

## Samé Polytechnic Solomon Ives & Jon Bassignani

Samé Polytechnic is the design-build project of a secondary school campus for 1000 students located in the District of Samé, Tanzania; East Africa. Our contribution to Samé Polytechnic includes researching site information and background, local building materials, and confined masonry as a construction method, and presenting the findings of this research for future structural engineering. The Schematic Design for the Christian Faith Halls, which are a part of the Religious Center in the project, is also included.



A Lab  
12:00  
Baltimore

## Mode Frequencies and Shapes of a Structure Kanger Shum

My senior project contains of two parts: the experiments and the modeling. For the experiment, a sinusoidal forcing function at a certain frequency, provided by a mechanical oscillating "shaker", is applied to the new CM building. While the building is vibrating, I take a measurement of the amplitude of acceleration corresponding to the same frequency and mode frequencies are found at local maximums. The mode frequencies have corresponding mode shapes and are found using the accelerations and displacements. The building is modeled in ETABS and analyzed to find mode frequencies and mode shapes. The results are compared to the experimental results.

E Lab  
12:00  
Archer/  
McDaniel

## Dynamic Loading of Pedestrian Bridges Yvonne Tsui & Whitney Woods

We studied and modeled three different bridges in San Luis Obispo County in order to understand their dynamic responses due to pedestrian loadings. By modeling our bridges on RISA, we were able to compare the actual strength and serviceability of these bridges to design specifications. The end goal is to determine the serviceability (how safe people feel) on each bridge



E Lab  
12:30  
Archer/  
Neuenhofer

## Connections: An Experiment in Design and Construction Brent Griffis & Joe Nunneley

A collaborative design project between ARCE and Landscape Architecture students to design and construct a concrete shade structure in Poly Canyon. The structure is a 14 ft. pre-cast concrete dish cantilevering out at 35 degrees off vertical. The mix design experiments with high volume fly ash, silica fume and high-density polypropylene (HDPP) additives. The project was focused on constructibility of a unique structure.



D Lab  
1:30  
Dong

## Collaborated Design Studio: School for the Performing Arts Chris Brazell, Mimi Le, Martin Cortez, Christina Ward, Loren Galarza, Angel Chan, Torrey Dickinson, & David Carmona

Our senior project was part of this year's ACSA/AISC Steel Competition. This competition was done as part of a collaborative design studio with ARCH and ARCE students. All four groups will have a representative from each group to share their experience of the class and project. The scope of the project for this competition was to develop a high school for the performing arts located on Deck Park in Phoenix, Arizona.

D Lab  
2:00  
Dong

## Rigid vs. Flexible Tim Beemer & Ryan Young

A comparative analysis between rigid and flexible diaphragms on a load bearing cold-formed steel hotel. Included in the analysis is a comparison between the 2006 International Building Code and the 1997 Uniform Building Code.

E Lab  
2:30  
Nuttall



# Senior Project Conference



June 4, 2009  
12:00-3:00PM

## Stick Structure Renovation

**Alex Barnes, Katie Blaesser,  
Chase Helgenberger, Justin Porter,  
& Blake Roskelley**

A resurrection of one of the major components of Cal Poly Canyon, this project strove to recreate a life size structural stability model for use by future generations of CAED students. From the basics of maintaining load flow during disassembly to complete foundation retrofits, the trials and tribulations of revitalizing a 32-year-old structure proved plentiful and sometimes disastrous, but no complication went without a solution. Once reconstruction was completed, the structure underwent excitation tests which were compared to computer modeled deformations and accelerations, maintaining the classic approach of



B Lab  
12:30  
Lynn &  
McDaniel

## Post-Tensioned Concrete vs. Regular Reinforced Concrete

**Christina Cieri**

The project includes the construction of examples simpson strong tie connections along with the display of actual wood framed construction techniques and materials used today.

E Lab  
2:00  
Laursen

## The Structure of a Story

**Margaux Burkholder & James Nunno**

This project explores the development of a storytelling framework including the story of a famous engineer, a hands-on activity for exploring a related engineering idea and reinforcement of standard math and science curriculum and assessment of the effectiveness of the storytelling medium to teach and inspire young students. Storytelling principles and scholarly materials on interesting figures in engineering are used to construct the stories. The story is followed by the hands-on activity to support the engineering concept. A pre- and post-story test are used to assess the effectiveness of the story and activity to learn about what engineers do, and the specific engineering idea.



A Lab  
2:30  
Brady &  
Saliklis

## 2009 Undergraduate Seismic Design Competition

**Alan Tonissen, Joe Thompson, &  
Eduardo Lopez**

Design and build of a 5 ft. balsa wood structure built at a 72:1 scale to resist earthquake testing. Analysis performed to achieve the optimal lateral frame configuration and predict the building response. Competition performance based upon the building response to Kobe, Northridge and El Centro earthquakes. Cal Poly placed first out of 18 participating teams nationwide.



B Lab  
12:00  
Lynn

## Career for ARCE's

**Jacleen Webber & Melissa Humber**

Our project profiles the many career paths an ARCE can enter upon graduation. By interviewing industry professionals in architecture, engineering and construction, we have created profiles about the day-to-day life of these careers, along with their place within the overall industry. We plan on introducing interested students to these profiles through the ARCE website and Open House.

E Lab  
1:00  
Brady

## Development of Long Span Bamboo Trusses

**Lucas Hogan**

As the world population continues to grow, the need for new building structures, especially those with long spans, is consuming our natural resources at an ever increasing rate. In response to this depletion of resources, the design community is utilizing new and creative construction techniques and materials to alleviate the pressure on our current resources. One such solution is the use of bamboo in long span trusses. This paper details ongoing research to facilitate practical, low tech, inexpensive long span bamboo trusses.



B Lab  
1:30  
Archer

## Hearst Chalet As-Built

**Scott Mosbacher**

This project involved the formulation of structural calculations and drawings for a chalet located just south of Mt. Shasta. The chalet is owned by the Hearst family and was designed by Julia Morgan who oversaw its construction in the 1930's. The Hearst family wanted to re-model the interior of the structure, but in order to do so they needed a set of as-built structural drawings. The project involved several site visits to fully determine the skeleton of the building and to trace its load path to the ground.



D Lab  
12:00  
Mwangi

## Cal Poly National Timber Bridge Design Competition Team

**Jonathan Rivera, Martin Guzman,  
& Eric McNeely**

Cal Poly's first entry into the National Timber Bridge Design Competition. The Team's goal was to design an aesthetically pleasing bridge that minimized deflection. This was achieved through the use of an arched glue laminated truss. The design was modeled in Risa, tested on a 1/6th scale, and then tested on a single full scale practice truss. The full bridge was then constructed and tested under a static load of 20kn, or 4500lbs for the duration of an hour. Deflections were taken at the midspan at fifteen minute increments, which were submitted along with a report to the judging body.



B Lab  
12:00  
Lynn

## The Camilo Ortega Medical Clinic

**Brendan McNiff**

Camilo Ortega is a community in Nicaragua that is short on not only food and adequate living conditions, but medical aid as well. Our project was to design a medical clinic to be built in Camilo Ortega later this year, to establish more stable and reliable medical attention



D Lab  
1:00  
Mwangi