

5th Annual Elizabethtown College Sustainability Symposium

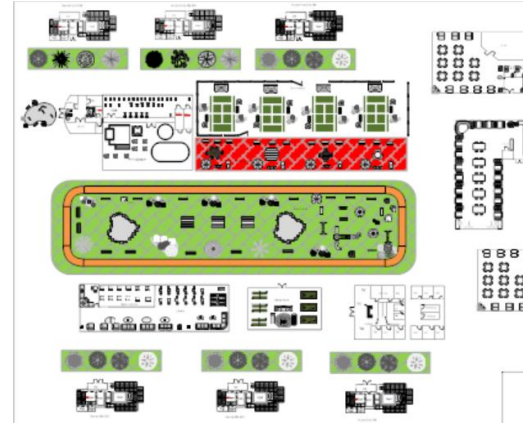
April 19th 2016, 1:00pm Gibble Auditorium

Moderators/Organizers:

Dr Tomás Estrada and Dr Joseph Wunderlich

1:00pm Water Filtration System

Anthony Davala, Cal Graziano, Zachary Karasek,
Brynne Kirsch, and Dereck Munch
Mentor: Dr Sara Atwood



1:15pm A Green Retirement Community

Rodrigo Barrera and Joshua McMahon
Mentors: Dr Joseph Wunderlich and Dr Patricia Ricci.

1:30pm Development and Testing of an Engineered Drainage Tile for Nitrogen Management

Julie Hess and Kimberly Kim
Mentor: Dr Brenda Read-Daily



1:45pm Etown Sports, Fitness, and Wellness Center

Michael Graziano
Mentors: Dr Joseph Wunderlich and Dr Patricia Ricci



2:00pm Why Live Tiny?

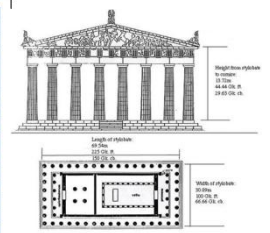
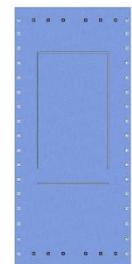
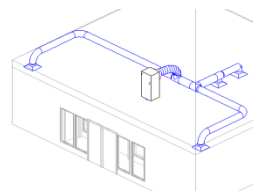
Mary Braasch
Mentor: Dr Kurt Degoede

2:15pm Hydroponic Gardens for Etown Food Services

Anh Bui and Basle Lavery
Mentors: Dr Joseph Wunderlich and Dr Thomas Murray

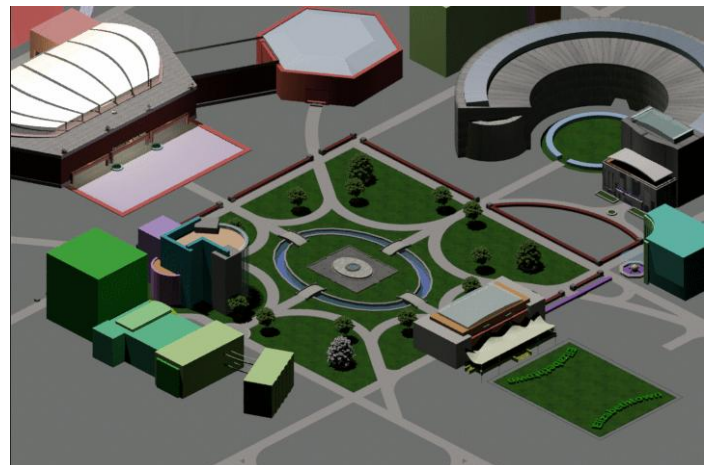
2:30pm Sustainable Site Design for Haiti (Off-Grid Photovoltaic Power System Design)

Chandler MacLaren
Mentor: Dr Kurt Degoede



2:45pm Architecture Design Studio Highlights

Rodrigo Barrera, Brian Brennan, Kelly Bresnowitz, Anh Bui,
Michael Graziano, Brynne Kirsch, Greyson McDonald,
Joshua McMahon, Joseph John Wunderlich
Mentors: Dr Joseph Thomas Wunderlich and Dr Patricia Ricci



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1:00:pm Water Filtration System

Anthony Davala, Cal Graziano, Zachary Karasek Brynne Kirsch, and Dereck Munch Mentor: Dr Sara Atwood

Providing clean, accessible drinking water is a challenge faced across the world, from developing nations to our own country. Water seems so abundant to many of us that we do not see that drinkable water is an infrequent commodity for many others. That being said, a majority of the world's population has yet to take advantage of natural resources in order to solve this issue. Rainwater is an untapped source of drinkable water that can be harnessed in most regions of the world and is completely natural and renewable in its supply. The purpose of our project is to provide a working prototype of a rainwater collection and purification system that can be used in communities and residences that have a limited water supply. The system uses mostly repurposed parts. Along with using recycled parts the final system will be able to run on the power produced by a 240kW solar panel in case the device is in an area with no electrical grid.

1:15pm A Green Retirement Community

Rodrigo Barrera and Joshua McMahon Mentors: Dr Joseph Wunderlich and Dr Patricia Ricci

This Architecture project by two Etown Sustainable Design Engineering students is a design of a retirement community that incorporates as many sustainability innovations as possible. The project begins with a global analysis of the demographics of aging populations and the potential demand for such a design. Both international and U.S. sites were considered. Details of the architecture and engineering will be presented.

1:30pm Development and Testing of an Engineered Drainage Tile for Nitrogen Management

Julie Hess and Kimberly Kim Mentor: Dr Brenda Read-Daily

The Chesapeake Bay is in ecological danger due to eutrophication. Eutrophication is the result of excess nutrients such as nitrogen and phosphorus, which causes oxygen depletion in receiving water bodies and threatens aquatic life. Agriculture is a contributing factor to increased levels of nitrates because nitrogen and phosphorus are main ingredients in fertilizers used to promote crop yields. Since fertilizers are a major culprit, treatment of agricultural runoff at the source (fields) is relevant in improving the water quality in the Chesapeake. Locations such as Lancaster County have large agricultural presences that feed into the bay and should be accountable. Many studies have shown that sulfur and limestone can be paired in order to achieve denitrification in context to wastewater and drinking water treatment. *Thiobacillus denitrificans* are bacteria known to respire under anaerobic conditions by converting reactive nitrogen (nitrates) into atmospheric nitrogen. This species of bacteria is the optimal microorganism to thrive in this anaerobic and sulfur-rich environment. The objective of this project is to demonstrate the capacity of an engineered drainage tile to continuously remove nitrates, thus improving water quality. A modified tile drainage system was built, where the tile was surrounded by a layer of elemental sulfur and limestone. Three different configurations were used: two systems using different sizes of limestone pieces and one control. From these influent and effluent water samples were tested for levels of nitrate, sulfate, and pH in order to estimate nitrate removal as well as biological activity inside the reactor. Results indicated that nitrate removal rates were significantly higher in the sulfur-amended tiles over the control.

1:45pm Etown Sports, Fitness, and Wellness Center

Michael Graziano Mentors: Dr Joseph Wunderlich and Dr Patricia Ricci

This project began as a contest in 2014 with 20 students and 22 judges in EGR343 "Green Architectural Engineering." Michael Graziano then met with the College's senior staff and presented a new design as part of last year's SCAD event, and this work led to a summer internship for him at an architectural firm in Washington DC. This year's design will reflect updated input from many constituents including 16 students who researched specific aspects of the proposed center as part of their Fall 2015 First-Year Seminar course "Conceptual Architecture."

2:00pm Why Live Tiny?

Mary Braasch Mentor: Dr Kurt DeGoede

In my presentation I will describe the journey I have taken designing and preparing to build my own tiny home. Faced with a culture focused on "stuff" and amassing as much as possible, I am looking to live a simpler life in a 200 sq. ft. home: a tiny home. The traditional model of working a 9-5 job and saving to buy a house and car does not describe the life I want to live. I explored sustainability, photovoltaics, and design, through an independent study last spring, and I am excited to share the knowledge I have gained with other students at Elizabethtown College. Through a Prezi and several hands on activities I will give the participants a taste of living in a tiny house with less stuff. I hope to illuminate societal waste, and inspire participants to begin reducing waste, taking better care of the environment, and examine what we really need to live a full and happy life.

2:15pm Hydroponic Gardens for Etown Food Services

Anh Bui and Basle Lavery Mentors: Dr Joseph Wunderlich and Dr Thomas Murray

This interdisciplinary project between a Biology student and a Computer Engineering student is the result of several years of development of prototype hydroponic gardens presented at previous SCAD events. This final stage of development involves finishing the circuits, programming, plumbing, ventilation, and lighting; combined with design of the precise nutrients and biological environment for the plants to thrive.

2:30pm Sustainable Site Design for Haiti (Off-Grid Photovoltaic Power System Design)

Chandler MacLaren Mentor: Dr Kurt DeGoede

Last fall in EGR276, we designed an off-grid photovoltaic power system. The system had to provide an appropriate amount of electric power and water pumping/storage for a family of four living in Haiti without access to grid power. I had to research the power usage for every essential and desired device and appliance to determine a recommended system size, balancing power requirements and system cost. The design included specifications for the inverter, solar panels, charge controller, and battery bank. Full documentation included specifying all wiring, connectors and breakers. Site layout, a full electrical schematic, anticipated system performance reports, and system cost (not including installation) completed the customer report. I will present my final design recommendations.

2:45pm Architecture Design Studio Highlights

Rodrigo Barrera, Brian Brennon, Kelly Bresnowitz, Anh Bui, Michael Graziano, Brynne Kirsch, Greyson Mcdonald, Joshua McMahon, Joseph John Wunderlich Mentors: Dr Joseph Thomas Wunderlich and Dr Patricia Ricci

This group presentation will show highlights of this Spring's work by 10 students in ART/EGR499 A&B "Architecture Design Studio I&II" with emphasis on designs not highlighted in other SCAD-2016 talks (i.e., hydroponic gardens, wellness center, and green retirement community). The highlighted architecture in this talk will include LEED residential design, postmodern residential design, modern sacred space design, green HVAC design, and design of a college campus.