

Event Title

Transatlantic Climate Bridge: Undergraduate Research Symposium focusing on Energy and Climate Change

Symposium Description

The German Foreign Office and German Environment Ministry established the Transatlantic Climate Bridge initiative to foster transatlantic cooperation between Germany and the United States, helping these countries to find solutions on issues related to environmental change and energy use. Climate and Energy Campus Week, a project launched via the initiative, highlights undergraduate students' work in these areas. The symposium was sponsored by the Campus Week project. The event was co-sponsored by the University of Pittsburgh's Center for Energy and Office of the Provost.

The symposium was comprised of two sections. In the first, students presented videos on issues ranging from clean and secure sources of energy to climate and environmental change. In the second, students presented posters on research related to the same subjects. The videos and posters did not frame issues explicitly in terms of German-American relations, but the underlying science addressed problems common to both countries. The winners in the video category were:

Biofuels on Marginal Lands To Remediate Heavy Metal Soil Contamination (first place)

Author: Chris Rovensky

Faculty Mentors: Amy Landis and Jason Monnell

http://www.youtube.com/watch?v=7W2F_ouU-T0

Inspiration for Today's College Students: Renewable Energy for Families and Citizens of the 21st Century (tied for second place)

Authors: Megan Cichon, Ohiremen Dibua, Matt Dukewich, Matt Franklin, Elise Hinderliter, Chelsea Milito, Rachel Sandercock, Sam Schock, Rebecca Schroeder, Dustin Smith, Wen Xu, and Evan Crader

Faculty Mentor: Joseph J. Grabowski

<http://www.youtube.com/watch?v=Ua8UHhTMhdY>

Smart Grid Control Methodology for Integrated Distribution Management (tied for second place)

Authors: Chris Lippert, Ansel Barchowsky, and Adam Sparacino

Faculty Mentor: Gregory Reed

http://www.youtube.com/watch?v=aOX19pfVP_Y

The winners in the poster category were:

Marcellus Shale Flowback Water Treatment Feasibility Study with Acid Mine Drainage (first place)

Author: Emily Wolff
Faculty Mentor: Radisav Vidic

A Comprehensive Approach to Light Water Reactor Fuel Recycling and Lowering Radiotoxicity of High Level Waste: Assessment of Technical Requirements for Partition Technologies (tied for second place)

Author: Yasir Arafat
Faculty Mentor: Edward Lahoda

Synthesis and Characterization of a Series of Pore Functionalized Pillared-Layered Metal Organic Framework Type Materials for CO₂ Capture (tied for second place)

Author: Catherine Madden
Faculty Mentor: Christopher Matranga, National Energy Technology Laboratory

Acknowledgements

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We are grateful to Juan Manfredi, Office of the Provost; Mark Redfern, School of Engineering; Alberta Sbragia, Office of the Provost; and Dan Skrovaneck, Strategic Corporate Research. These individuals donated their time to evaluate the videos and posters.

Finally, and certainly not least, we thank the undergraduate students who participated in this event. These students, and their faculty mentors, conducted the research that made this event possible. The summaries and abstracts included in this program represent months, if not years, of their effort.

The Two Winning Videos in the German Competition

The winning videos and posters were subsequently submitted to the German embassy in Washington, D.C. The embassy collected submissions from all participating universities, and the two following videos were judged to be winners in their respective categories.

Smart Grid Control Methodology for Integrated Distribution Management

Authors: Chris Lippert, Ansel Barchowsky, and Adam Sparacino
Faculty Mentor: Gregory Reed

http://www.youtube.com/watch?v=aOX19pfVP_Y

Abstract: Research and development in the field of “smart grids” is advancing at an ever expanding rate, with an increasing number of industry participants and other key constituents internationally, including government entities and educational institutions. It is vital to understand the approaches being taken by these various entities in order to determine the optimal method by which to proceed with defining the smart grid and associated future developments. A survey was undertaken with the intent of determining representative approaches from various international participants, and combining them into an overarching view of the industry as a whole. This included smart grid activities across North America, Europe, Australia, and Asia. As a result, the more practical and efficient methods of improving the electrical grid were revealed, as well as gaps within the existing technology and standards. The most apparent gaps were determined to be in the following main areas: common communications; improved transmission and distribution controls; real-time information and incentives for both the end-user and the utility; self-healing grids; energy storage and renewable integration; and improved standards for the industry. In particular, future work into the development of improved control software for renewable integration utilizing energy storage is discussed, which will contribute to further research within the field.

Biofuels on Marginal Lands To Remediate Heavy Metal Soil Contamination

Author: Chris Rovensky

Faculty Mentors: Amy Landis and Jason Monnell

http://www.youtube.com/watch?v=7W2F_ouU-T0

Abstract: Biofuel-based phytoremediation is being evaluated as a beneficial means to repurpose potentially contaminated, underutilized urban marginal lands. Heavy metal concentration data has been collected from several sites since 2008 (shared through the generosity of a local Pittsburgh nonprofit community group) and analyzed by atomic absorption spectroscopy. New sites have been identified for the 2010 growing seasons. The biofuel crops could improve soil conditions at the sites, as well as alleviate the economic and social blight associated with vacant urban lands.