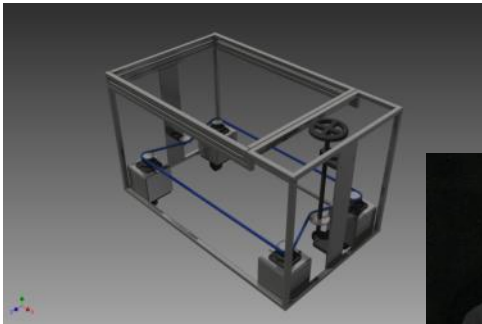**Project Participants**: Daniel McGeough, Oliver Sangalang
Instructor: Joe Aldridge
Faculty Advisor: Joe Aldridge

Abstract:
In its most basic form, road cases are simply storage containers on a set of casters. Road cases come in a multitude of sizes for various applications and are widely used for their durability and ease of shipping. Seeking to improve upon road case safety and efficiency, this project will result in the creation of a functional prototype of a 5' x 3' x 3' road case to explore the benefits of adding retractable casters.

The purpose of this project is to produce a mechanism that can easily raise and lower the casters of a road case. The mechanism will be housed internally and retract the casters into recesses at the bottom of the road case. The goal is to grant users the option of removing the road case's ability to roll, which will create a safer condition for stacking as well as preventing roll off accidents. It will also make loading, unloading, packing, and strapping down the cases more efficient, all while maintaining the current functionality of a standard road case.

Left to Right: Oliver Sangalang, Daniel McGeough,
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Time: 11:00 am
Banana Box
Department: Electrical & Computer Engineering
Project Participants: Alan Carreño, Zeeshan Mohammad, Gabriel Nuer
Instructor: Brandon Blackstone
Faculty Advisor: Venki Muthukumar

Abstract:
When people buy bananas from grocery stores they usually buy them in bulk, 5 to 10 bananas at a time. Furthermore, the bananas are usually not ripe yet when they are purchased so the consumer has to wait a few days until they are ripe. As we all may already know, the bananas will ripen at the same time and it is unreasonable to eat all the bananas once they have ripened. To solve this issue We designed the Banana Box.

What our Banana Box will do is ripen bananas sequentially so that you will have seven bananas ready to eat for each day of the week. The Banana Box will do this by controlling the temperature inside seven separate chambers that will hold one banana. The system will monitor the humidity as well to see if it has any effect on the ripening speed of the banana. The Banana Box will show you the temperature and humidity in each chamber and which banana is ready to eat.

Left to Right: Gabriel Nuer, Alan Carreno, Mohammad Zeeshan

Time: 11:15 am
Apples Rain Game
Department : Computer Science
Project Participants: Ernesto Pavon
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis

Abstract:
Apples Rain consists of a 2D game for the Windows Phone 7. The game has the player trying to catch as many falling apples as possible while avoiding obstacles in a limited amount of time. The game will have several levels which will increase in difficulty as the player progresses. As the player progresses, there will be more obstacles and the time available might change. At the end of each level, the player is presented with a screen showing his score along with the top scores for that session. Controls will be handled via the phone touch screen. A display will be presented which will allow players to control the character as if they were handling an analog stick. A button displayed on the screen will allow the player to jump if tapped.

Time: (to be assigned by Crissy)
Automotive Maintenance Scheduler
Department: Computer Science
Project Participants: David Chorpash
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
Automotive Maintenance Scheduler will cater to those who own a vehicle and perform periodical preventive maintenances throughout it's lifespan. Since periods of these maintenances are often far apart and/or special in nature, for example, a special maintenance might only be performed at 60,000 miles, people tend to forget about performing them at all, causing wear and tear, and possibly decreasing the vehicle's lifespan and value. Automotive Maintenance Scheduler will consist of the following:
 • A friendly, easy to use user interface.
 • A database consisting of maintenance information from all car manufacturers.
 • A database to keep track of it's users.

A first-time user will begin by creating a profile, which the user will input year, make, model, and current mileage of the vehicle. These values will be stored in a database and matched with the recommended maintenance schedule in the manufacturer database. The values of the next scheduled maintenance will be stored in the user database and will alert the user a week or 100 miles before maintenance is due, whichever occurs first. The user will be able to change these values, giving the user flexibility. Whenever maintenance is performed, the user will enter in the current mileage, which will replace the values in the profile, along with the time.

Time: 11:35 am
Slope Style Trix
Department: Computer Science
Project Participants: Jordan Donato
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
Slopestyle Trix is an app designed with the beginner to intermediate snowboarder in mind. The app is a reference to various forms of maneuvers a snowboarder can learn and it can be utilized while at the ski resort. Starting from the easiest, the snowboarder must accomplish the current trick before moving up to the next level. The app has 3 categories of tricks; Aerial Tricks, Ground Tricks and Summer Drills.

Aerial Tricks is ubdivided into 4 other categories. Grabs: A simple trick that once the snowboarder is in the air, grabs a particular part of the snowboard with style. Spins: A more advanced trick where the snowboarder spins off the Z axis in the air starting from half a spin (180°) all the way to 3 and a half spins (1260°). Inverted: An even more advanced trick where the snowboarder flips off either the Y axis or the Z axis. It can range from 1, 2 or 3 full flips. Combinations: The most advanced tricks and are worthy of competition. These are a combination of the first 3 categories. (i.e. the snowboarder is doing a grab while rotating on either the X-Z axis or the Y-Z axis)

Ground Tricks is subdivided into 2 other categories. Park features: This section goes through the several different types of slides that a snowboarder can do on park features. Snow: No park features. Just lists the type of tricks a snowboarder can do while carving down the slope.

Summer Drills will go over things that a snowboarder can do to maintain and progress their skills even when there is no snow. Various forms of exercises, trampoline drills and practice with skate rails will be discussed.

When a trick is selected by the user, the app will present a brief description of the trick, and a button that provides pictures, videos or animations of the trick to help the snowboarder visualize it.
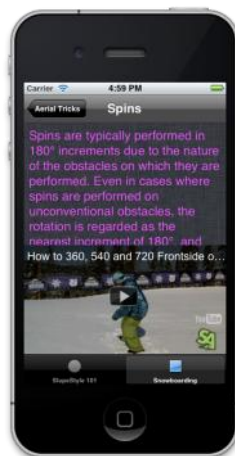
Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

ME: Second Place Winner—$500

Time: 12:15 pm
SolaCon – The Concentrating PV System
Department: Mechanical Engineering
Project Participants: Jessica Christy, Justin Galli, Joshua Herrera, Vu Tran
Instructor: Dr. Zhiyong Wang   **Faculty Advisor**: Dr. Robert Boehm
**Technical Advisors:** Rick A. Hurt, Dr. Suresh B. Sadineni
Community Advisors: Alain Chuzel - SunCat Solar, LLC; Tim Hebrink - 3M; Olson Iron, Inc

Abstract:
In today's world, renewable energy sources are of paramount importance. Photovoltaic (PV) systems are one of the largest sources of renewable energy. However, these systems are expensive due to PV cell production costs, which limit their widespread application. In order to reduce the PV cell cost for this type of renewable energy system, our project attempts to reduce the number of PV cells required.

The SolaCon Concentrating PV System's main objective is to reduce the number of PV cells that are required to produce a given amount of energy. This will be accomplished by concentrating the irradiance of 3.8 suns, theoretically, onto a PV cell array.

The SolaCon Concentrating PV System consists of four rows of sheet metal covered in 3M CoolMirror Film 550. These mirrors are mounted at a specific orientation in order to reflect the total irradiance of 3.8 suns onto a row of seven SunPower A-300 PV cells. These PV cells, located in the central focus of the concentrator, are mounted onto a heat sink in order to dissipate any excess heat build-up due to the 3.8 concentrations. The SolaCon Concentrating PV System is mounted onto a dual-axis solar tracker where it will track the sun from sunrise to sunset and ensure that the unit is aimed directly at the sun. With the irradiance of 3.8 suns concentrated onto the row of seven PV cells, theoretically, the SolaCon Concentrating PV System should produce 3.8 times as much power when compared to an identical single sun, non-concentrating system.
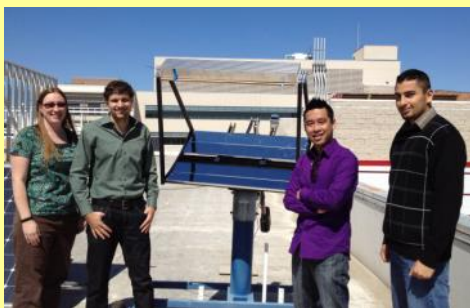
Left to Right: Jessica Christy, Justin Galli, Vu Tran, Joshua Herrera

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 12:30 pm
Respond: A Mobile App For Saving Time Between Contractors and Realtors
Department: Computer Science
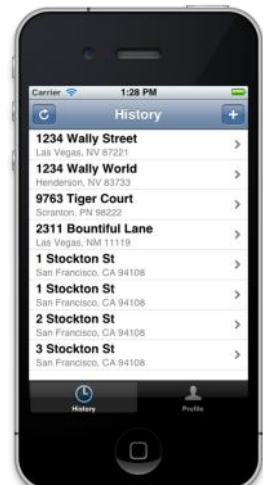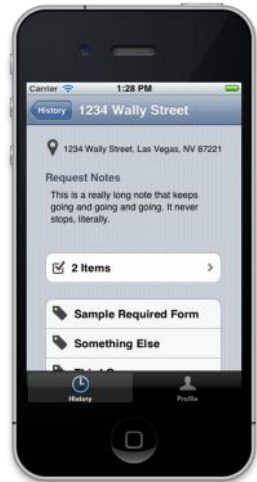**Project Participants**: Troy Parkinson
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
The "Respond App" saves time between realtors and contractors and enables faster communication and therefore faster repair of properties that have suffered vandalism. The Bank of the property assigns the property to a realtor who makes a walkthrough to identify hazard and safety issues as well as needed repairs. Our app organizes the pictures and the realtors notes in a way that is easy for the contractor to estimate the cost for the needed repairs and therefore reply promptly giving a relatively accurate time and money estimate for the repairs.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 12:40 pm
Hyper Mind Blitz
Department: Computer Science
Project Participants: Davis Nguyen
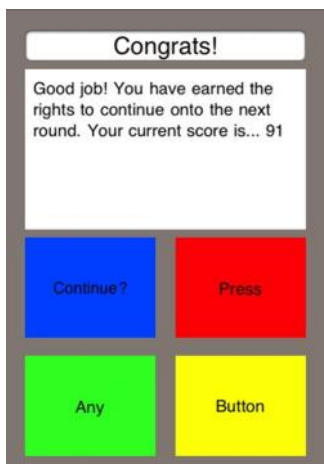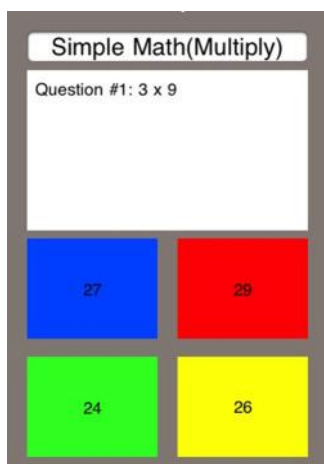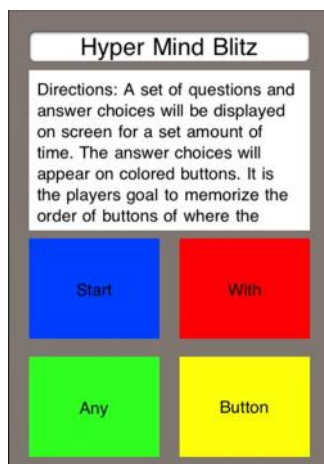**Instructo**r: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:

Hyper Mind Blitz is a game-based application. It is designed to help improve the players' memorization skills. This game is similar to the game "Simon Says", the big difference is that instead of displaying the pattern for the players to input, there will be a question with four answer choices displayed, and players will have to memorize the button of what they   believe to be the correct answer choice. Once the entire set of questions for each level has been displayed player will have to input their answer choices in the order of which the questions were displayed. The questions will appear on the screen for a set amount of time, and as the game progress that time is decremented. There will also be a set amount of time for which the players have to input their answers. This time will remain the same.

This is a single-view application, meaning there is only one page. The display on the screen changes depending on what is happening in the game. Though there is only one view, there are four or five different variations of views. There are four different types of questions, and a set total of 40 different questions. Each questions have their own unique answer choices. There are future implementation plans for the entire application set.

Time: 12:50 pm
Geogra-Fun
Department: Computer Science
Project Participants: Scott Buff
Instructor: Dr. Evangelos A. Yfantis

Abstract:

Geogra-Fun is an attempt to make learning geography fun. This application offers several different, user-selectable games in addition to tutorial learning exercises geared toward helping students learn geography without knowing they're doing it. Users will be able to choose between traditional matching games, flash card style, selecting possible answers from a Picker control, timed games and others.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 1:00 pm
Transportation Solutions for Conflicts Associated with the Proposed UNLV NOW Project
Department: Civil & Environmental Engineering and Construction
Project Participants: Leah Irons, Marissa Kupris, Joanna Opena, Ashley Selvy
Instructor: Dr. Barbara Luke
Faculty Advisor: Dr. Mohamed Kaseko
Technical Advisor: Walter Vodrazka, Jr., PE

Abstract:

In 2011, the UNLV Board of Regents approved a proposal that will allow Majestic Realty to proceed with the next steps of executing their landmark project, UNLV *NOW.* This development is anchored by a 60,000 seat open-air stadium, housing for up to 5,000 students and faculty, and approximately 600,000 square feet for destination/entertainment retail and restaurants, all of which will be constructed on 150 acres on the southwest portion of the UNLV campus. As part of the development, Swenson Street, which carries a great deal of airport traffic, will be terminated just north of Tropicana Avenue. This will impact the high traffic volume around campus that is already generated by the large drive-in population of UNLV students, staff and attendees for events at the Thomas & Mack Center. As a result, the current roadway network will no longer be able to support the high traffic demand surrounding UNLV.

We propose two design alternatives that will address the traffic and environmental impacts associated with UNLV *NOW*, particularly if nothing is done to improve the network. One alternative requires the tunneling of Swenson under the development to maintain this street as a through road. This is paired with an exclusive eastbound left turn overpass at the intersection of Paradise and Tropicana. The second alternative involves widening both Tropicana Avenue and Paradise Road, which will become a two-way street to accommodate the traffic diverted from the terminated Swenson Street. This will be the first traffic analysis performed for UNLV *NOW* since its proposal in 2009.

Photos for Transportation Solutions for Conflicts Associated with the Proposed UNLV NOW Project

UNLV NOW Conceptual Masterplan.
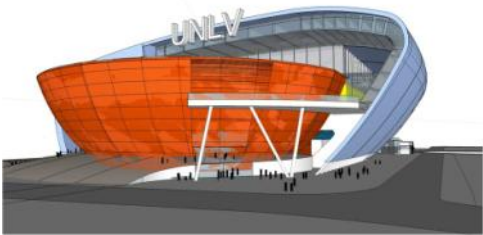
UNLV NOW Conceptual Stadium.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 1:15 pm
Localization and Navigation
Department: Electrical and Computer Engineering
Project Participants: Michael Harris, Neil Ocampo, Ashley Dimang
Instructor: Brandon Blackstone
Faculty Advisor: Dr.Venki Muthukumar

Abstract:

Team ProjNav's senior design project is dedicated to creating a traversable grid implemented seamlessly. The idea is to take radio requency signal strength to create a coordinated grid system traversable with a mobile tracked chassis equipped with various sensors. Our method of implementation is to use RF Transceivers that emit RF signals with a calculated Received Signal Strength Indicator (RSSI) to build our coordinate system. An algorithm will then be implemented for the tracked chassis to navigate from its current location to a transmitted destination on the grid. The tracked chassis will be equipped with a digital compass to know its heading, a pair of quadrature encoders to track the distance travelled, an ultrasonic sensor for object collision, and an IR sensor for close range precision. The general flow of events entails the mobile system finding out its location, the final destination on the grid, and plotting its general course to the destination. Ultimately, the mobile tracked system will approach the final destination where it will use IR sensors to move as close to the destination as possible.

Left to Right: Ashley Dimang, Michael Harris, Neil Ocampo.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 1:30 pm
Remote operated compact Hot Uniaxial Press (HUP)
Department: Mechanical, Electrical and Computer Engineering
Project Participants: Ariana Alaniz (ME), Luc Delgado (EE),
Brett Werbick (CPE)
Instructor: Dr. Wang
Faculty Advisor: Dr. Brendan O'Toole and Dr. Robert Schill, Jr.
Technical Advisor: Dr. Thomas Hartmann

Abstract:
The objective of this project is to create a remotely-operated compact hot uni-axial press (HUP). This machine has versatile applications and can be used for sample fabrication that requires the simultaneous application of pressure and temperature parameters of up to 600 MPa and 1200°C, respectively. It features electronic control and feedback systems to set and monitor pressure, load, and temperature parameters. This device operates wirelessly via portable computer using Bluetooth® technology.

The machine is specifically designed to produce ceramic monolithic pellets of densities of above 90% theoretical which is currently not attainable by more traditional pressing and sintering methods. Our HUP device is   designed for installation in a standard atmosphere controlled glove box to further allow sintering under inert conditions (e.g under Ar, He, N2). This will further allow utilizing this HUP for other potential applications, including radioactive samples, novel ceramic waste forms, advanced oxide fuels, air-sensitive samples, metallic systems, advanced powder metallurgy, diffusion experiments and more. To the date there are no commercial HUP or HIP (hot isostatic pressing) available for installation in a standard laboratory size glove box due to dimensions and complexity. Furthermore entry level HUP or HIP instrumentation is not available for less than $100,000.00. The HUP is a one-of-its-kind design and will be patented and eventually commercialized. This device includes elements of mechanical, electrical, and computer engineering and could only be developed through the alliance of these disciplines. This project was funded under the auspices of the US Department of Energy, Office of Nuclear Energy (DOE-NE).
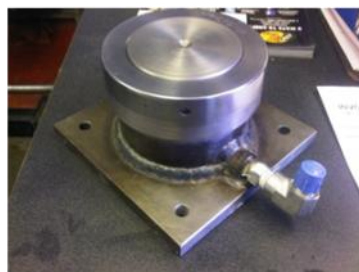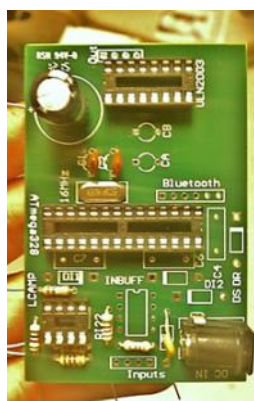
Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 1:45 pm
Theme Street Trunk Sewer Lift Station
Department: Civil & Environmental Engineering and Construction
Project Participants: Angelyn Accad, Gabriel Barrera, Glenn Blake, Sean Sims
Instructor: Dr. Barbara Luke
Faculty Advisor: Dr. Haroon Stephen
Technical Advisor: Dr. Douglas Drury, Clark County Water Reclamation District

Abstract:
Team ABBS has been approached by the Clark County Water Reclamation District (CCWRD) to design a lift station for a 69-inch pressurized concrete pipe for wastewater that, if left alone, will have detrimental effects for years to come. Currently, the pipe is flowing at full capacity of 113 million gallons per day, corroding the top inner lining of the pipe. It is vital to decrease the height of the wastewater in the pipe to prevent corrosion and allow the odors in the wastewater to flow for later treatment. The solution is to build a lift station on CCWRD property that will pump the excess flow into a separate pipe. The lift station will also include an odor-control facility to treat the gases that travel in the pipe above the wastewater. The Team ABBS design revolves around in-depth research and calculations based on site evaluation, hydrology analysis on the wastewater flow, sizing of the pumping facilities (wet well and dry well dimensions), specifying the pumps that will be used and its scheduling, and taking full considerations for safety.
ABBS is an environmental engineering group consisting of UNLV Civil Engineering students Angelyn Accad, Gabriel Barrera, Glenn Blake, and Sean Sims. Our objective is to apply environmental/water resources engineering skills into real world projects in order to benefit the public for years to come.

Left to Right: Angelyn Accad, Sean Sims, Gabriel Barrera, Glenn Blake

Lincoln Lift Station, Clark County Water Reclamation District

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

ECE: First Place Winner—$1000

Time: 2:00 pm
Magnetron Automatic Frequency Control System
Department: Electrical & Computer Engineering
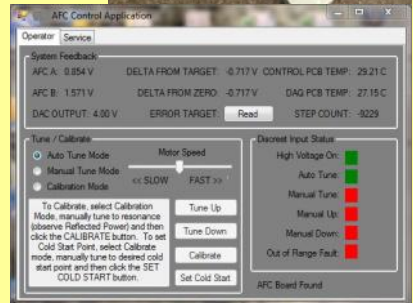**Project Participants**: John Turner
Instructor: Brandon Blackstone
Faculty Advisor: Dr. Singh

Abstract:
High energy x-ray machines frequently use electron accelerators to generate x-rays. The accelerator is driven by bursts of RF energy which in many cases are supplied by a magnetron. In order for the accelerator to efficiently accelerate the electron beam the RF frequency generated by the magnetron must exactly match the resonant frequency of the accelerator's cavities. Due to heating during operation, both the accelerator's resonant frequency and the magnetron's output frequency are constantly changing.

The purpose of this control system is to actively determine whether the magnetron's output frequency matches the accelerator's resonant frequency. If a frequency mismatch is detected, the system will generate an error signal based on feedback from the x-ray machine's RF network which is used to determine how far off resonance the magnetron is operating and which way the magnetron needs to be tuned to correct the mismatch. It then drives a stepper motor, which is coupled to the magnetron's tuning shaft, in the appropriate direction to correct the mismatch condition. As it drives it continuously monitors the feedback signals to determine if an error still exists. The system also monitors the state of the x-ray machine to determine how to handle input signals. The system also has the ability to be remotely calibrated from a PC to allow for installation on machines that preclude the operator from standing nearby while producing radiation. The calibration GUI also provides visual feedback of signals such as error signals, motor position, temperature, etc., assisting with calibration and/or troubleshooting.

CS: First Place Winner—$1000

Time: 2:10 pm
Basic Yoga
Department: Computer Science
Project Participants: Amrita Nikhil Amritphale
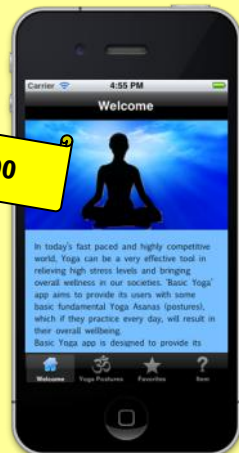**Instructor**: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis

Abstract:
In today's fast paced and highly competitive world, Yoga can be a very effective tool in relieving high stress levels and bringing overall wellness in our societies. 'Basic Yoga' app aims to provide its users with some basic fundamental Yoga Asanas (postures), if practiced every day, will result in overall wellbeing. Today, various forms of Yoga are practiced. The list of Yoga postures, with their variations and related literature, can be overwhelming for someone who is new to Yoga. Yoga is a powerful tool and even the basic knowledge and understanding of it can bring about a transformation in one's wellbeing. With the use of latest technology, making this powerful tool of life transformation available to a large number of people is the inspiration behind the 'Basic Yoga' app.
Basic Yoga app is designed to provide its users with sets of simple fundamental Yoga Asanas (postures). This app will provide a brief introduction to the science of Yoga and how to wisely employ it in one's life to get maximum benefit out of this practice. This app will provide a list of basic Yoga postures in seven categories, which are – Sitting Poses, Standing Poses, Inverted Poses, Backbends, Forward Bends, Twists and Final Relaxation Pose. Each pose will have a detailed set of instructions along with the picture to describe that posture. The option of audio, which will read out the instructions provided in each pose, will also be available to the user. Basic Yoga app will be a tab based application. It will have four main tabs – Home, Postures (Asanas), Favorites and Help. Home tab will have a brief introduction to the science of Yoga and its various benefits. Postures tab will list all the aforementioned categories. Individual postures will be navigable from these categories. Favorites tab will allow users to save individual postures of their liking or capability. Help tab will allow users to find answers relating to the app's functionalities.

Time: 2:20 pm
Persatxt (Purse-ah-text)
Department: Computer Science
Project Participants: Alexander Eby
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:

A group texting application which inserts the first name value of the contact that is being texted into the text message. For example, if I were sending out a group text regarding a party, I could say:
" Hey %f, are you coming to the party? It's tonight at 10pm at …" where %f is a non alphanumeric character used as a placeholder within texts.
When the app sends the message it pulls the first name value from the contact list and replaces the first name placeholder.
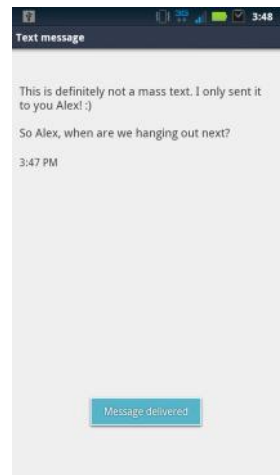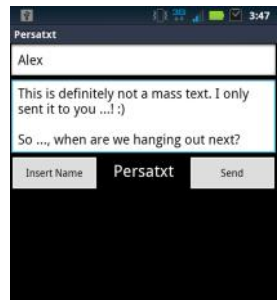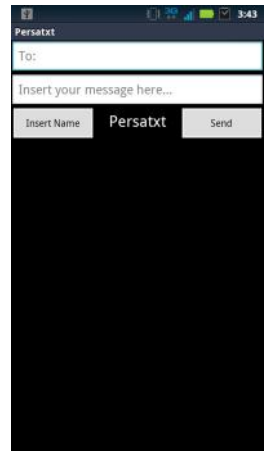
Purpose:
To personalize text messages in order to increase the chances of success when inviting people to things or asking a question.

Possible features:
The ability to insert a last name as well.
The ability to set a nickname value in the contact list which will replace first name if chosen for that text.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 2:30 pm
Sequential Automated Manual Transmission
Department: Mechanical Engineering/ Computer Engineering
**Project Participants**: Timothy Pratt (ME), Soloman Wu (ME), George Louie (CPE)
Instructor: Dr. Wang, Prof. Brandon Blackstone
Faculty Advisor: Dr. Woosoon Yim

Abstract:
The Sequential automation system for the T-56 manual transmission is designed to closely emulate the function of an actual sequential racing transmission. An actual sequential transmission touts benefits of not having to use the clutch and fast shift times in less than 100 milliseconds. Shifting this quickly and not having to use the clutch to shift allows the racer to keep the power to the ground for more time; this translates into faster lap times. In close races shaving 1/10th of a second during every shift save a lot of time itself not including the extra speed capable from not having to lose momentum during each shift. A typical front engine, rear wheel drive sequential transmission is upwards of $25,000.

The system being built is designed to automate everything shift related so that perfect shift timing and not missing gears is achievable. The main mechanism will allow the transmission shifting to be controlled with two multi-position air cylinders. Those will be pneumatic and controlled with a bank of air solenoids. The clutch will have the option of manual and automated, with an extra hydraulic cylinder actuated by another air cylinder. Controlling all of the electrical components of the system will be an Arduino board; the input will be the VSS, TPS, RPM, Clutch activation, and shifting buttons. The Arduino will control all of the solenoids for the air cylinder, the clutch lock out, ignition kill, and the LED display to indicate gear and shift mode. This will allow for complete control.
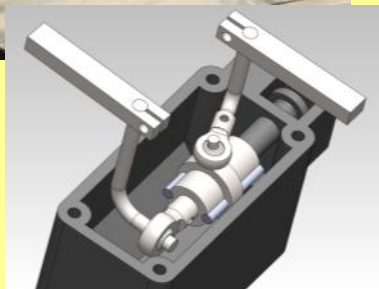
Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 2:45 pm
Electronic Ride Height Control (ERHC)
Department: Mechanical Engineering
Project Participants: Daniel Otero, Juan Aguiar Jr., Geoff Conlin, Ronnie Santos
Instructor: Dr. Wang
FacultyAdvisor: Dr. O'Toole

Abstract:
In the automotive performance industry, it is a common occurrence for an enthusiast to lower the ride height of their car for improved handling characteristics, stability, and overall appearance of their vehicle. However, the desirable ride height of the car may be too low for certain city driving situations and may need to be adjusted for various situations. The current market for height adjustment contains air bag and hydraulic systems but these systems are typically many times the cost of traditional suspensions, and often does not offer the desired handling characteristics. In order to change the ride height using coilovers, the owner in most cases must lift the vehicle, remove the wheels, and physically turn the suspension. This takes significant time and energy.
This project looks to solve this conflict between performance and the required effort to obtain it. The ERHC system will allow the enthusiast to make simple adjustments to the ride height via a controller in the cockpit without any physical labor. The controller will communicate with the height adjustment apparatus and it will respond by making the required changes. After the enthusiast has our system installed, they will be free to change the height simply and promptly when an obstacle is encountered (speed bump, driveway, dips, etc.), or merely to enhance their vehicle's appearance.

Left to Right: Geoff Conlin, Ronnie Santos, Daniel Otero, Juan Aguiar

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Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Grand Prize—$2500

Time: 3:00 pm
Retrofit Hybrid Solution
Department: Electrical & Computer Engineering
Project Participants: Jeremy Feliciano, Derek Joiner, Richard Ryan
Instructor: Brandon Blackstone
Faculty Advisor: Dr. Yahia Baghzouz
Technical Advisor: Dr. Venkatesan Muthukumar

Abstract:
The average driver only drives about 36 miles a day according to a study conducted by the U.S. Department of Transportation in April 2011. With such a small average distance traveled each day, the commute time is under an hour. We can then determine that a hybrid would only need about one hour's worth of electricity to be used in conjunction with the motor in order to provide an economically viable hybrid solution.

Our goal is to create a system to be implemented on gas cars and trucks to make it a plug-in hybrid that will not hinder the performance of the original vehicle. With our system, the vehicle can enjoy higher gas mileage for short distances, but also have the full capability of its original performance for long hauls and distances. Our product will be a complete bolt on system and require no major alterations to the original vehicle.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 3:45 pm
Controller Design for the Peak Power Demand of a "Smart" Home
Department: Mechanical Engineering
Project Participants: James Benavente, Alexander Fitzjerrells, Ann Marie Frappier, Norman Richardson
Instructor: Dr. Wang
Faculty Advisor: Dr. Yitung Chen
Technical Advisor: NV Energy, Mohammad Saadeh, Bill O' Donnell
Community Advisor: Clarissa Cross, Matthew Fitzgerald, Shaun Stanton

Abstract:
In today's society, it seems as though everyone is overcome with Renewable Energy alternatives. Renewable Energy is a growing area of research and development, as the demand for such technology continues to rise. However, with the outrageous costs of installing and maintaining a Renewable Energy sources (such Photovoltaic or Hydrogen Fuel Cells), does anyone wish to control their home's power consumption to minimize cost and maximize savings? This is the main objective of Team NAJA's controller.

The goal of the controller is to essentially monitor a "Smart" home's power demand and consumption. As the home's demand for power from the local utility company rises during the course of the day, the controller will cap the amount of power that can be taken from the utility company. Any power demands beyond this level would be handled by the home's Renewable Energy source which would be activated and controlled by the Controller.

The performance of a photovoltaic (PV) hydrogen production and storage and fuel cell installation in a single story family 'smart' home at Las Vegas in Nevada (2174 feet above sea level and 36.06°N latitude) has been studied. The automatically controlled system has been designed and will be built mainly from commercial components for the goal to shave the peak power demand. It consists of an array of roof mounted PV solar panels, an alkaline membrane electrolyzer, a hot water storage tank, a hydrogen compressor and storage unit, an oxygen storage unit, and a stack of fuel cells.

Time: 4:00 pm
The Kanji Tutor App
Department: Computer Science
Project Participants: Amber Kimmik
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
We are developing an iPhone app to help learn
Japanese. The app is specifically designed to help with
kanji. The app will allow the user to search for kanji in
a few different ways: through the ways it can be read,
"on yomi and kun yomi," and the "radicals," the char-
acters that kanji are made up of. Each entry will have
the kanji, all ways it can be read, the "radicals" it's
made up of, various words that are made with that
character, and a few sample sentences. A user will be
able to toggle between searching for kanji and having
kanji flash cards to study, and will be able to choose
which characters they want to study. The options for
flash cards will be to match the kanji to the reading,
and match the reading to the kanji.

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Cox Pavilion
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Time: 4:10 pm
Know Your Fish
Department: Computer Science
Project Participants: Ruth Betowski
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
We are being encouraged by physicians, the American Heart Association and other health agencies to consume more fish for health reasons. We are presented with a wide selection of fish, in fresh or frozen form, that is being shipped to all parts of the country from all over the world. We are confused by warnings of the possible presence of contaminants in certain species of fish. It is important that the consumer be guided into making an educated decision about what species of fish he or she may safely consume. This application hopes to achieve this by providing basic information on the source, nutritional value, health benefits, and cooking tips of about thirty species of fish that a consumer may find in a restaurant menu or for sale in a market. Links to relevant websites are provided to give the consumer additional information.

Time: 4:20 pm
Culinary Companion
Department: Computer Science
Project Participants: Charles Watkins
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
The idea is for a flavor profile app. This is different from a simple recipe app however -- this app is targeted at anyone who already knows what kind of dish they want (for example, a spicy chicken penne with alfredo sauce), or knows what kind of food they want (for example, Mediterranean) but wants to add other components that compliment (or replace) parts of the dish. Top chefs know these things by heart, but by bringing it into an app for the iPhone, anyone can masterfully combine flavors. This is based on the idea that certain ingredients always seem to go together -- for example, smokey fish with cheese, or rye bread with red meat. You can pick a food, and the app will list the things that taste delicious with it. Pick a spice, and you'll be matched with meats that are a perfect fit. Pick a meat or vegetable, and you'll be given the taste profile. There will also be a "Select a country" section -- this will allow you to create the taste that reminds you of a particular culture. The app will also prefer ingredients that are in season, and tell you what the season times are. It's also practical -- you can look in your fridge and choose a centerpiece. You can pull up the app to see what flavors go well with that item, and by using only the ingredients you have on-hand, you can make a delicious meal. A planned feature down the line is to select multiple items, then have the app match you with simple, common recipes you can make (and improvise with), and the app will recommend more items.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 4:30 pm
Design Solutions to Improve Pedestrian Safety on Maryland Parkway at UNLV
Department: Civil & Environmental Engineering and Construction
Project Participants: Patrick H. Mlay and Kaleegziabeher Aragaw
Instructor: Dr. Barbara Luke
Faculty Advisors: Dr. Mohamed Kaseko and Dr. Alexander Paz
Technical Advisors: Mr. David C Swallow (PE) Director of Engineering Services, RTC, Mr. Matt Kreuz – Product Consultant (Paver Patch LLC)

Abstract:
Las Vegas is well known for its smooth and wide roads, which are engineered primarily to facilitate optimal traffic flow. However, studies have shown that Las Vegas is one of the leading cities in the country for pedestrian fatalities. Since walking remains a fundamental mode of pedestrian mobility-we all walk at some point in our daily routine, there is an urgent and serious need to design and develop infrastructure that fosters safe and user-friendly environment for pedestrians.

According to the Nevada Department of Transportation's mission statement, every life matters and thus NDOT aims for "zero fatality" in pedestrian and motor vehicle safety. Although daunting, this goal is attainable if we put people's safety first when designing our infrastructures.

It is in this regard that KAPA evaluated the pedestrian safety at the cross-walk between Harmon Avenue and University Road on Maryland Parkway, and are proposing an alternative design that will enhance pedestrian safety and at the same time reduce traffic delays on that section of Maryland Parkway. This cross-walk ties UNLV to restaurants, consumer services and other key amenities that are across the street and generates a lot of pedestrian traffic.

The proposed design will incorporate a pedestrian signal light on the cross walk that will coordinate with existing traffic lights along the corridor to foster a pedestrian and motor vehicle system which is safer and in line with NDOT's "zero fatality" mission.

Left to Right: Pat Mlay & Kalee Aragaw

Crosswalk of interest, on the scene vehicles fails to stop before the stop line.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 4:45 pm
Brake Cooling Rebel Rims
Department: Mechanical Engineering
Project Participants: Brittany Wheeler, Stephanie Ross, and Dustin Hart
Instructor: Dr. Zhiyong Wang
Faculty Advisor: Brendan O'Toole

Abstract:
An automobile braking system relies exclusively on a great amount of friction to stop a moving vehicle. This friction can generate enough heat to warp brake rotors and boil brake fluid, ultimately causing the entire system to fail. Our Brake Cooling Racing Rims are designed to provide increased cooling to the brake pads, rotors, and calipers on any racing or commercial vehicle. This is accomplished by integrating a fan blade design into the spokes of an ordinary car wheel in order to trap and edirect additional ambient temperature air toward the breaking system. This forced induction system should provide increased air convection within the wheel, thus decreasing brake temperature more rapidly. From our extensive testing of 2 scale models of 2 unique designs we proved that our integrated fan design does in fact redirect a significant amount of the air flowing over the rim into the brake system, and cool the brake system convincingly. Using mass and volumetric flow rate flow rate we calculated the efficiency of our system vs. the competitors. From our findings we found our rims to be 33% more efficient than the most popular alternative. Our brake cooling rims will solve any racers problem.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 5:00 pm
Instant Incentives
Department: Computer Science
Project Participants: Robert J. Gripentog
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
In the world of business, advertising is a large cost that is often associated with companies. Some strategies include coupons, or groupons in attempts to lure people into the store. However, the problem with this marketing strategy is lack of minimal time based incentives. Instant Incentives will cater to the business that decides a low traffic time of the day might need a boost as compared to other times in attempts to average out the profit per hour for the entire day. To accomplish the task of micro advertising, Instant Incentives will allow a registered business to log into a website and offer to the public discounts, or other demand boosting products to an audience that is looking for current deals. The company will choose a time for the incentive to begin, a length of an hour to several hours and after finishing the entire setup on the website the data will be added into a database. The database of current offers will be uploaded to the app during startup. Once the app has started it will have a list of current offers and the time they will expire, if an item is chosen it will bring to the user a detail of the offer and where it is located. This list will be classified by zip code, or distance from epicenter and then listed in order by time remaining.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 5:10 pm
Traffic Counter Application For Mobile Devices
Department: Computer Science
**Project Participants**: Victor Hugo Molano Paz
Instructor: Dr. Evangelos Yfantis
Faculty Advisor: Dr. E. A. Yfantis
Technical Advisor: Dr. E. A. Yfantis

Abstract:
The counts of vehicles and characteristics at signalized intersections and others transportation facilities are usually made using manual counters. These manual counters are mechanical or digital boards in which the user can record the different observations from the field. The use of these devices is usually required when more sophisticated methods are not available, such as when expensive equipment is not justified and for scholastic practices. The devise has buttons as input hardware, each with its own label. When a different procedure is required a sheet is located over the device giving it different labels. It has a small screen where the information about the data is displayed, a memory disk where the data is stored, and the most recent devices can record information using GPS. To download the information from the device it is necessary to have a wired connection directly to a computer. The idea for the application is to use all capabilities of the mobile devices such as the display, memory, touch screen, wireless access to internet, GPS and others. The application should be able to give the user the different required input methods such as buttons, and ways to collect data depending of the study or design in progress. A tool to store and process these data must be implemented and the capability to send the collected data and the GPS records

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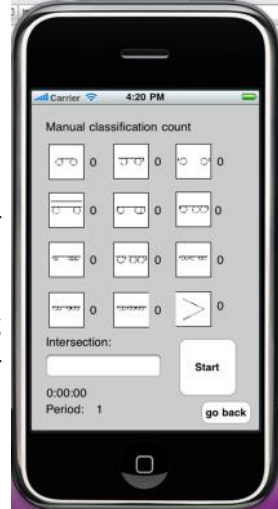
Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 5:20 pm
Jovan's Adventure
Department: Computer Science
**Project Participants**: Javier Ramos
Instructor: Dr.Yfantis

Abstract:
It has always been my life's dream to make a video game. I love retro games. I've always wanted to make a action-platformer game like Super Mario Bros. or Mega Man. So I thought to myself, "why not make one?" The basic premise is as follows. You play as Jovan. A kid who mysteriously wakes up with super powers, but doesn't remember his past. Using his the powers of the four elements (Earth, Wind, Fire, and Water), Jovan seeks to discover his past.

In my game, I want to have 8 worlds. Each world will correspond to a specific theme. Upon finishing a world, you will have to fight a boss. Doing so will unlock some back-story of the character Jovan.

To create my game, I'm using the open source engine Cocos2d. I'm also using some open source header files for the virtual joystick and buttons called Sneakyinput.
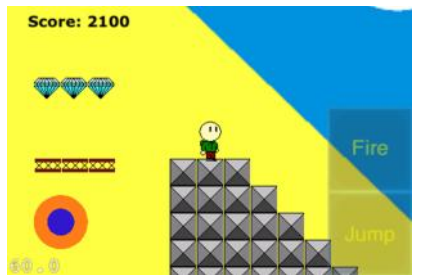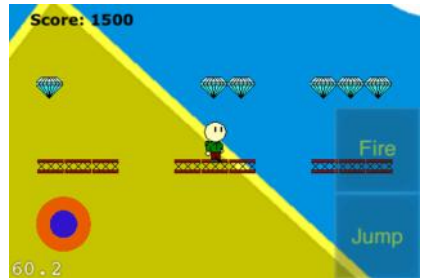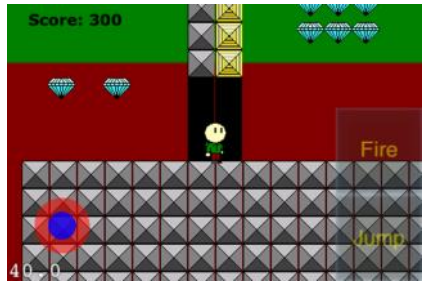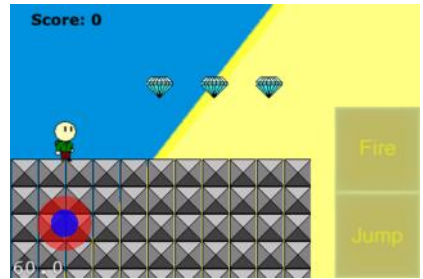
Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

Time: 5:30 pm
Pedestrian Safety on Camino Eldorado Blvd at Bent Arrow Dr. in Las Vegas
Department: Civil & Environmental Engineering and Construction
Project Participants: Negasi Gebremichael and Trung Tran
Instructor: Barbara Luke, Ph.D., P.E., D.GE
Faculty Advisor: Alexander Paz, Ph.D., P.E., Aly Said, Ph.D., P.E.
Technical Advisor: Naveen Viramisti, PhD candidate at UNLV
Community Advisor: Matt Cruez (Sustainable Hardscapes, LLC), Tesfay Nirea(American Soils, LLC)

Abstract:
Pedestrian safety enhancement measures were designed for a critical mid-block location in the city of Las Vegas. Las Vegas is one of the top ten fastest growing cities in the United States of America in the last decade (2001-2010). People move to Las Vegas from all over the world, bringing with them different behaviors of walking and driving. Reducing pedestrian-vehicle crashes is necessary for such a fast growing city, which has become the sixth most dangerous US metropolitan area in this regard, with 2.5 death rates per 100,000 population. Most of the pedestrian-vehicle crashes with fatal and severe injuries occur in midblock crossing locations. Drivers are judged to be at fault 39% of the time. We believe that pedestrian-vehicle crash fatality and severity can be reduced if drivers are well informed and alerted. The rising number of vehicle-pedestrian crashes at midblock crossing location can be mitigated through economical pedestrian safety measures. A midblock site location was selected on Camino Eldorado Blvd at Bent Arrow Drive, an area that features newly developed residences, a school and a park. This midblock location had multiple pedestrian injuries with one fatality in October 21, 2011.
The Getarm Solutions team, Negasi Gebremichael and Trung Tran, designed pedestrian safety measures that alert drivers to the presence of pedestrians on the crosswalk and thereby mitigate pedestrian-vehicle crashes. We evaluated three different alternative measures: active (raised median, rumble strip, advance warning signs); passive (stutter flashers, signs, crosswalk, and yield bar); and the do-nothing alternative.

Camino Eldorado Boulevard at Bent Arrow Drive

Team members, Negasi Gebremichael and Trung Tran at Camino Eldorado Boulevard at Bent Arrow Drive.

Senior Design Project Abstracts
Cox Pavilion
May 3, 2012

ME: First Place Winner—$1000

Time: 5:45 pm
The Self-Stirring Stove
Department: Mechanical Engineering
Project Participants: Sally Bachman, Trevor Bergstrom,
Robert Brown, and Matthew Reyburn
Instructor: Dr. Wang
Faculty Advisor: Dr. Chen

Abstract:
Everyone is glad to have a helpful hand in the kitchen. The self-stirring stove will be replacing your need to constantly check in on your food on the stove. Specialized for the gas stove top and therefore being able to use in commercial kitchens and cafeterias, the self-stirring-stove will be able to stir liquid foods like soups and gravy for you. It is a stainless-steel grate that can replace the existing grate or is already installed into the stovetop.
A small electric motor is spinning two permanent magnets directly under the pot. A magnetic stir bar is placed inside the pot. The magnetic coupling ensures the spinning of the stir bar and the food inside the pot will be stirred. One less thing to do when cooking – a true kitchen helper.
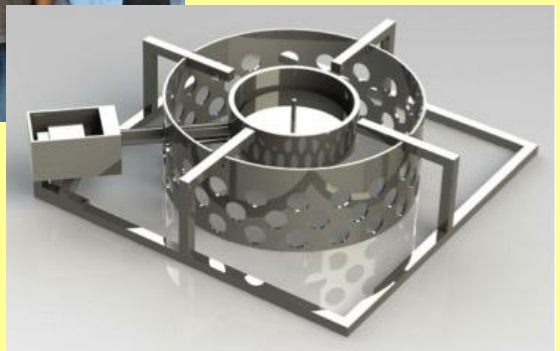
Senior Design Project Abstracts
Cox Pavilion
May 13, 2011

ECE: Second Place Winner—$500

Time: 6:00 pm
Climactic
Department: Electrical & Computer Engineering
Project Participants: Miguel B. Murillo, Sergio Flores-Castro
Instructor: Brandon Blackstone

Abstract:
Most "smart" thermostats today require programming of the thermostat through either the thermostat itself or a web interface, setting the days and times of the week they'll be at the house. Unfortunately most people don't program their thermostats either because it's too time consuming, complicated or they just forget. Also the majority don't have fixed schedules every week which means they have to constantly change the settings of their thermostat if they truly want to maximize energy savings. In addition when the person is not home, the thermostat is still running and therefore wasting energy and money. The objective of this project is to create a home thermostat control system that will be aware if the house is occupied or not. When people leave the house it will either turn off. As the person approaches his house again it will once again turn on the thermostat to the person's desired temperature when they're home. The location awareness will be accomplished through an iPhone application that will track the person's location and relay it to a server that will in turn interface with the physical thermostat turn it on or off. Additionally the programming of the thermostat is done through the iPhone application only. This will make it intuitive and extremely user friendly.

Left to Right: Miguel Murillo, Sergio Flores.