



Senior Design

10th

Anniversary

Celebrate

the spirit of innovation...

*Fall 2010 / Spring 2011
Abstracts*

Friday, May 13, 2011

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

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. A capstone to the student's educational career, the senior design project encourages the student to use everything learned in the engineering program to create a practical, real world solution to an engineering challenge.

The senior design competition helps focus the senior students in increasing the quality and potential for commercial application for their design projects. Judges from local industry evaluate the projects on innovation, commercial potential and presentation quality. One overall winner, two winners from each discipline, and one multi-disciplinary winner (when applicable) are chosen and receive cash awards with commemorative plaques and medallions.

The competition has generated significant interest from the local community, and has provided additional motivation for students to be innovative and to produce quality projects.

History

In 1999, the Entrepreneurship Club (E-Club) of the College of Engineering began sponsoring the Senior Design presentation event. The E-Club has been actively pursuing the goal of integrating entrepreneurship with engineering curriculum through seminars and facilitating senior design projects. In 2001, the E-Club conducted its first senior design competition. This opened the senior design event to Civil and Environmental, Electrical and Computer, and Mechanical Engineering students. The E-Club itself, the senior design projects and the competition all encourage students to become entrepreneurs upon graduation and contribute to the College's role in the economic diversification of the Southern Nevada area.

The Awards

Beginning in 2002, College of Engineering supporters Harriet and Fred Cox have generously provided for the Harriet and Fred Cox Engineering Design Award to be given to the top outstanding projects in the senior design competition. Ongoing support for the awards has been established by their endowment gift to the College. The founder of four corporations — Emulex Corporation, Manufacturers Capital, California Data Processors, and Microdata Corporation — Fred Cox knows the value of entrepreneurship very well, and he and his wife Harriet are delighted to support the College of Engineering and our students in this significant venture. A special dinner in the spring celebrates the students' achievements and provides their families, faculty, and the greater Las Vegas community an opportunity to share in the excitement of the students' work.

Senior Design Instructors

Dr. Paolo Ginobbi

Department of Electrical & Computer Engineering

Dr. Alexander Paz

Department of Civil & Environmental Engineering

Dr. John Wang

Department of Mechanical Engineering

Judges

**Special thanks to our
Senior Design Industry Judges:**

Igor Tsapenko

Aldec, Inc.

Wekianos Hailu

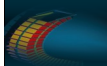
Las Vegas Water District

David Swallow

Regional Transp. Commission of Southern Nevada

Dominic Anthony Marrocco

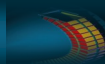
Honorary Fellow, College of Engineering



Senior Design Competition

Presentation Slot	Presentation Time	Senior Design Project Title
PRESENTATION 1	8:00 - 8:30 a.m.	Autopod
PRESENTATION 2	8:15 - 8:45 a.m.	Park & Ride
PRESENTATION 3	8:30 - 9:00 a.m.	Solar Assisted Moped (S.A.M.)
PRESENTATION 4	8:45 - 9:45 a.m.	sUAS Autopilot
PRESENTATION 5	9:00 - 9:30 a.m.	US Highway 93 Hoover Dam Bypass
PRESENTATION 6	9:15 - 9:45 a.m.	Pump Station Design for Compost Facility
PRESENTATION 7	9:30 - 10:00 a.m.	M.A.S.H. Tool
PRESENTATION 8	9:45 - 10:15 a.m.	Electric Beer Pong Table
PRESENTATION 9	10:00 - 10:30 a.m.	ERMA-X Self Navigating Rover
PRESENTATION 10	10:15 - 10:45 a.m.	Colorado River Replenishment
PRESENTATION 11	10:30 - 11:00 a.m.	Sunrise Mountain Pump Storage
PRESENTATION 12	10:45 - 11:15 a.m.	SmelloVision
PRESENTATION 13	11:00 - 11:30 a.m.	Singing in the Rain Stage Design
PRESENTATION 14	11:15 - 11:45 a.m.	Fire Alarm Notification and Detection Device
PRESENTATION 15	11:30 a.m. - Noon	Interactive Driving Simulator
PRESENTATION 16	11:45 - 12:15 p.m.	Rapid Transit Development in the Las Vegas
PRESENTATION 17	12:00 - 12:30 p.m.	Improving Traffic Congestion at US 93 S Between Buchanan Blvd. and Hoover Dam
PRESENTATION 18	12:15 - 12:45 p.m.	Nutrient Removal from Fertilizer Runoff
LUNCH	12:30 - 1:30 p.m.	LUNCH BREAK
PRESENTATION 19	1:30 - 2:00 p.m.	OPEN
PRESENTATION 20	1:45 - 2:15 p.m.	OPEN
PRESENTATION 21	2:00 - 2:30 p.m.	OPEN
PRESENTATION 22	2:15 - 2:45 p.m.	OPEN
PRESENTATION 23	2:30 - 3:00 p.m.	OPEN
PRESENTATION 24	2:45 - 3:15 p.m.	OPEN

Presentation Schedule



Department

	Mechanical Engineering
	Civil & Environmental Engineering
	Mechanical Engineering
	Electrical & Computer Engineering
	Civil & Environmental Engineering
	Civil & Environmental Engineering
	Mechanical Engineering
	Electrical & Computer Engineering
	Electrical & Computer Engineering
	Civil & Environmental Engineering
	Civil & Environmental Engineering
	Electrical & Computer Engineering
	Mechanical Engineering
	Electrical & Computer Engineering
	Civil & Environmental Engineering
Valley	Civil & Environmental Engineering
	Civil & Environmental Engineering
through Wetland Design	Civil & Environmental Engineering
LUNCH	

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 8:00am to 9:00am

The Autopod: An Improved Tripod Leveling Head

Department: Mechanical Engineering

Project Participants: Alberto Paulino & Ryan Tardy

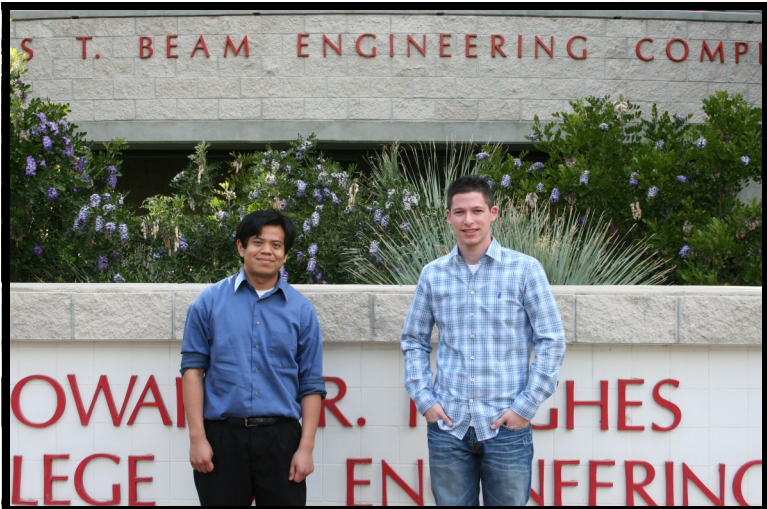
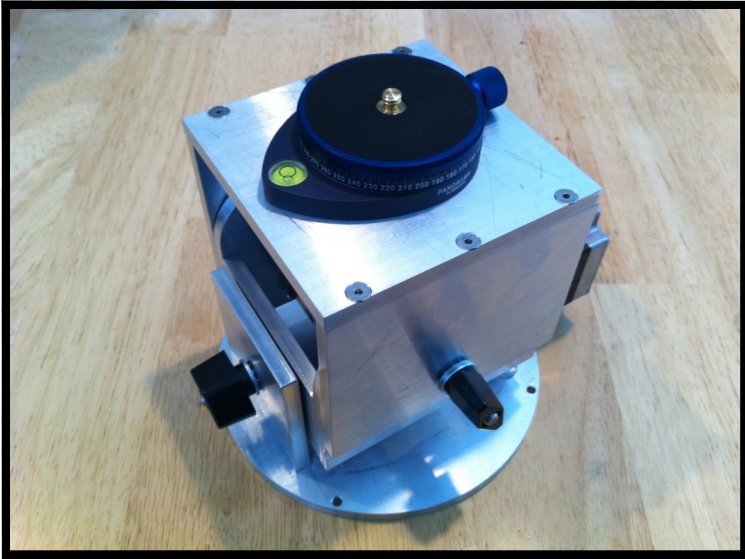
Instructor: Dr. Brendan O'Toole

Community Mentor: N/A

Abstract

During freelance work in the production industry, we noticed a need for an improved tripod leveling head. The goal of our product is to address this need by improving the currently manufactured designs. We have designed a product – the *Autopod* -- that can level itself automatically at the push of a button. Currently, the market for existing products of this nature is dominated by a small handful of companies. Our conceptual design meets the major criteria desired by our targeted consumers. The *Autopod* is designed to use two motors and a pan head in order to provide a full range of motion. This new product is a cheaper, fully functioning alternative to the over-priced products currently available.

Notes:



Students who created the *Autopod* are Alberto Paulino (left) and Ryan Tardy (right).

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 8:15am to 8:45am

Park & Ride

Department: Civil & Environmental Engineering

Project Participants: Ahmed Rouine

Instructor: Dr. Alexander Paz

Community Mentor: N/A

Abstract

Since the opening of the new Hoover Dam bypass bridge, Boulder City has witnessed an increase in traffic congestion, as well as significant backups of southbound traffic on U.S. 93. The traffic backs up from Buchanan Boulevard to the Hacienda Casino, which is a 4.8-mile stretch of highway. The team's approach to this problem is to reduce the demand of vehicles rather than increase the capacity by adding another lane to the U.S. 93 southbound. The first step in this plan to alleviate traffic congestion is to create a "Park and Ride" for cars that are going to visit the Hoover Dam. This will help minimize the number of cars driving on U.S. 93 towards the dam, and the traffic congestion will be minimized by 10%-25%. Signs will be placed 500 feet apart at various intervals on the U.S. 93 prior to the garage to alert visitors of the option to park and ride. If they choose not to utilize the "Park and Ride," there will be an extra fee at the dam for their entrance. At the park and ride cars will be asked to pay a fee less than the fee at the dam, and a shuttle bus will pick them up and transport them to the dam.

Notes:



Ahmed Rouine

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 8:30am to 9:00am

Solar Assisted Moped (S.A.M.)

Department: Mechanical Engineering

Project Participants: Jorge Arroyo, Brian Magann, & Jeremy Stern

Instructor: Dr. Zhiyong (John) Wang

Technical Advisor: Dr. Robert Boehm

Abstract

S.A.M. is an innovative project that utilizes “green” energy to increase the efficiency of an electric moped. This prototype provides convenience to the consumer, allowing riders to travel further throughout their communities. One of the greatest benefits associated with this design is its’ simplicity and ease of usage. Once parked just slide the panels out, lock them in place, and go! The design itself integrates lightweight metals, high efficiency solar panels, and responsive regulatory controls to achieve a quality charge. This system was constructed for the batteries to be charged while the moped is parked, and the driver is at work or school; thereby exposing the solar panels to the peak charge hours each day. Essentially, the driver may leave with a low battery and return to a charged moped. The final product pioneers into the field of solar powered travel, providing a safe and effective source of travel for the consumer.

Notes:



Jorge Arroyo, Brian Magann, and Jeremy Stern

Senior Design Project Abstracts

Cox Pavilion
May 13, 2011

Time: 8:45am to 9:15am

sUAS Autopilot

Department: Electrical & Computer Engineering

Project Participants: Kyle Comstock, Eric Gebbs, & Joseph Wolf

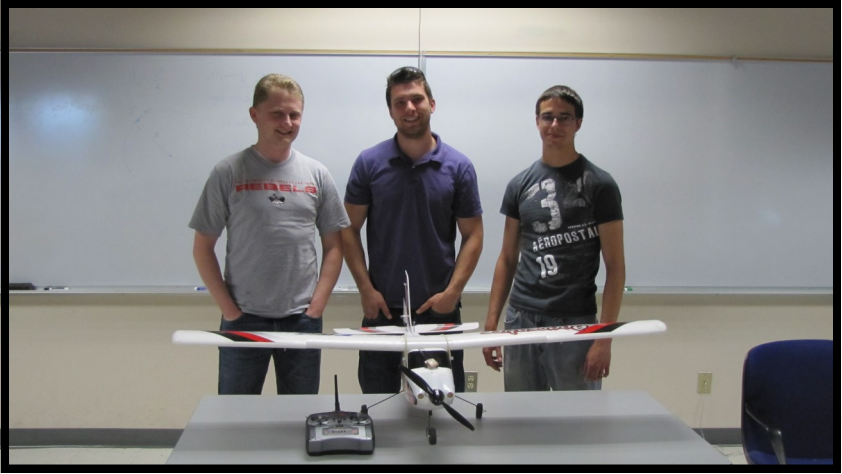
Instructor: Dr. Paolo Ginobbi

Technical Advisor: Dr. Yingtao Jiang

Abstract

A small unmanned autonomous aviation system, or sUAS, is a plane that has the capability to fly steadily under its own control. The need for these small unmanned and autonomous airplanes is great in the military and in various research fields. Accordingly there is a need for a simple and functional package to retrofit existing remote controlled airplanes to make them autonomous. The immediate objective of this research is to design and build an autopilot for an existing hobbyist RC airplane. This platform will be portable to many different air frames, small, light, and inexpensive.

Notes:



From left to right it is Eric Gebs, Kyle Comstock, Joseph Wolf

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 9:00am to 9:30am

US 93 Highway Improvement Project – Buchanan Blvd. to Hoover Dam Bypass Bridge

Department: Civil & Environmental Engineering

Project Participants: Joe Runyan, Alfredo Zamorano, J Johnson, & Michael Schwab

Instructor: Dr. Alexander Paz

Technical Advisor: Dr. Mohamed Kaseko

Community Advisor: Chad Halverson, P.E., VTN Nevada

Abstract

The US 93 Highway is a major artery in the nation's highway system connecting western states such as Montana, Idaho, Nevada, and Arizona, as well as Canada and Mexico. Beginning in October 2010, the US 93 added a major improvement with the completion of the Hoover Dam Bypass Bridge. This new bridge allowed more traffic to run between Arizona and Nevada via the US 93. However, the section of US 93 Highway from the intersection of Buchanan Boulevard-Nevada Way in Boulder City, Nevada to the completed Hoover Dam Bypass Bridge is inadequate to handle the new traffic loads. The increase traffic volume has caused significant traffic delays and caused many complaints from the residents of Boulder City, Nevada. This project addresses the problem of traffic congestion on the US 93 from Buchanan Boulevard to the Hoover Dam Bypass Bridge by improving the level of service for the roadway and by designing a welcome center to allow travelers to enjoy the scenic view of Lake Mead. Traffic will flow smoothly and the economy of Boulder City, Nevada will still receive traffic volumes that will sustain businesses in the community by increasing vehicle capacity on the roadway.

Notes:



Joe Runyan, Michael Schwab, Alfredo Zamorano, J Johnson

Senior Design Project Abstracts

Cox Pavilion
May 13, 2011

Time: 9:15am to 9:45am

Pump Station Design for Compost Facility

Department: Civil & Environmental Engineering

Project Participants: Richard Turkson, Borhan Moradi, & Jarrett Habu

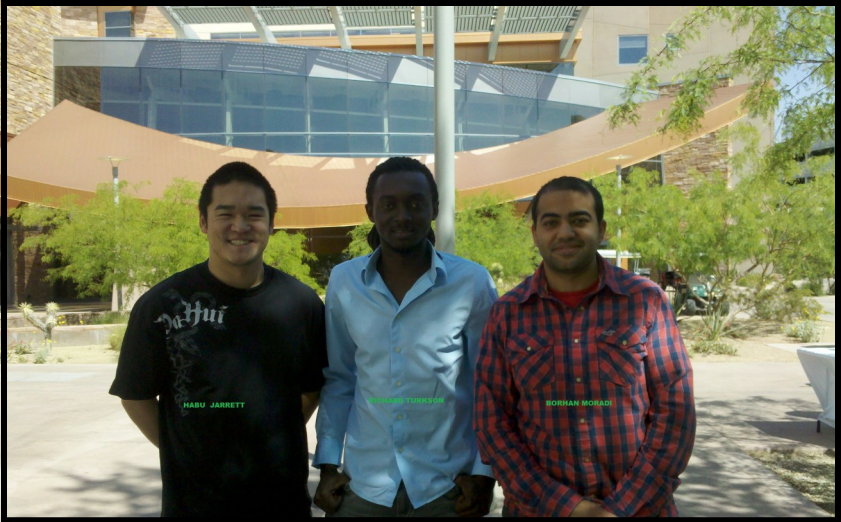
Instructor: Dr. Alexander Paz

Faculty Advisor: Dr. Ahmed Sajjadd, Dr. Karakouzian, Dr. Thomas Piechota, Mr. Jeff Jensen

Abstract

Water scarcity has become a tremendous concern in the Las Vegas Valley as water levels in Lake Mead continue to drop. A strain has been put on the limited potable water for consumption. Nevadans tap into the potable water for consumption and for other purposes such as irrigation, plant and tree cultivation, compost, and recycling to provide a sustainable environment for a better quality of living. The Innovative Sustainable Design Team (I.S.D.) is going to help alleviate some of the strain on the limited potable water by tapping into the shallow groundwater supply and using it for a compost facility. Others can use the shallow groundwater for a variety of things such as providing a source for irrigation or other industrial applications. Each of these uses will help to alleviate the strain placed on the potable water supply. The parcel of land that has been chosen for the project is located on Reno Avenue and Lamb Boulevard. It is 6.86 acres and has a shallow groundwater table located at a depth of 12 ft. to 20 ft. from the surface. Two pumps will be used at a depth of 24 ft. to 30 ft. from the surface with a 4” inch diameter pipeline to convey water from the ground to the 4000 gallon reservoir for compost usage.

Notes:



Habu Jarrett, Richard Turkson, Borhan Moradi

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 9:30am to 10:00am

M.A.S.H. (Manually Actuated Spring Hammer) Tool

Department: Mechanical Engineering

Project Participants: Jeremy Lusk, Nic Smith, & Travis Zeller

Instructor: Dr. Woosoon Yim

Faculty Advisor: Mr. Kevin Nelson

Abstract

Existing digging bars and tamping tools are tiring, require a lot of energy directly from the user, and therefore are only as effective as the user. Jackhammers and other demolition tools can be expensive, starting in the \$1000+ price range. The primary demographic for our product would be small businesses and homeowners with small-scale landscaping needs and budget.

The basic concept of the M.A.S.H. Tool is similar to a spring loaded center punch used to make an indentation in metal or wood. Our design will be much like a center-hole punch, but on a much larger scale and with a very different function and different mechanics. When force is applied downward by means of a foot pedal, a spring is compressed. When the tool reaches a specified point, the spring is released, driving an impactor and transferring the energy through the tip to the ground. A second mode allows for repetitive motion with less force.

The M.A.S.H. Tool can produce better results than existing digging bars while exacting less energy from the user. It has many uses in the private sector, where the cost of hydraulic or pneumatic machinery is too expensive for the casual use needed by the consumer. It will have multiple attachments, depending on the need of the tool at the time, and two modes of operation, where the user either can compact dirt or else break through rock or concrete. These features make it versatile and useable for a wide range of needs.

Notes:



Manually Actuated Spring
Hammer (MASH) Tool



Jeremy Lusk, Nic Smith, Travis Zeller

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 9:45am to 10:15am

Electric Beer Pong Table

Department: Electrical & Computer Engineering

Project Participants: Jake Agaran, Gerold Agustin, John Chen, & Thad Fuji

Instructor: Dr. Paolo Ginobbi

Faculty Advisor: Dr. Paolo Ginobbi

Abstract

Beer Pong is a game that is well known among all college students. Being college students enrolled in the Electrical and Computer Engineering program, we decided to add electrical components to the game and build an electronic *Beer Pong* table. Our main objective is to create a way to detect a ball using load cells to indicate changes in voltage if the ball is made into the cup. To detect the ball and hand, we implemented infrared (IR) beams using IR detectors and IR LEDs that will detect when a player passes the table before taking their shot. We expect this will bring a new excitement to the game of beer pong.

Notes:



Right to Left: Thad Fuji, Gerold Agustin, John Chen, & Jake Agaran

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 10:00am to 10:30am

ERMA-X Self Navigating Rover

Department: Electrical & Computer Engineering

Project Participants: Anabell Shimono, Joseph Javier, & Tam Kim

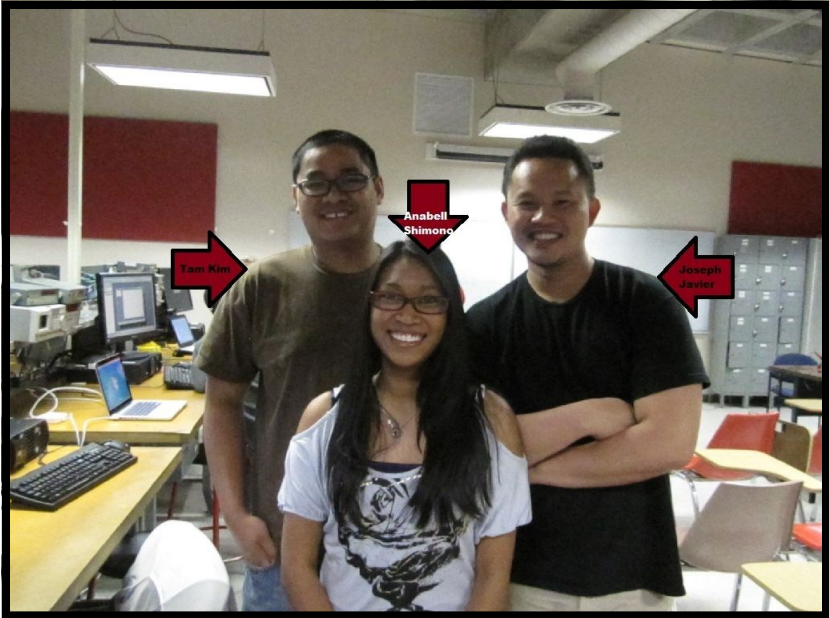
Instructor: Dr. Paolo Ginobbi

Faculty Advisor: Dr. Venkatasen Muthukumar

Abstract

The goal of our project is to design and build a small rover that will be able to go from point A to point B without receiving any input from the user. To determine where point B is, beacon sensors comprised of infrared (IR) sensors are attached to the rover and also to the final destination. When the rover beacon scans for the destination beacon, it checks which direction is outputting a voltage LOW. Once that voltage LOW is found, the rover moves towards that direction. If a LOW is not found, the rover will continue to move around while it constantly scans for the beacon until it is found. We are using three Ultrasonic sensors to determine the distance between the rover and an object. If the front sensor reads that there is no object obstructing its path, the rover will continue to move forward. If an object is detected within 6 inches of the rover, it will check its side sensors and turn to move around the object. If all three sensors are blocked, the rover will do a 180 degree turn and continue to move accordingly. Once the rover has reached its destination, it will do a 180 degree turn and adjusts its motors to output LOW with a long delay.

Notes:



Tam Kim, Anabell Shimono, & Joseph Javier

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 10:15am to 10:45am

Colorado River Replenishment: Securing Water for the West

Department: Civil & Environmental Engineering

Project Participants: Blake Gonska, Barry Bender, & Daisy Madrigal

Instructor: Dr. Alexander Paz

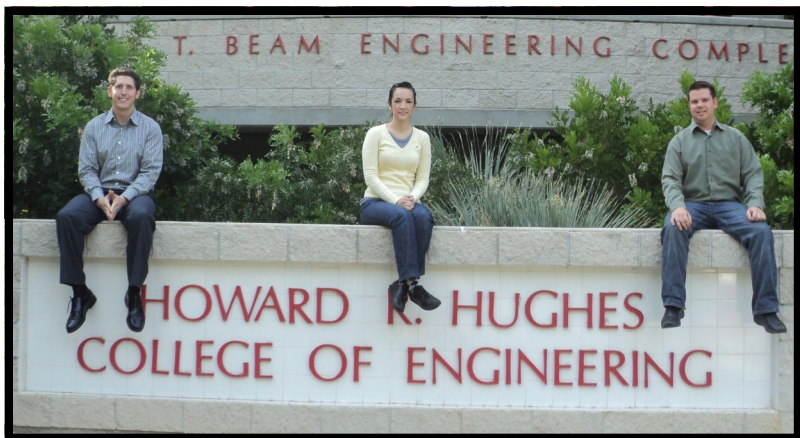
Faculty Advisor: Dr. Thomas Piechota

Abstract

The Colorado River Basin, which includes seven states (Wyoming, Utah, Colorado, New Mexico, Nevada, Arizona, and California), is the main source of water for major population and economic centers throughout the Southwest. Many reservoirs along the Colorado River have enabled city and state populations to sustain themselves per withdrawal limits established by "The Law of the River," a series of compacts made many years ago. Although the West has been facing persistent drought conditions for the last 10 years, many scientists are proposing that the West is not merely facing an extended drought, but rather a climate shift, in which future normal precipitation is expected to be far less than historical averages. With the river system already over-taxed due to the fact that the amount of water allocated by the Law of the River is typically 1 to 2 million acre feet more than what the river delivers, a solution to providing better water security to the southwest is needed.

We propose a plan to transfer water from the Lake Superior Basin to the Flaming Gorge Reservoir by means of a pipeline system. The Green River would be utilized to transport this additional water to the Colorado River. This would provide for a better way to manage reservoir levels and also allow for a larger buffer of water security along the river system. In this study, we will show our analysis reflecting the rationale for such a project as well as the implications associated with such a program. Furthermore, we will show an analysis determining an efficient pipeline route, pipeline sizing, pump characteristics, and pump station location as well as energy generation at the final discharge into the Flaming Gorge Reservoir. Obstacles for a project such as this are identified and addressed as best as possibly could be done without performing site visits, laboratory testing, or political debates.

Notes:



Blake Gonska, Daisy Madrigal, and Barry Bender

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 10:30am to 11:00am

Sunrise Mountain Pump Storage

Department: Civil & Environmental Engineering

Project Participants: Johnesha Inman, Efraim Bajizan, & Shauncy Maloy

Instructor: Dr. Alexander Paz

Faculty Advisor: Dr. Thomas Piechota

Abstract

An abundance of sunshine makes Las Vegas the ideal location for solar power plants. Although the idea of capturing the power of the sun in order to support homes and industry sounds advantageous, it does not come without drawbacks. The obvious problem with solar is that when the sun is not shining, power is not being generated. Inconsistencies result from power shortages on the grid caused by cloud cover over a solar power station. These inconsistencies cause generation to increase and decrease at a faster rate that can be countered by traditional fossil fuel power generation. In the past these inconsistencies were merely nuisances, but as more solar plants are being developed and power companies rely more on solar power, new ideas for generating green renewable energy need to be developed. Pump Storage, also called pumped hydro, which converts potential energy into electrical energy, is one solution to this problem. Because pumped hydro can be turned on and off quickly it can also be used to counter inconsistencies in solar energy. Pump hydro is a system that uses cheap electricity at night to pump water to an upper reservoir and releases that water through turbines in the middle of the day when electricity is expensive. The difference in the cost of the electricity is greater than the energy losses in the system.

Notes:



Efraim Barizan, Johnesha Inman, & Shauncy Maloy

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 10:45am to 11:15am

Smell-O-Vision – Synchronized Odor Mixing System

Department: Electrical & Computer Engineering

Project Participants: Charbel Azzi, Steven Correia, & Jorge Reynaga

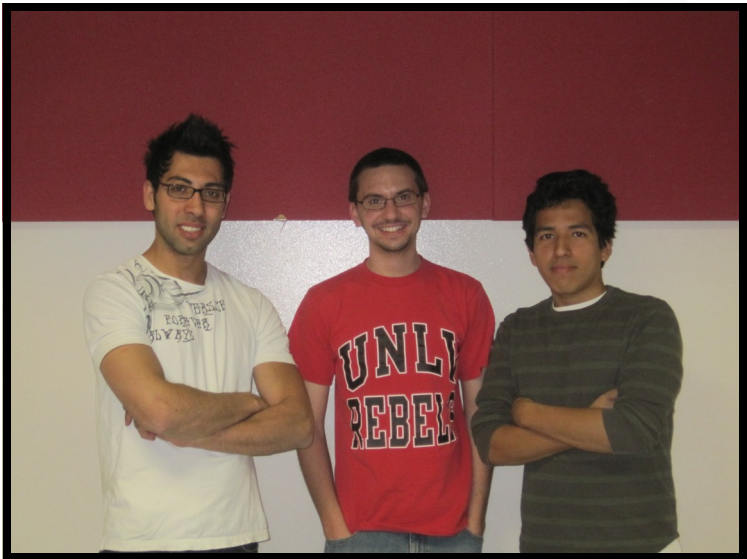
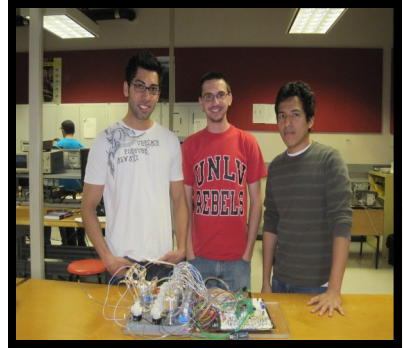
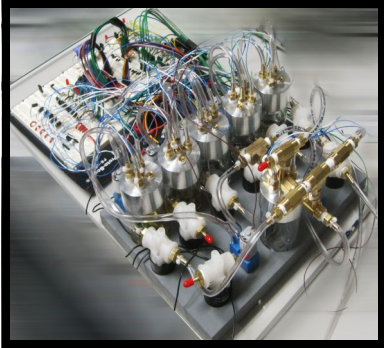
Instructor: Dr. Paolo Ginobbi

Faculty Advisor: Dr. Rama Venkat

Abstract

The concept of “Smell-O-Vision” dates back to 1916 during the broadcast of the Rose Bowl, where the scent of rose oil was dispersed among a theater in Pennsylvania. Several research studies have been carried out about this technology, but a functional product has never been developed or realized. This idea has ignited our curiosity to develop a functional system to that uses modern technology to accomplish this “myth”. We developed a fully functional prototype of the Smell-O-Vision system. Scented oils contained in glass jars are heated until a cloudy vapor is created. Miniature air pumps and solenoid valves are used to propagate and contain the scented vapor within the system. An Apple iPod Touch is used to communicate over a Wi-Fi network to send serial messages to the microcontroller to release each of the above aromas and combinations of aromas. This system provides the user with a variety of applications of use, ranging from use in movie theaters, to advertisement and marketing and even to aromatherapy.

Notes:



Charbel Azzi, Steven Correia, & Jorge Reynaga

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 11:00am to 11:30am

Rain Maker and Stage Design

Department: Mechanical Engineering

Project Participants: Eskender Kebede, Valerie Lalonde, & Cody Wright

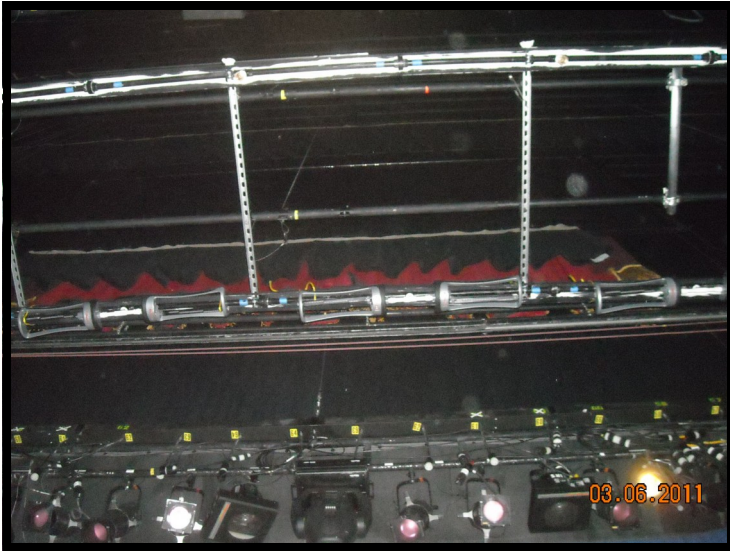
Instructor: Dr. Zhiyong (John) Wang

Community Advisor: Mr. Paul Villaluz

Abstract

"Singing in the Rain" is one of the most beloved musicals of all time, and is no easy feat to recapture on a live stage. However, Signature Productions has taken on this arduous task, and our group has been in charge of creating the rain for the production's most iconic scene. The rain starts in a 9' by 2'8" rectangular water tank made from wood and pond liner, placed underneath the rain deck. The water here is maintained by heaters, filters, and pool chemicals to keep it safe. A dual-pump system sends the water through short PVC sections and hoses to two separate lines; one to a "water spout" during the Singing in the Rain scene for the actor to perform under, while the other main line directs water to our raining apparatus. Made of PVC pipe and unions as well as an array of sprinklers, our rain apparatus is fully customizable to fit the needs of any theater. Unions are used to be able to change the length of the pipes, and therefore control the area of water coverage. The sprinklers can be (and many times have been) changed out to suit aesthetic needs of the production staff, ranging from different lawn sprinklers to hand-made "rain-sticks" created by drilling holes in half-inch PVC pipe. The rain falls onto the rain deck, a two piece, three tiered wooden deck placed on the stage and painted with waterproof roofing paint. The deck also acts as the drainage system, having a slope of just over 2 degrees to send the water into a drainage gutter at the back of the bottom piece, and thus directing the water back into the holding tank to complete the closed system. Using our system, Signature Productions has been able successfully present one of its most difficult undertaking with astounding success and share this amazing musical experience with many an audience. What a wonderful feeling, indeed.

Notes:



Eskender Kebede, Valerie Lalonde, & Cody Wright

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 11:15am to 11:45am

Fire Alarm Notification and Detection Device

Department: Electrical & Computer Engineering

Project Participants: Ezra Hartz, Ryan Peeples, & Hamid Moradi

Instructor: Dr. Paolo Ginobbi

Faculty Advisor: Dr. Paolo Ginobbi

Abstract

The purpose behind our device was to provide cheaper and more complete fire emergency notification to the deaf, children and the hard of hearing. The device accomplishes its purpose with the following features:

Utilizes the lights that people already have in their home to provide notification. Lights are regularly used in residential homes and kept in proper working order, making them a cheap and yet reliable notification source.

Designing our device to provide additional services that a non-deaf or hard of hearing person would use. Our device will send out a text message to a maximum of 7 phone numbers after a smoke or heat detector goes off. The device will notify the owner and others by text message. This provides a service that is similar to ADT that would allow people to monitor their home while away, and additionally notify neighbors that may be home that could check on their house for them. By providing features that benefit all people in addition to the deaf and hard of hearing, we can create more demand for the device that should allow the price of the device to be less than if it was only designed for visual and physical notification.

Notes:



Ezra Hartz, Ryan Peebles, & Hamid Moradi

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 11:30am to 12:00pm

Interactive Driving Simulator: A Study of Safety and Awareness

Department: Civil & Environmental Engineering

Project Participants: Anjero Asprer, Anthony Todechiney, James Cordova, & Jason Hargreaves

Instructor: Dr. Alexander Paz

Abstract

The purpose of this design project was to study the reactions of drivers as they were confronted with real life situations as modeled in a SimCraft driving simulator. The project focused mainly on collisions incurred while driving distracted and also whether or not crosswalks contribute to the cause of accidents. The methodology used was the gathering of basic geometric, vehicular, and pedestrian data at all major intersections to model a realistic simulation of Maryland Parkway. The section of roadway that was modeled is the stretch of Maryland Parkway located between Flamingo Road and Tropicana Avenue. The geometric data were gathered using a combination of Google Earth and a wheel measure. The pedestrian and vehicular data were observed and recorded manually. The help of a video recorder was employed to help manage the large volume of vehicular data and aid accuracy. Data were captured for two hours beginning at 12:00 pm, when the most UNLV classes were in session (Monday-Thursday). The normal distribution was found for each particular data set and was programmed into the simulator. Test subjects of different backgrounds and ages then tested the simulation and their behavior frequency of crashes were observed and recorded. A statistical analysis was then performed to find the normal distribution.

Notes:



Jason Hargreaves, Anthony Todechiney, James Cordova,
& Anjero Asprer

Senior Design Project Abstracts

Cox Pavilion
May 13, 2011

Time: 11:45am to 12:15pm

Development of Rapid Transit for the Las Vegas Valley

Department: Civil & Environmental Engineering

Project Participants: Dustin Johnson, Anthony Boghos, & Jacoub Hanna

Instructor: Dr. Alexander Paz

Faculty Advisor: Dr. Mohamed Kaseko & Dr. Alexander Paz

Abstract

The Regional Transportation Commission (RTC) has provided mass transit for residents and visitors of southern Nevada since 1983. Although the system has enjoyed a great deal of success, some neighborhoods within the Las Vegas Valley are grossly under served. To help find ways to enhance service and increase ridership of the Citizens Area Transit (CAT) system, we developed bus rapid transit routes to connect Henderson and Centennial Hills to the Las Vegas Strip resort corridor. The new routes would feature dedicated bus lanes in congested corridors, less frequent stops, and level boarding. In order to better estimate the success of the proposed routes, a survey was created and conducted at multiple locations near the proposed routes. The survey data, combined with population and employment characteristics, were used to predict ridership of each proposed route. The final recommendations will make public transportation a more competitive and attractive alternative to valley residents.

Notes:

No Graph or Picture Available

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 12:00pm to 12:30pm

Improving Traffic Congestion at US 93 South Between Buchanan Blvd. and Hoover Dam Interchange

Department: Civil & Environmental Engineering

Project Participants: Karina Barragan & Rahel Shibeshi

Instructor: Dr. Alexander Paz

Faculty Advisor: Dr. Mohamed Kaseko

Community Advisor: Mr. Bryan Osborn

Abstract

Traffic volume has increased since the opening of the O'Callaghan-Tillman Memorial Bridge that leads to Arizona. The new bridge over the Hoover Dam was built with the hopes of making travel easier for drivers, but for people in Boulder City, it is causing some traffic headaches. The one lane which carries traffic from the main Buchanan Blvd. intersection in Boulder City over a 4.9-mile stretch of highway leading to expanded two lane travels just beyond the Hacienda Casino, near the approach to the new bridge is not enough to accommodate all the traffic. In order to improve the traffic congestion problem at US 93 South a parking lot will be constructed in Boulder City on US 93 and Madrone St. Synchro/SimTraffic will be used to analyze the traffic before and after the parking lot to estimate the percentage of improvement in delay, fuel usage, travel time and emissions. As a result, the parking lot reduces the traffic congestion problem at US 93 South and also helps the economy at the City of Boulder City by creating jobs for customer service and bus driver.

Notes:



Karina Barragan & Rahel Shibeshi

Senior Design Project Abstracts

Cox Pavilion

May 13, 2011

Time: 12:15pm to 12:45pm

Nutrient Removal from Fertilizer Runoff through Wetland Design

Department: Civil & Environmental Engineering

Project Participants: Nastaran Afnani, Adam Ballesteros, Caitlyn Bennett & Christina Wilson

Instructor: Dr. Alexander Paz-Cruz

Faculty Advisor: Dr. Sajjad Ahmad

Community Advisor: N/A

Abstract

Hypoxia is a term that refers to an area of water where an algal bloom has occurred and microbial bacteria consume the algae, depleting the oxygen levels in the water. This phenomena results in the destruction of marine life that cannot survive in the oxygen depleted conditions. Algal blooms are created from excess nutrients being present in the water and the Gulf of Mexico is one of the largest in the world. The main contributor to high nutrient concentrations in water supply to the Gulf is runoff from farms along the Mississippi and its inlets. Fertilizer is the main culprit to the problem along with non-conservative fertilizer application methods due to the lack of regulation on runoff concentrations. A proposed solution can be constructed near a farm that would have the effluent pass through a series of channels, lined with a geo-membrane to prevent leaks, to a wetland that would naturally filter out the high concentrations of nutrients. This natural solution would need to be constructed out of pocket for farmers due to regulations being set in place or by governmental funding based upon concentration levels by state. The overall cost of the project would be construction costs, materials for channels/wetland (plants and liners) and maintenance costs (annually).

Notes:



Bottom left: Caitlyn Bennett
Bottom center: Nastaran Afnani
Top center: Adam Ballesteros
Bottom right: Christina Wilson

Award Winners

Will be announced
At the dinner on May 13, 2011

Congratulations on your achievement.

We look forward to seeing
you at the
10th Annual Senior Design Dinner

Cox Pavilion
5:30 p.m. - 9:00 p.m.

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