Welcome to the 2017 CATALYST Academy Built Environment and Sustainability

The week at the CATALYST Academy at CTECH

Each afternoon you will listen to a short lecture on a different aspect of built environment and then work on a design or discovery-oriented activity. You will work in groups to explore all different aspects of built environment: conducting surveys and experiments on the topic of crowding; co-meeting in planning, design and management of transit systems learning transportation emissions and monitoring real time exposure to air pollution; 3-D printing of a test plate subjected to a ballistic impact; Seismic design and testing; a demonstration on how we can determine the types of microorganisms that are present in different types of soils and water testing.

Program Schedule for the Week

Monday, July 17

Transportation in Practice

1pm-2:30pm, 166 Hollister Hall

Veronica O. Davis, P.E.

Today urban areas are plagued with congestion. Widening streets and making cars move faster does not work. Cities are grappling with how to move people today and how to move people in the future when new technologies become available. In this lesson you will learn about technologies available today and being tested for future use. You will have the opportunity to work in teams to design a transportation system of the future.

3-D Printing Load Bearing Structures (Part 1)

2:30pm-5pm
366 Hollister Hall

Derek Warner
Associate Professor

Paul Charles
Facilities Coordinator

Additive Manufacturing (AM), popularly known as 3D Printing, has the potential to be a truly disruptive technology. AM technology presents the capability to create customized parts rapidly, economically, and with a geometric complexity beyond what is possible with traditional manufacturing. This ability will significantly impact the biomedical, aerospace, and construction enterprises. In this module, students will be introduced to the concept of AM, with a focus on creating load bearing parts and structures. As a demonstration, students will use AM technology to design, create, and test plate subjected to a ballistic impact.

The week at the CATALYST Academy

Tuesday, July 18, 1pm-5pm
366 Hollister Hall

Built Environment and Sustainability: Transportation in Practice, Emissions, and Air Pollution

Oliver Gao
Associate Professor

Edwin (Todd) Cowen
Professor

While providing critical service for the mobility needs, transportation-related air pollution constitutes important risk factor for cardiopulmonary disease, increases children's asthma rates and premature death, lung cancer death, and substantial loss of average life expectancy. In this lab session, students will first learn systems thinking about the complexity of transportation, emissions, air pollution, and public health problems.

After this, we'll conduct real time measurement of respiratory exposures at different places/facilities (e.g., walking, on a bus, near a stop sign, on a parking lot, etc.) on Cornell campus in Ithaca, NY. With the collected exposure data, the students will then come back to the lab to analyze the data and discuss the results. More specifically, this lab session consists of the following sections:

1:00-2:00pm (366 Hollister Hall) Presentation and discussion led by Associate Professor Gao on transportation, emissions, and air quality.

2:00-3:30pm (start in 366 Hollister Hall, then to the demonstration site) Discussion and demonstration of pollutant dispersion led by Professor Todd Cowen.

3:30-4:30pm (Cornell campus, students will be divided into 4 groups) Measurements of exposure to PM2.5 on campus.

4:30-5:00pm Back in computer room to download and view the data.

The week at the CATALYST Academy

Wednesday, July 19

Transit Systems Design

1pm-3:30pm
366 Hollister Hall

Samitha Samaranayake
Assistant Professor

In this lab session, students will get introduced to some engineering problems that arise in the context of urban mobility. We will discuss the different modes of transportation available to commuters and explore the benefits and challenges of each of these modes, paying special attention to the rapidly growing segment of on-demand transportation services (such as Uber, Lyft and bike sharing). Students will take part in thought experiment on how to redesign the NYC transit system given the existence of these new services.

3-D Printing Load Bearing Structures (Part 2)

3:30pm-5pm
366 Hollister Hall

Derek Warner
Associate Professor

Paul Charles
Facilities Coordinator

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The week at the CATALYST Academy

Thursday, July 20

Vibrations in Structures

Greg McLaskey
Assistant Professor

GROUP 1
1pm-5pm
366 Hollister Hall

In this lab session, students will be introduced to vibrations in structures ranging from the Earth to buildings and bridges to electric guitars. Students will learn about resonant frequencies of vibration, modal shapes, and how to measure those vibrations with sensors, and visualize the vibration measurements with computer software. Students will then participate in a field test involving the vibrations of the Duffield Hall stairs on the engineering quadrangle.

Soil Biology, Water Quality, and Climate Change

Matt Reid
Assistant Professor

GROUP 2
1pm-2:30pm
166 Hollister Hall

Professor Reid will discuss how the “unseen majority” of microorganisms in soils have an outsized influence on chemical pollutants that make their way into waterways, and on the emission of gases that contribute to climate change. There will be a discussion on how humans can change the makeup of these microbial communities, with either positive or negative results. The session will include a demonstration on how we can determine the types of microorganisms that are present in different types of soils.

Environmental Water Sampling

Yolanda Brooks
Postdoctoral Associate

GROUP 2
2:30pm-5pm
166 Hollister Hall

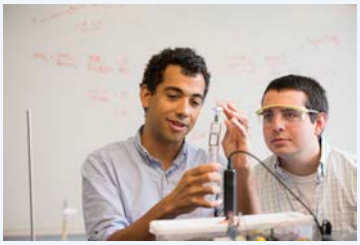
In this lab session Dr. Yolanda Brooks will give a demonstration of water testing and discuss her current research.

The week at the CATALYST Academy

Friday, July 21

Soil Biology, Water Quality, and Climate Change

Matt Reid
Assistant Professor



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