

# Mascaro Center for Sustainable Innovation

## 2004-2019 Past Participants in Undergraduate Summer Research

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### 2019 Participants

#### Reducing Emissions - Fuel Consumption Reduction Technologies for Pittsburgh Port Authority Buses

**Kathryn Rossi**, chemical & petroleum engineering

Advisor: Matthew Barry, mechanical engineering & materials science

#### Silk-based flexible/wearable electronics: towards sustainable fabrication and materials engineering

**Rim Biaz**, industrial engineering

Advisor: Mostafa Bedewy, industrial engineering

#### Validating citizen science tools used to identify lead water lines

**Arianna Heilbrunn**, environmental studies

Advisor: Mike Blackhurst, university center for urban and social research

#### Ni-Mn-Ga magnetic shape memory alloys for power generation applications

**Tyler Papham**, mechanical engineering & materials science

Advisor: Markus Chmielus, mechanical engineering & materials science

#### Chemical semantics and its implications on environmental transport, fate, and toxicity

**Rachel Fay**, civil & environmental engineering

Advisors: Leanne Gilbertson and Carla Ng, civil & environmental engineering

#### Small & Mighty: Exploring nature to identify bacteria capable of degrading a new generation of environmental contaminants

**Kareem Rabbat**, civil & environmental engineering

Advisor: Sarah Haig, civil & environmental engineering

#### Structural Design with Bamboo

**Stephanie Martinos**, architectural studies

Advisor: Kent Harries, civil & environmental engineering

#### Capturing and storing energy from hurricane waves with a piezoelectric device

**Stephanie Litwack**, mechanical engineering & materials science

Advisor: Katherine Hornbostel, mechanical engineering & materials science

#### Capturing carbon dioxide from the ocean with a membrane device

**Christopher Snodgrass**, bioengineering

Advisor: Katherine Hornbostel, mechanical engineering & materials science

#### Reducing frictional energy losses in transportation and industry: Surface coatings and the effect of surface roughness on friction

**Annie Shi**, mechanical engineering & materials science

Advisor: Tevis Jacobs, mechanical engineering & materials science

#### Using acoustic sensors and machine learning to locate birds and bats in the field

**Jiade Song**, industrial engineering

Advisor: Justin Kitzes, Department of Biological Sciences

#### Durable Antireflective, Anti-Soiling and Self-Cleaning Solar Glass

**Sooraj Sharma**, mechanical engineering & materials science

Advisor: Paul Leu, industrial engineering

#### Designing new ways to test the performance of large-scale battery technologies

**Carissa Yim**, chemical & petroleum engineering

Advisor: James McKone, chemical & petroleum engineering

#### Smarter Riversheds – real-time sensor networks

**Carlie Johnson**, civil & environmental engineering

Advisor: David Sanchez, civil & environmental engineering

**Recirculating Aquaculture – managing water quality in a closed system**

Mason Unger, civil & environmental engineering

Advisor: David Sanchez, civil & environmental engineering

**Campus-Wide Sustainability Dashboard**

Jonathon Coles, civil & environmental engineering

Advisor: Aurora Sharrard, Director, University Office of Sustainability

Collaborators: Drs. Melissa Bilec & Michael Blackhurst, plus interactions with Pitt Facilities Management

**Increasing the Structural Resilience of Reinforced Concrete through Bio-Remediation**

Aamil Shah, bioengineering

Advisor: Max Stephens, civil & environmental engineering

**What the Frack: Designing nanocatalysts for responsible use of natural gas**

Albert Lopez-Martinez, chemical & petroleum engineering

Advisor: Goetz Vesper, chemical & petroleum engineering

**Post-processing design on superalloys by additive manufacturing for NASA space technology missions.**

Yinxuan Li, mechanical engineering & materials science

Advisor: Wei Xiong, mechanical engineering & materials science

**Graphene-based composite materials for high performance thermoelectric devices**

Seth So, electrical and computer engineering

Advisor: Minhee Yun, electrical and computer engineering

**Developing a novel photopolymer based additive manufacturing machine (3D Printer) for high-resolution applications**

Yue Zhang, mechanical engineering & materials science

Advisor: Xiayun Zhao, mechanical engineering & materials science

## **2018 Participants**

**Protein-based nanomanufacturing: Using silk and hydrophobins for sustainable lithography**

Megan Black, mechanical engineering & materials science

Advisor: Mostafa Bedewy, industrial engineering

**Microstructure and properties of sintered magnetocaloric materials for efficient magnetic refrigeration**

Rafael Rodriguez, mechanical engineering & materials science

Advisor: Markus Chmielus, mechanical engineering & materials science

**Magnetocaloric effect of binder jet printed Ni-Mn-Ga magnetic shape memory alloy**

Aaron Acierno, mechanical engineering & materials science

Advisor: Markus Chmielus, mechanical engineering & materials science

**Energy-efficient processors, sensors, and systems for space-based sensing and computing**

Sridhar Reddy Velagala, electrical engineering and computer science

Advisor: Alan George, electrical & computer engineering

**Designing efficient electrocatalysts devices atom by atom**

Sarah Newton, chemical & petroleum engineering

Advisor: John Keith, chemical & petroleum engineering

**Black silicon solar cells**

Sooraj Sharma, mechanical engineering & materials science

Advisor: Paul Leu, industrial engineering

**Nanofabricated interfaces for electrochemical catalysis**

Julia McKay, chemical & petroleum engineering

Advisor: James McKone, chemical & petroleum engineering

**Capturing tidal energy using smart materials**

**Katrina Haidari**, mechanical engineering & materials science

**Advisor:** Katherine Ong, mechanical engineering & materials science

**Smarter Riversheds – Real-time environmental sensors networks**

**Kathleen Beaudoin**, civil & environmental engineering

**Advisor:** David Sanchez, civil & environmental engineering

**Feeding a Growing World: Towards a novel process for ammonia synthesis**

**Eyram Akabua**, chemical & petroleum engineering

**Advisor:** Goetz Vesper, chemical & petroleum engineering

**Making more with less: “Greening” the process industry via process intensification**

**Trevor Devine**, chemical & petroleum engineering

**Advisor:** Goetz Vesper, chemical & petroleum engineering

**Green electronics – Low-Power memory device on transparent nanopaper substrate**

**Nolan Ardolino**, mechanical engineering & materials science

**Advisor:** Feng Xiong, electrical and computer engineering

**3D Printing of Graded Alloys for Energy Efficiency in Aerospace Materials Manufacturing**

**Noah Levine**, mechanical engineering & material science

**Advisor:** Wei Xiong, mechanical engineering & material science

## **2017 Participants**

**Water desalination through reactive extraction**

**Madeleine Hamrick**, Chemical & Petroleum Engineering

**Advisor:** Eric Beckman, Chemical Engineering

**Pittsburgh Water Microbiome**

**Austin Kuntz**, Bioengineering

**Advisor:** Kyle Bibby, Civil & Environmental Engineering

**Additive manufacturing of energy-saving and energy producing materials**

**Colleen Hilla**, Materials Science & Engineering

**Advisor:** Markus Chmielus, Mechanical Engineering & Materials Science

**Development of Next Generation Nano-Antimicrobials**

**Cole D’Aurizio**, Mechanical Engineering

**Advisor:** Leanne Gilbertson, Civil & Environmental Engineering

**Unlocking energetically efficient water oxidation for ozone disinfectants**

**Angela Leo**, Chemical & Petroleum Engineering

**Advisor:** John Keith, Chemical & Petroleum Engineering

**Machine Learning Blueprints for Green Chelating Agents**

**Ethan Henderson**, Chemical & Petroleum Engineering

**Advisor:** John Keith, Chemical & Petroleum Engineering

**Black silicon etching for solar cells**

**Maxwell Lindsay**, Materials Science & Engineering

**Rafael Rodriguez**, Materials Science & Engineering

**Advisor:** Paul Leu, Industrial Engineering

**Electrochemistry for sustainable energy conversion and storage**

**James Hughes**, Chemical & Petroleum Engineering

**Dean Miller**, Chemical & Petroleum Engineering

**Advisor:** James McKone, Chemical Engineering

**Integrating Sustainable Design in Engineering Education**

**Kaleigh Smith**, Mechanical Engineering

**Advisor:** David Sanchez, Civil & Environmental Engineering

**Desalination using polymer crystallization**

**Joseph Hamm**, Chemical & Petroleum Engineering

**Advisor:** Sachin Velankar, Chemical Engineering

**Feeding a Growing World: Towards a Novel Process for Ammonia Synthesis**

**Eric McElhinny**, Chemical & Petroleum Engineering

**Kendra LaVallee**, Chemical & Petroleum Engineering

**Advisor:** Goetz Vesper, Chemical & Petroleum Engineering

**Automated growth of two-dimensional materials for green electronics**

**Joji Bronner**, Computer Engineering

**Advisor:** Feng Xiong, Electrical and Computer Engineering

**2-D and nanomaterials for Energy Applications**

**Connor Herring**, Chemical & Petroleum Engineering

**Advisor:** Minhee Yun, Electrical and Computer Engineering

## **2016 Participants**

**Use of Equilibrium Chemical Reactions to Enhance Desalination and Heat Transfer Processes**

**Emily Connor**, Chemical and Petroleum Engineering

**Advisor:** Eric Beckman, Chemical and Petroleum Engineering

**Pittsburgh Water Microbiome Project**

**Marissa Drobitch**, Civil and Environmental Engineering

**Advisor:** Kyle Bibby, Civil and Environmental Engineering

**Additive Manufacturing of Magnetocaloric Materials for High-efficiency Cooling**

**Katerina Kimes**, Mechanical Engineering and Materials Science

**Advisor:** Markus Chmielus, Mechanical Engineering and Materials Science

**Piezoelectric Foams for Energy Harvesting**

**Noah Perryman**, Mechanical Engineering and Materials Science

**Advisor:** William Clark, Mechanical Engineering and Materials Science

**Development of Stable Nano-Emulsions as a Sustainable Alternative to Conventional Fertilization Practices**

**Jasmine Toney**, Chemical and Petroleum Engineering

**Advisor:** Leanne Gilbertson, Civil and Environmental Engineering

**Mechanical Test Methods for Full-Culm Bamboo**

**Jelani Virgo**, Civil and Environmental Engineering

**Advisor:** Kent Harries, Civil and Environmental Engineering

**Black Silicon Solar Cells**

**Bradley Pafchek**, Mechanical Engineering and Materials Science

**Advisor:** Paul Leu, , Industrial Engineering

**Carbon Nanotube Based Fuel Cells**

**Anthony Galante**, , Industrial Engineering

**Advisor:** Paul Leu, , Industrial Engineering

**Renewable Energy Integration on the Electric Power Grid**

**Julia Cope**, Electrical and Computer Engineering

Advisor: Thomas McDermott, Electrical and Computer Engineering

**Sustainable Energy Generation Using Microbial Fuel Cells**

**Emily Klonicki**, Civil and Environmental Engineering

Advisor: David Sanchez, Civil and Environmental Engineering

**Sustainable Design within Engineering Education**

**Cameron Beichner**, Mechanical Engineering and Materials Science

Advisor: David Sanchez, Civil and Environmental Engineering

**Design of Lightweight 3D Printed Lattice Structured Parts**

**John Wallace**, Mechanical Engineering and Materials Science

Advisor: Albert To, Mechanical Engineering and Materials Science

**Dirt to Diamonds: CO<sub>2</sub> Conversion to Chemicals and Fuels**

**Patrick Asinger**, Chemical and Petroleum Engineering

**Isaac Mastalski**, Chemical and Petroleum Engineering

Advisor: Goetz Vesper, Chemical and Petroleum Engineering

## 2015 Participants

**Pittsburgh Water Microbiome**

**Lucy Powell**, Biological sciences

Advisor: Kyle Bibby, Civil and Environmental Engineering

**On the Sustainability of Forests in PA: how disease, Bambi, & logging threaten regional forest health**

**Kyle Suess**, Biological Sciences

Advisor: Walter Carson, Biological Sciences

**Electrochemical Degradation of Persistent Organic Compounds**

**Alexandra Abram**, Chemical and Petroleum Engineering

Advisor: Di Gao, Chemical and Petroleum Engineering

**Buckling Behaviour of Full-culm Bamboo**

**James Bumstead**, Civil and Environmental Engineering

Advisor: Kent Harries, Civil and Environmental Engineering

**Computational modeling of CO<sub>2</sub> capture and conversion**

**Ronald Reynolds**, Chemical and Petroleum Engineering

Advisor: Karl Johnson, Chemical and Petroleum Engineering

**Understanding Complexity and Resilience in Engineered Systems**

**Andrew Beck**, Chemical and Petroleum Engineering

Advisor: Vikas Khanna, Civil and Environmental Engineering.

**Fabrication of new nanomaterials for solar cells**

**Thomas Werkmeister**, Engineering Science

**Sean McCarthy**, Mechanical Engineering and Materials Science

Advisor: Paul Leu, Industrial Engineering

**Black Silicon**

**Mohamed Kashkoush**, Industrial Engineering

Advisor: Paul Leu, Industrial Engineering

**Data Collection and Analysis of Energy Demands for Sustainable Buildings**

**Matthew Abbott**, Industrial Engineering

Advisor: Thomas McDermott, Electrical and Computer Engineering

**Cost-Effective Renewable Energy Integration on Electric Utility Systems**

**Taeyoung Lee**, Electrical Engineering  
Advisor: Thomas McDermott, Electrical and Computer Engineering

**Sustainable Design within Engineering Education**

**John Walker**, Civil and Environmental Engineering  
Advisor: David Sanchez, Civil and Environmental Engineering

**Sustainable Energy Generation using Microbial Fuel Cells**

**Troy Salvatore**, Civil and Environmental Engineering  
Advisor: David Sanchez, Civil and Environmental Engineering

**Mechanical behavior of Novel 3D Printed Cellular Structures for Lightweight Applications**

**Joseph Brown**, Mechanical Engineering and Materials Science  
Advisor: Albert To, Mechanical Engineering and Materials Science

**Clean and efficient production of energy and chemicals via “chemical looping”**

**Charles Hansen**, Chemical and Petroleum Engineering  
Advisor: Goetz Vesper, Chemical and Petroleum Engineering

**The Ugly Side of Nano: Towards Understanding Nanotoxicity**

**Julie Hartz**, Chemical and Petroleum Engineering  
**Sarah Casne**, Chemical and Petroleum Engineering.  
Advisor: Goetz Vesper, Chemical and Petroleum Engineering

**Harnessing microbial power for waste-to-energy biotransformation**

**Lisa Stabryla**, Engineering Science  
Advisor: Na Wei, Civil and Environmental Engineering

## **2014 Participants**

**Microbiome of Pittsburgh Drinking Water**

**Maia Hoffman**, Chemical Engineering (*Heinz Scholar*)  
Advisor: Kyle Bibby, Civil and Environmental engineering

**Dynamic Life Cycle Assessment of a Net-Zero Energy Building**

**Naomi Anderson**, Civil and Environmental Engineering (*Heinz Scholar*)  
Advisor: Melissa Bilec, Civil and Environmental Engineering

**Sustainable Healthcare – Focus on Greenhouse Gas Emissions and Product Design**

**Delia Scoville**, Biochemistry, Oberlin College (*Heinz Scholar*)  
Advisor: Melissa Bilec, Civil and Environmental Engineering

**Resilience in large scale networks: Implications for critical infrastructure**

**Trent Dillon**, Mechanical Engineering and Materials Science (*Condon Scholar*)  
Advisor: Vikas Khanna, Civil and Environmental Engineering

**Hybrid Hydrophobic/Hydrophilic Surfaces for Boiling Enhancement**

**Emma Sullivan**, Mechanical Engineering and Materials Science (*Heinz Scholar*)  
Advisor: Mark Kimber, Mechanical Engineering and Materials Science

**Electrodeposition of oxide semiconductors for solar-fuel conversion**

**Matthew Duff**, Mechanical Engineering and Materials Science (*Bevier Scholar*)  
**Michael Masley**, Mechanical Engineering and Materials Science (*NSF Scholar*)  
Advisor: Jung-Kun Lee, Mechanical Engineering and Materials Science

**Nanostructures for Solar Cells**

**Dalton Hale**, Industrial Engineering (*Bevier Scholar*)  
**Donald Volland**, Engineering Science (*NSF Scholar*)

**Brendan O'Brien**, Industrial Engineering (*NSF Scholar*)  
**Lincoln Walton**, Engineering Science (*NSF Scholar*)  
Advisor: Paul Leu, Industrial Engineering

**Non-Boolean Electronic Circuits for Low Power Computation**  
**Natalie Janosik**, Electrical and Computer Engineering (*Heinz Scholar*)  
Advisor: Steven Levitan, Electrical and Computer Engineering

**Nanoscale Characterization of Solar Cells**  
**Brandon Contino**, Electrical and Computer Engineering (*Bevier Scholar*)  
Advisor: Guangyong Li, Electrical and Computer Engineering

**Case Studies for Sustainable Systems Modeling**  
**Stephanie Cortes**, Electrical and Computer Engineering (*Bevier Scholar*)  
Advisor: Tom McDermott, Electrical and Computer Engineering

**High Efficiency Cook Stove for the Kuna Yala of Panama**  
**Allison McCurdy**, Mechanical Engineering and Materials Science (*Bevier Scholar*)  
**Jessica Schneider**, Mechanical Engineering and Materials Science (*Bevier Scholar*)  
Advisor: Laura Schaefer, Mechanical Engineering and Materials Science

**Towards Understanding Nanoparticle Toxicity**  
**Kimaya Padgaonkar**, Chemical and Petroleum Engineering (*MCSI scholar*)  
Advisors: Goetz Vesper, Chemical and Petroleum Engineering  
Ipsita Banerjee, Chemical and Petroleum Engineering

**Chemical Looping – A Flexible Approach Towards Process Intensification**  
**Jonathan Hughes**, Chemical and Petroleum Engineering (*Frank & Daphna Lederman Scholar*)  
**Natalie Isenberg**, Chemical and Petroleum Engineering (*Bevier Scholar*)  
Advisor: Goetz Vesper, Chemical and Petroleum Engineering

**'Greening' Heterogeneous Catalysis through Nanofinement**  
**Bronson Lockwood**, Chemical and Petroleum Engineering (*Bevier Scholar*)  
Advisor: Goetz Vesper, Chemical and Petroleum Engineering

**Too Valuable To Burn: Utilizing Shale Gas for Chemicals Production**  
**Jeffrey Schallick**, Chemical and Petroleum Engineering (*Bevier Scholar*)  
Advisor: Goetz Vesper, Chemical and Petroleum Engineering

## **2013 Participants**

**Understanding resilience in energy production landscapes: changes in the coupled hydrologic system**  
**Angela Anderson**, Civil Engineering (*Heinz Endowments Scholar*)  
**Robert Wallace**, Chemical Engineering (*Bevier Scholar*)  
Advisor: Dan Bain, Geology

**Sustainable Science and Engineering Education**  
**Jayne Marks**, Civil Engineering (*Heinz Endowments Scholar*)  
Advisor: Melissa Bilec, Civil & Environmental Engineering

**High-Performance Building Automation and Design**  
**Corey Woloschin**, Civil Engineering (*Heinz Endowments Scholar*)  
Advisor: Melissa Bilec, Civil & Environmental Engineering

**Design of Oil-Absorbing Media for Environmental Cleanup**  
**Andrew Kittka**, Chemical Engineering (*Heinz Endowments Scholar*)  
Advisor: Di Gao, Chemical & Petroleum Engineering

**Evaluating the environmental sustainability of infrastructure compatible hydrocarbon biofuels**

**Karen Kaminsky**, Chemical Engineering (*Frank and Daphna Lederman Scholar*)

Advisor: Vikas Khanna, Civil and Environmental Engineering

**Enhancing efficiency of pool boiling**

**Ed Kraft**, Mechanical Engineering (*Heinz Endowments Scholar*)

Advisor: Mark Kimber, Mechanical Engineering & Materials Science

**Core-shell Photoelectrochemical Cells for Solar Hydrogen Production**

**Thomas Nilson**, Engineering Science (*Bevier Scholar*)

**Colin Detweiler**, Materials Engineering (*NSF Scholar*)

Advisor: Jung-Kun Lee, Mechanical Engineering & Materials Science

**Extremely Affordable Solar Cells**

**Brendan O'Brien**, Industrial Engineering (*Scalise Industries Scholar*)

**Miriam Rathbun**, Mechanical Engineering (*NSF Scholar*)

Advisor: Paul Leu, Industrial Engineering

**All-solution-processed solar cells**

**Samantha Small**, Computer Engineering (*Douglas Condon Scholar*)

**Christian Bottenfield**, Engineering Physics (*NSF Scholar*)

Advisor: Guangyong Li, Electrical and Computer Engineering

**Nanotoxicity – The other side of nano**

**Brittany Givens**, Chemical Engineering (*Bevier Scholar*)

Advisor: Goetz Vesper, Chemical & Petroleum Engineering

**Nanoencapsulation- A novel approach towards energy efficient processes**

**Joshua Maskrey**, Chemical Engineering (*Bevier Scholar*)

Advisor: Goetz Vesper, Chemical & Petroleum Engineering

*NSF: International Research Experiences for Students*

**Evaluation of bamboo-to-bamboo connections**

**Andrew Beck**, Chemical Engineering

**Eric Belski**, Mechanical Engineering

**Rebecca Glucksman**, Civil Engineering

**Steven Marusic**, Chemical Engineering

Advisor: Kent Harries, Civil and Environmental Engineering

## **2012 Participants**

**Chemical looping reforming- A novel, efficient process for CO<sub>2</sub> utilization**

**Louis Miller**, Chemical Engineering (Frank and Daphna Lederman scholar)

**Martin Roberts**, Chemical Engineering (Roberta Luxbacher scholar)

Advisor: Goetz Vesper, Department of Chemical and Petroleum Engineering

**Critical Materials: Resilience and Sustainability Implications for the U.S. Economy**

**Berlyn Hubler**, Chemical Engineering (Construction Financial Management Assoc. scholar)

**Greg Zaines**, Physics (Bevier Scholar)

Advisor: Vikas Khanna, Department of Civil and Environmental Engineering

**Wireless sensor networks for environmental monitoring research**

**Brian McGlynn**, Civil and Environmental Engineering (Scalise Industries scholar)

Advisor: Xu Liang, Department of Civil and Environmental Engineering

**Extremely affordable solar cells to address energy poverty**

**Peter Brendel**, Industrial Engineering (Scalise Industries scholar)

**Ibrahim Chebib**, Electrical and Computer Engineering (Douglas Condon scholar)

Advisor: Paul Leu, Department of Electrical and Computer Engineering



**Assessment of the green infrastructure installations occurring in Schenley Park**

**Trevor Bublitz**, Civil and Environmental Engineering (Bevier Scholar)

**Bruk Berhanu**, Civil and Environmental Engineering (Bevier Scholar)

Advisor: Dan Bain, Department of Geology

**Point-of-use water treatment technologies for low-income communities in the less developed world**

**Douglas Kopp**, Civil and Environmental Engineering (Bevier Scholar)

Advisor: Ian Nettleship, Department of Mechanical Engineering and Materials Science

**Energy-efficient filtration**

**Alyssa Kunkel**, Chemistry (Bevier Scholar)

**Christina O'Donnell**, Chemical and Petroleum Engineering (Bevier Scholar)

Advisor: Haitao Liu, Department of Chemistry

***NSF: International Research Experiences for Students***

**Bamboo Gridshells**

**Katherine Brown**, Chemical Engineering

**Patrick Eells**, Mechanical Engineering and Materials Science

**Michael Nites**, Industrial Engineering

**Mathew Paggiassotti**, Electrical and Computer Engineering

**Abigail Stein**, Civil and Environmental Engineering

**Chris Zimmerman**, Bioengineering

Advisors: Dr. Bhavna Sharma, Dr. Kent Harries and Michael Richard

## **2011 Participants**

**Self-powered Sensors for Energy Efficient Buildings**

**Kent Berthoud**, Physics & Astronomy

Advisor: Dr. Buddy Clark

**Microalgae as Fuel**

**George Zaines**, Physics Department

Advisor: Dr. Vikas Khanna

**Nano-characterization of Silver-nanoparticles deposited on Porous Ceramics or Geopolymers for Sustainable low-cost ceramic water filters**

**Michael Melia**, Mechanical Engineering & Materials Science

Advisor: Dr. Ian Nettleship

**Comparative life cycle analysis for bamboo portal frame construction**

**Marianne Choi**, Civil & Environmental Engineering

**Ahra Kwon**, Chemical & Petroleum Engineering

**Oren Lawit**, Chemical & Petroleum Engineering

**Preston Macready**, Civil & Environmental Engineering

**Chad Ringel**, Chemical & Petroleum Engineering

**Jennifer Zettl**, Civil & Environmental Engineering

Advisors: Drs. Kent Harries, Melissa Bilec, Bhavna Sharma and Michael Richard

**Exploring Smart Materials for Reducing Energy Demands in Buildings**

**Minao Shen**, Mechanical Engineering & Materials Science

Advisor: Dr. Buddy Clark

**Enabling the Utilization of Nanoporous Aluminum for Sustainable Structures by Understanding its Mechanical Properties**

**Jiaxiang Tao**, Civil & Environmental Engineering

Advisor: Dr. Albert To

**Net-zero Energy School Buildings- Development of the Education Module**

**Tylor Balson**, Industrial Engineering & **Ellis Mays**, Civil & Environmental Engineering  
Advisor: Dr. Bhavna Sharma

**Smart Grid Control Methodology Development for Integrated Generation Management**

**Ansel Barchowsky**, Electrical & Computer Engineering  
Advisor: Dr. Greg Reed

**Resource Recovery from Waste Water**

**Matt Weschler**, Civil & Environmental Engineering  
Advisor: Drs. Amy Landis and Willie Harper

**Controls and Dynamic Life Cycle Assessment**

**Peter Stegman**, Electrical & Computer Engineering  
Advisor: Dr. Alex Jones

## 2010 Participants

**An Analysis of Humanitarian Logistics Relief in Haiti**

**Matthew Yandura**, Industrial Engineering  
Advisor: Dr. Brian Norman

**Construction Success Factors for Net Zero Energy Homes**

**Katelyn Ryan & Michael Sweriduk**, Civil & Environmental Engineering  
Advisor: Dr. Melissa Bilec

**Biological Processes Involved in Water Quality**

**Christine Currie**, *Columbia University* & **Patrick Saboe**, *University of New Haven*  
Chemical and Petroleum Engineering  
Advisor: Dr. Willie Harper

**Designing Self-Healing Materials**

**Chet Gnegy**, Electrical Engineering  
Advisor: Dr. Anna Balazs

**Biofuels Grown on Marginal Lands**

**Christopher Rovensky**, Chemical Engineering  
**Emily Wolff**, Civil & Environmental Engineering  
**Julie Schalles**, Mechanical Engineering & Materials Science  
Advisor: Dr. Amy Landis

**End-of-Life Compostables**

**Nicole Ostrowski**, Mechanical Engineering & Materials Science  
**Nicholas Stamatakis**, Industrial Engineering  
Advisors: Drs. Amy Landis and Melissa Bilec

**Exploration of New Designs in Energy Harvesting**

**Jon Bumstead**, Mechanical Engineering, Physics, Astronomy  
**Matt Paterson**, Mechanical Engineering & Materials Science  
Advisor: Dr. Buddy Clark

**Green Roof for Soldiers and Sailors**

**Marianne Choi**, Civil & Environmental Engineering  
Advisor: Dr. Jason Monnell

**Icing and Condensation at Superhydrophobic Surfaces**

**Michael Malencia**, Engineering  
Advisor: Dr. Di Gao

**Improving the Durability of Sustainable Ceramic Water Filters for Low-income Communities**

**Daniel Walsh**, Mechanical Engineering & Materials Science  
Advisor: Dr. Ian Nettleship

**Kingsley- Alternative Construction Opportunities**

**Madeline Allen-Sandoz**, Civil & Environmental Engineering

**Matthew Balsbaugh**, Environmental Studies

**Ryan Carmichael**, Engineering

Advisors: Drs. Melissa Bilec, Vanessa Gomes Da Silva, Maristela Gomes Da Silva

**Oleophobic and Hydrophilic Coatings for Chemical Free Cleaning and Water-oil Separation**

**Benjamin Dickinson**, Chemical & Petroleum Engineering

Advisor: Dr. Di Gao

**Optimization and Life Cycle Assessment**

**Oliver Green**, Civil & Environmental Engineering

**Kyle Shatzer**, Civil Engineering, *Carnegie Mellon University*

Advisors: Dr. John Brigham, Amy Landis, Melissa Bilec

**Physical and Mechanical Modeling of Complex Biomaterials: Bamboo**

**Gautam Vangipuram**, Bioengineering

Advisors: Drs. Kent Harries and John Brigham

**Pool Boiling Enhancement for Nanostructured Surfaces**

**Mike Kristufek**, Mechanical Engineering & Materials Science

Advisor: Dr. Mark Kimber

**Smart Grid Control Methodology Development for Integrated Generation Management**

**Ansel Barchowsky**, Electrical & Computer Engineering

**Christopher Lippert**, Mechanical Engineering & Materials Science

Advisor: Dr. Greg Reed

**The Copper Coil: Design of a New Household Water Storage System for the Less Developed World**

**Joseph Landry**, Mechanical Engineering & Materials Science

Advisor: Dr. Ian Nettleship

**Two Sides of "Na no": Carbon Capture with a Nanoporous Sorbent**

**Christopher DiAndreth**, Chemical & Petroleum Engineering

Advisor: Dr. Goetz Vesper

**Two Sides of "Na no": Toxicity of Free and Encapsulated Nanomaterials**

**Craig Stevenson**, Chemical & Petroleum Engineering

Advisor: Dr. Goetz Vesper

**Solar Power in Vietnam**

**Chris Thai**, Mechanical Engineering and Materials Science

Advisor: Dr. Laura Schaefer

## **2009 Participants**

**Children's Hospital Green Building Metrics**

**Matthew Geary**, Civil and Environmental Engineering

Advisor: Dr. Melissa Bilec

**City of Pittsburgh- LED Life Cycle Assessment**

**Douglas Hartley** Civil and Environmental Engineering

**Cassandra Jurgens** Civil and Environmental Engineering

**Eric Zatzoff** Civil and Environmental Engineering  
Advisors: Drs. Melissa Bilec and Joe Marriott

**Electricity Reduction for Development Properties- New & Existing**

**Matt Kaminski** Civil and Environmental Engineering  
**Kathleen Kessler** Civil and Environmental Engineering  
**Abigayle Sterle** Civil and Environmental Engineering  
Advisors: Drs. Melissa Bilec and Joe Marriott

**Energy Harvesting for Improved Power Management in Buildings**

**Anthony Machi**, Mechanical Engineering and Materials Science  
Advisor: Dr. Buddy Clark

**Life Cycle Inspired Chemical Design**

**James Cregg** Chemical Engineering  
**Michaelangelo Tabone** Chemical Engineering  
Advisors: Drs. Eric Beckman and Amy Landis

**Microbial Fuel Cells**

**Charles Covel**  
**Jessica Gardner**  
**David Rounce**  
Electrical and Computer Engineering  
Advisors: Dr. Minhee Yun and David Sanchez

**New Microstructural Designs for Low-Cost Ceramic Water Filters**

**Nicole Ostrowski**, Mechanical Engineering and Materials Science  
Advisor: Dr. Ian Nettleship

**Sustainable Disinfection**

**Jennifer Howells**, Civil and Environmental Engineering  
Advisor: Dr. Leonard Casson

**Synthesis of Functional Core-Shell Nanomaterials for Clean Energy Production**

**Rebecca Byrnes**, Chemical & Petroleum Engineering  
Advisor: Dr. Goetz Vesper

## **2008 Participants**

**Development of Biofuels for Atmospheric Temperature Supply in Diesel Vehicles**

**Maura Koehle & Todd Moyle**  
Chemical & Petroleum Engineering  
Advisor: Dr. Eugene Wagner (chemistry)

**East Liberty Development Project**

**James Ostendorf**  
College of Arts and Sciences  
**Scott Streiner**  
Computer Engineering  
**Wafa Koubaa**  
Chemical & Petroleum Engineering  
Advisors: Drs. Laura Schaefer & Melissa Bilec

**Processing & Properties of Renewable Polymers based on Thermoplastic Starch**

**James Goetz**, Chemical Engineering (Penn State University)  
Advisor: Dr. Sachin Velanker

**Remediation Potential of Biofuel Feedstocks**

**Bradley Harken**, Civil & Environmental Engineering

Advisors: Drs. Laura Schaefer, Melissa Bilec, Amy Landis, Eugene Wagner

**Development of Nanocomposite Materials via Metal Impregnation for Clean Energy Production**

**Nicole Hoehn**, Chemical & Petroleum Engineering

Advisor: Dr. Goetz Vesper

**Methodology for Assessing Material Resistance Factors for Structural Bamboo**

**Derek Mitch**, Civil & Environmental Engineering

Advisor: Dr. Kent Harries

**A Risk Assessment of Sea-Level Rise as a Coastal Hazard for Regions of the Pacific**

**Mary Beth Oshnack**, Civil & Environmental Engineering

Advisor: Dr. Kent Harries

**Microstructure Analysis of Clay Ceramic Materials treated with Silver Nanoparticles for use in Low Cost Water Filters in Brazil**

**Nicole Ostrowski (IRES)**, Mechanical and Materials Science Engineering

Advisor: Dr. Ian Nettleship

**Fabrication of Dye-Sensitized Solar Cells**

**Paul Shin**, Civil & Environmental Engineering

Advisor: Dr. Di Gao

**Catalytic Microreactors for Clean, Decentralized Combustion Reactions**

**Tim Tallon**, Chemical & Petroleum Engineering

Advisor: Dr. Goetz Vesper

## **2007 Participants**

**Investing the Potential use of Untreated Waters for Cooling Tower Make up in Coal Power Plants**

**Scott Duda**, Civil and Environmental Engineering (Cornell)

Advisor: Dr. Radisav Vidic

**Ceramics Processing and the Usefulness and Effectiveness of Ceramic Materials in Environmental and Energy Efficiency Application**

**Benjamin Groth**, Materials Science and Engineering

Advisor: Dr. Ian Nettleship

**Research the Degradation of Building and Infrastructure Materials Caused by Environmentally Harmful Substances**

**Kyle Kaminski**, Civil and Environmental Engineering

Advisors: Drs. Julie Vandenbossche and Robert Ries

**Study of the Safe and Controllable Combustion of Hydrogen**

**Angela Noll**, Chemical & Petroleum Engineering

Advisor: Dr. Goetz Vesper

**Mapping of Average Groundwater Levels Across the US**

**Heather Pry**, Civil and Environmental Engineering

Advisor: Dr. Xu Liang

**Automated Biodiesel Production: Design of Distributed/ Greener Energy Systems**

**Justin Sciulli**, Mechanical Engineering

Advisor: Dr. Jeff Vipperman

**Watershed Modeling for the Sustainability of Panther Hollow Run**

**Adam Smelko**, Bioengineering

Advisor: Dr. Dan Budny

**Water Purification via Micrometer-sized Structures Synthesized by Hierarchical Self-assembly of Nanoparticles**

**Kevin Tamm**, Chemical Engineering

Advisor: Dr. Di Gao

**Use of Piezoelectric Materials to Create a Self-powered Occupancy Sensor for Sustainable Buildings**

**Andrew Thornburg**, Mechanical Engineering

Advisor: Dr. Buddy Clark

## **2006 Participants**

**Study into the Use of Bamboo as a Hazard Mitigating Construction Material**

**Mark Beacraft**, Civil & Environmental Engineering

Advisor: Dr. Kent Harries

**Ethical Sustainability Surrounding the Brazilian Charcoal Industry**

**Aaron Beamguard**, Computer Engineering

Advisor: Dr. Larry Shuman

**Using Rainwater to Solve Bangladesh's Tainted Water Problem**

**Andrew Corris**, Chemical Engineering

Advisors: Drs. Eric Beckman and Robert Parker

**Development of Effective Cooling Strategies for Oxy-fuel/Hydrogen Turbine Systems**

**Todd Locker**, Mechanical Engineering

Advisor: Dr. Laura Schaefer

**Minimizing Aluminum Toxicity from Acid rock Discharges**

**Evan Murphy**, Environmental Engineering

Advisor: Dr. Ron Neufeld

**Filtration at the Nanoscale: Environmental Protection, Water Purity and Nanoparticle Transport**

**Patricia Nichols**, Materials Science and Engineering

Advisor: Dr. John Barnard

**Water Transport and Use in Irrigation**

**Phae Papas**, Chemical & Petroleum Engineering

Advisor: Dr. Robert Parker

**Design and Development of Super Water and Oil Repellent Surfaces**

**Tyler Price**, Chemical & Petroleum Engineering

Advisor: Dr. Di Gao

**Vandergrift Revitalization**

**Steven Hein**

Bioengineering

**Yi Zhuang**

Industrial Engineering

Advisor: Dr. Lisa Weiland

## **2005 Participants**

**Ramifications of Design of a Non-Chlorine Alternative for PVC**

**Jewel Barber & Robert Brasington**, Chemical Engineering

Advisor: Dr. Eric Beckman

**Nanoparticles and their Interactions with Water**

**Elizabeth Clark**, Materials Science and Engineering

Advisor: Dr. John Barnard

**Investigating Alternate Sources of Lighting for a Household Environment**

**Andrew Corris**, Chemical Engineering

Advisor: Dr. Marlin Mickle

**Cement Bonded Wood Composites**

**Molly McClelland**, Civil and Environmental Engineering

Advisor: Dr. Amir Koubaa

**Analysis of the Shrinkage Characteristics of High Slag Mixes and the Influence of Ambient Temperatures on the Hydration Process of Slag Mixes**

**Angela Heinzman**, Civil and Environmental Engineering

Advisor: Dr. Julie Vandenbossche

**Evaluating the Use of Phytoextraction by Arsenic-accumulating Ferns & Grasses as a Means of Water**

**Monica Higgins & Arica Santucci**, Civil and Environmental Engineering

Advisor: Dr. Radisav Vidic

**Self-Healing of Surface Coatings for Green Construction**

**Benjamin Slavin**, Computer Engineering

Advisor: Dr. Steven Levitan

## **2004 Participants**

**How Plants can be Identified and Classified as Phytoremediating Agents and Finding relevant Application of Their Use in Land and Water Reclamation**

**Chantal Blake**, Civil and Environmental Engineering

Advisor: Dr. Joseph MacNeil, Chatham College

**Proper Materials and Structure for Optimum Performance of Green Roofs in South Western PA**

**Daniel Bliss**, Civil and Environmental Engineering

Advisor: Dr. Robert Ries

**Green Structural Neurology- A Nervous System for Green Buildings**

**Justin Keogh**, Electrical Engineering

Advisor: Dr. Marlin Mickle

**Examining the Green Buildings of Healthcare Structures**

**Brett Rettura**, Bioengineering

Advisors: Drs. Kim Needy & Robert Ries

**Self-Healing of Surface Coatings for Green Construction**

**Benjamin Slavin**, Computer Engineering

Advisor: Dr. Steven Levitan