DIRECTOR OF RESEARCH REPORT 2016

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Director of Research, Robert Brecha, PDH Report 2

UNIVERSITY of DAYTON
Since the beginning of 2015 when the position of Director of Research for HSI was created, I have been involved in a variety of activities. Some of these were included in the original description of the position, others have developed over time. This report will summarize some of the main activities, which I would classify in different categories as 1) organizing faculty scholarship grants; 2) mentoring of undergraduate and graduate students; 3) leading a search committee for a post-doctoral researcher; 4) organizing and participating in conferences; 5) hosting a guest researcher; 6) participation in a climate change and environmental justice-themed theater piece; 7) maintaining an active research and publication program; 8) outreach in the form of public presentations, talks and media publications. I will address each of these areas in order (briefly).

HSI has now sponsored two calls for proposals from UD faculty and UDRI researchers. In the first round, six projects were funded for a total of $145,000, with faculty members from the School of Business, School of Engineering, Visual Arts, Natural Sciences and researchers from UDRI submitting successful proposals. The process was competitive, with over $500,000 in proposals submitted. Reports from the funded proposals will be submitted by scholars and researchers within the next month. The second round of proposals, in the Fall of 2015, resulted in requests for nearly $500,000 in funding, with $225,000 being awarded to faculty and researchers across a broad spectrum of disciplines.

HSI has funded several graduate students, including two in the Engineering Renewable and Clean Energy Master’s Degree Program. As a faculty member in that program, I am advising two of these students on their work. One student (Matthew Worsham) is developing a set of scenarios for UD to potentially follow on the way to achieving carbon neutrality, to which we committed as an institution through the American College & University Presidents’ Climate Commitment. The second student (Chris Wagner) is still in the process of developing his project, which may involve renewable energy projects in developing countries. In addition to the students directly funded through HSI, I have been advising four additional graduate students on either projects or theses. Three undergraduate students and one more graduate student will be joining the research group in August 2016.

After a failed first search for a post-doctoral researcher in Spring of 2015, we re-launched the search in Fall 2015 and successfully hired Felix Fernando, who started in March 2016. He has a broad and interdisciplinary background in natural resources, the natural and environmental sciences, as well as in sociological research and economics. We will be working with Felix over the coming year or two to help him develop his research agenda and give him experience in teaching and developing courses.

The 2015-2016 academic year has seen HSI involved in three conferences, either as lead organizers or partners. In Fall 2015, we worked with UD’s Human Rights Center on the second Social Practice of Human Rights Conference, held at UD. I was able to chair a panel discussion on human rights and environmental issues. In November 2015 we were the lead organizers of the Divest/Invest Conference held on campus, and again I was able to moderate a panel discussion and participate in the initial stages of organization of the conference. Finally, in March 2016, together with UD’s Dr. Vince Miller, we organized a conference on Laudato Si’, the papal encyclical released in June 2015. The conference included a highly-attended keynote talk by Prof. Ottmar Edenhofer, a colleague with whom I have worked for many years at the Potsdam Institute for Climate Impact Research in Germany. The outcome of that conference will be a textbook for use at Catholic universities, with contributions from the many theologians who took part in the conference. In addition to assisting with conference organization, I am contributing two chapters to the final book, one on the science of climate change and one on climate change mitigation options.
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For three months in early 2016 HSI has been hosting an international scholar, Dr. Falko Ueckerdt from the Potsdam Institute for Climate Impact Research (PIK). He and I have been developing further a project looking at the integration of fluctuating renewable energy sources into existing electricity grids. During his stay he has also been finishing a manuscript with colleagues from PIK looking at tradeoffs between future climate change damage costs and the costs of mitigating climate change.

We worked with Dr. Michelle Hayford of UD’s Theater Program to create and perform the play Sustenance in February 2016, collaborating with Michael Bashaw, HSI’s Visiting Sustainability Artist. The play grew out of an idea from a non-profit I co-founded with friends in Berlin, but with significant changes, additions and improvements by Dr. Hayford. The play was an interactive theater experience created to immerse the audience in the performance and raise empathy for the plight of climate refugees, those suffering from environmental injustice, and to think about the consequences of our own actions on both the natural world and on those around us.

My research and publication work has taken a number of forms, ranging from journal articles that have appeared within the past year or been submitted for publication, to conference talks and public presentations, to written blog contributions published on Huffington Post and radio essays broadcast on local NPR station WYSO. A list of these efforts is given below.

**PUBLICATIONS AND SUBMISSIONS OR WORKS IN PROGRESS**

“Climate Change Science,” Robert Brecha, Chapter for textbook volume, “Everything is Connected: Teaching Pope Francis’ Laudato Si’”

“What is to be done? Climate Change Mitigation,” Robert Brecha, Chapter for textbook volume, “Everything is Connected: Teaching Pope Francis’ Laudato Si’”

“How much is not enough? One-, two- and three-atmospheric-layer models for earth’s energy balance” R.J. Brecha, Submitted to American Journal of Physics, March 2016


“Analyzing major challenges of wind and solar variability in power systems” Falko Ueckerdt, Robert Brecha, Gunnar Luderer, Renewable Energy 81 (2015) 1-10 http://dx.doi.org/10.1016/j.renene.2015.03.02

PUBLISHED CONFERENCE PAPERS IN PROCEEDINGS AND PROJECT REPORTS


CONFERENCE TALKS AND POSTERS, AND SEMINARS

- “Sustenance: an original play about sustainability to promote empathy and action” Michelle Hayford and Robert Brecha, Association for Environmental Studies and Sciences, Washington, DC, June 2016
- “Sustainability Production and Practice for Higher Education” Panel discussion participant, Association for Environmental Studies and Sciences, Washington, DC, June 2016
- “Divestment: Useful strategy or distraction?” Panel discussion chair and organizer, Association for Environmental Studies and Sciences, Washington, DC, June 2016
- “Climate Change Science” Everything is Connected Conference, University of Dayton, March 3-5, 2016
PUBLIC AND OFF-CAMPUS TALKS, PRESENTATIONS AND PANELS

- “Disciplines or interdisciplines – Connecting physics education to the wider world of sustainability” Ohio Section AAPT talk, April 9, 2016
- “Let’s Talk about Religion, Politics ... and Physics” Ohio Section APS meeting invited talk, April 8, 2016
- “Climate change and food system resiliency” Yellow Springs Resiliency Network, Antioch College, Nov. 19, 2015
- “Transformative Classrooms for Sustainability” Community Solutions Conference, Yellow Springs, OH Sept. 26, 2015
- “Energy System Transformation, Climate Change Mitigation and Development” Antioch College Global Seminar, Aug. 6, 2015
- “A View of the Future Energy World” PEAL River Campus, Univ. of Dayton, Aug. 28, 2015
- “Does This Really Change Everything?” Unitarian Universalist Fellowship, Feb. 1, 2015

ON-CAMPUS CLASSROOM TALKS, PANEL DISCUSSIONS AND WORKSHOPS

“Climate Change and Climate Justice” Human Rights Week, March 9, 2016
“Ohio’s Energy Future Tour – Panel Discussion” University of Dayton, March 16, 2015

MEDIA INTERVIEWS AND CONTRIBUTIONS

- June 25, 2015 – Huffington Post: Can Free Trade Agreements be Consistent with Climate Change Mitigation http://www.huffingtonpost.com/bob-brecha/can-free-trade-agreements_b_7660580.html
- Feb. 18, 2015 – WLW: Conversation with Bill Cunningham (20 min.)