

The Ohio State University

Environmental Science Graduate Program Interdisciplinary Graduate Program Review

Self-Study Report

Spring 2013 to Autumn 2016

Office of Academic Affairs Program Review

June 30, 2017

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Executive Summary

The National Science Foundation “Grand Challenges for Biological and Environmental Research: A Long-Term Vision” emphasizes that the existential Grand Challenges of the future are: (i) inherently interdisciplinary and complex. And (ii) involve not just science and engineering, but also policy, government, and geopolitics. Directly in light of these challenges, the mission of The Ohio State University's Environmental Science Graduate Program (ESGP) is the pursuit and dissemination of knowledge and the training of skilled researchers and professionals in the interdisciplinary field of environmental science. ESGP, an interdepartmental program, is designed to cut across traditional academic disciplines, departments and colleges to provide sound and effective graduate education and research on interdisciplinary environmental issues.

ESGP is a unique graduate student program at OSU. It provides a synergistic resource for affiliated faculty that complements the research they conduct and the students they supervise through their department. ESGP faculty strongly attest that they would not simply use students from another existing graduate program to meet the needs of some of their collaborative and cross-disciplinary environmental research projects. We attract a unique set of high quality interdisciplinary students. Feedback from current graduate students through periodic surveys show that most of our applicants were directly attracted by our interdisciplinary program and would not have applied to non-ESGP programs at OSU. We provide an interdisciplinary graduate academic arm for interdisciplinary research initiatives at OSU, including Discovery Themes. ESGP is unique in that it provides a career-focused education and research experience from a wide range of environmental subdisciplines with 119 faculty across 27 departments and 7 colleges.

The total student number in the program has been relatively constant throughout the years, between 50 and 70, maintained by the available 1-year funding for 13-14 new students per year. The ESGP budget and organizational reporting process is through the OSU Graduate School, which leads the Program Council of Deans in oversight and funding of the program. The

co-directors of ESGP report to the Dean of the Graduate School. The annual budget for the program is consistently between \$500,000 and \$600,000. The majority of the annual budget, 80 to 90%, supports 13 student-years of support for our graduate students as teaching or administrative assistants.

ESGP works closely with graduate student program coordinators and human resource personnel in 27 departments across campus to make Graduate Assistant appointments. ESGP has a synergistic relationship with departments. Through their faculty participation in ESGP, departments gain revenue from courses and thesis research credit hours, access to high quality graduate students, revenue from ESGP students attending departmental courses listed as ESGP core courses, and additional resources for their department and research program in the form of fellowships, graduate teaching associate support, student presentation travel awards, and funding for student recruitment. The ESGP has established working relationships with Centers, Institutes, and the Discovery Themes (DT) Initiatives at OSU. Thirty-five percent of ESGP faculty are active participants of five DT. Many of the new faculty DT hires have joined the ESGP program because ESGP provides them with high quality interdisciplinary graduate students. Many faculty have commented that ESGP is essential to meet their DT research projects (please see faculty testimonials in Appendix I). ESGP works closely with centers and institutes to fill academic programmatic needs by creating new interdisciplinary specialization tracks. For example, the ESGP Agroecosystem specialization track meets some of the academic needs of the InFact and affiliated programs. We are actively working with the College of Public Health Environmental Health Science program to create an ESGP degree specialization track to meet their interdisciplinary program needs. The Sustainable and Resilient Economy (SRE) DT and the Subsurface and Energy Research Center (SERC) are interested in exploring an ESGP degree specialization track to meet their interdisciplinary program needs.

ESGP is successful at attracting, retaining, and training high quality graduate students. The average entrance GPA of 3.5 for M.S. and 3.6 for Ph.D. students and average GRE combined score of 315 for M.S. and 316 for Ph.D. are above the national average GRE combined score of 302. Many of the students were above the 75th percentile. ESGP students won a significant

number of fellowships (15 internal; 31 external fellowships and awards) over the last 3 years. Student scholarship is high with 73 presentations at scientific conferences and 97 peer-reviewed publications in scientific journals. Many of the student presentations were at prestigious international conferences and several publications in top-of-the-field, high-impact, refereed journals. ESGP graduates are trained for oral and written communication skills during 3 semesters in the ESGP graduate student seminar and in their research thesis work. The average time to completion for the doctoral degree is 5.5 years which is equivalent to comparable programs at OSU. The ESGP has been successful in attracting an extraordinarily diverse body of first-rate graduate students not only from the United States but from different continents. Thirty-three percent of our students are international. Over the last 5 years our student body has included 56% female and 7.5% of the domestic students from minority groups. From 2013 to 2016, 39 ESGP graduates have secured careers in academia (31%), industry (33%), and government (21%).

The majority of ESGP-affiliated faculty, 83%, have been active in the program over the last 3 years and directly contributed to students' education and research experiences. Interaction between faculty and students is made during the ESGP seminar and the monthly newsletter prepared by the student services office, through student supervision by thesis advisors and exam committees, and in ESGP core courses. Affiliated faculty can participate and contribute to the ESGP also by serving on the Graduate Studies Committee (GSC) that administers the academics of the program.

Our Self Study identified the following issues that ESGP strives to improve for the future:

- Funding to support more ESGP students has to be enhanced. The ESGP program does not admit approximately 50% of high quality student applicants conditionally accepted into the program because of insufficient financial support from supervisors, which could be leveraged by 1-year support through the ESGP. At the same time, faculty are looking for high quality interdisciplinary students to support their research in Discovery Themes and other interdisciplinary research. Our funding has gradually been reduced from 18

student-years per year in 2005 to 14-15 until 2015, to 13 students currently. ESGP is interested in closer coordination with Discovery Theme faculty to place high quality student applicants in their extramural research projects. ESGP will explore approaches to increase the student base and funding for it through external grants and through collaboration with other research and academic programs throughout OSU.

- Our student diversity has to be increased. We are improving our recruitment efforts through the existing OSU diversity student recruitment program (i.e., GPS, SROP). We will expand our recruitment to Honors programs at Institutions with diverse student bodies. Discovery Theme efforts to recruit diverse faculty will help ESGP improve its student recruitment. Future recruitment plans include visits to historically black colleges and universities to present “Why ESGP?” application workshops; attendance at an increased number of graduate school fairs; and building recruitment pipelines with 4-year universities as well as universities without graduate degrees in Environmental Science.
- ESGP has to improve awareness and communication with departmental units. Many Chairs and Faculty are not aware of the benefits of ESGP to their departments. Many do not realize resources provided by ESGP to their department are synergistic and not competitive. ESGP has to improve communication to provide information to departments on a continuing basis. Furthermore, improved communication will help ESGP expand its faculty base and recruitment of new faculty and will facilitate more synergistic participation in initiatives across campus.

1. Background

Establishment of the interdisciplinary Environmental Science Graduate Program (ESGP) was initiated in April 1989 by faculty from the colleges of Agriculture, Biological Sciences, and Engineering in response to growing demands by graduate students for degree programs in Environmental Science and by the increasingly interdisciplinary nature of research by faculty in this area. As an alternative to a new program, an ad-hoc faculty committee proposed to expand the existing Environmental Biology Graduate Program. This change was approved by the Ohio State University (OSU) Council on Academic Affairs in April 1991 and by the University Senate

in Spring 1991.

The new program started with the original faculty in Environmental Biology and members of the ad-hoc committee who developed the proposal. Professor Terry Logan of the Department of Agronomy was appointed as the first Director of the ESGP. An open invitation was extended to the university faculty to participate in the program. The faculty participation has continued to grow, increasing from 20 faculty members in Environmental Biology in 1991 to 119 currently. Faculty members hold appointments in 22 Departments and seven Colleges.

The total student number in the program has been relatively constant throughout the years, between 50 and 70, maintained by the available 1-year funding for new students per year, currently supporting 13 students. While most of the students are full-time, a small number are part-time, holding full-time jobs at the university, in state government, or local industry. Our graduates are employed as faculty members in universities around the world, working with industry, government agencies, and research scientists with both universities and industry.

The ESGP program has undergone comprehensive review in 2005 and 2008. In 2015, ESGP was included in the Environmental Science Network review. The co-Directors, Chair of the GSC, and Program Administrative Assistant conduct internal reviews of the program on an annual basis.

2. Current Program Overview

2.1. Mission/Vision/Goals

The Environmental Science Graduate Program (ESGP) is a multi-college endeavor at The Ohio State University (OSU) and is comprised of faculty from many departments within the Colleges of Arts and Sciences; Engineering; Food, Agricultural, and Environmental Sciences; Public Health; Public Affairs; Law; and Veterinary Medicine. The ESGP's mission is the pursuit and dissemination of knowledge and the training of skilled researchers and professionals in the interdisciplinary field of Environmental Science. Specifically, our academic program provides an

interdisciplinary curriculum for training across physical sciences and engineering, biological sciences, and social sciences with disciplinary depth in established specializations or self-designed by the graduate student's committee. In line with the Discovery Themes Initiative at The Ohio State University, which focuses on critical societal needs and environmental issues, ESGP is designed to provide novel interdisciplinary graduate education and research by bringing together disciplines and experts from across campus.

2.2. Research Foci

The dominant problems of the next century -- ecological, economic and political -- will be those of an interconnected, interdependent world population. Ecological issues, such as environmental degradation and resource depletion, are often the ultimate cause of economic and political policies. To deal with these issues it is important to understand the processes and principles of the environment -- embodied in environmental science. Understanding will come from research on the problems themselves and on the basic science underlying the problems. Examples of environmental issues studied by ESGP faculty that continue to grow in importance in the 21st century and beyond include: air quality; community and sustainable development; energy and environment; ecological engineering; carbon sequestration; ecosystems services; human health and the environment; forest ecology; natural resource management; remote sensing of the environment; water resources; and agroecosystems.

The program is designed around the following principles:

- Academic compartmentalization is often ill suited to learning about and solving the environmental problems of the 21st century.
- ESGP is designed to cut across traditional academic disciplines to provide sound and effective graduate education and research experience on these important environmental issues.
- Scientists and professionals are needed who, after achieving a solid disciplinary education in science-related fields as undergraduates, have integrated and interdisciplinary approaches to solve complex environmental issues.

2.3. Learning Goals

The Environmental Science Graduate Program emphasizes basic research on environmental processes and effects and on applied research and teaching that will contribute to solving the world's pressing environmental problems. Our goal is to educate the future generation of environmental scientists and professionals. Our learning goals are to graduate professionals who:

- Demonstrate an understanding of major global environmental problems and how biological, physical, and social sciences and engineering contribute to the interdisciplinary study of these problems and their solutions.
- Demonstrate in-depth understanding of one area of expertise within the environmental sciences, including the ability to analyze, synthesize, and apply research to aid in the understanding of the complexity and interconnectedness of environmental problems and their solutions.
- Conduct original, environmental science research that may involve modeling, laboratory



research, field-based experiments, and/or field research.

- Collaborate effectively as an environmental scientist in interdisciplinary project planning and in research efforts that engage multiple stakeholders.
- Communicate environmental science theories, research, and findings effectively in publications and in oral presentations.

2.4. Organizational Structure and Operation

The Environmental Science Graduate Program is an interdepartmental program. Its budget and organizational reporting process is through the Ohio State University Graduate School, which leads the Program Council of Deans in oversight and funding of the program. The Co-Directors of ESGP report to the Dean of the Graduate School.

ESGP is supported by the Ohio State University Graduate School. The annual budget for the program is consistently between \$500,000 and \$600,000. The majority of the annual budget, 80 to 90%, supports 13 student-years of support for our graduate students as teaching or administrative assistants, Other budget categories include staff salaries (1 program coordinator, 2 program directors @ 10% compensation), program operations, seminar program support, graduate student recruitment, and student travel awards to deliver presentations at scientific conferences.

Student support from sponsored research grants and contracts by ESGP faculty represents a major source of funding for our students. The ESGP provides two semesters of stipend and tuition and one summer semester of tuition for M.S. or for Ph.D. students. The remainder of the student financial support, 1-2 years for an M.S. and 3-4 years for a Ph.D, is provided by ESGP faculty from their sponsored research projects. This significant financial commitment from faculty underscores the importance of ESGP students to the successful completion of their research projects. ESGP has one endowed fellowship, the Fay, which provides additional 1-year support for 1-2 exceptional, incoming Ph.D. students per year.

2.5. Endowments

1. Environmental Science Graduate Program Development Fund - ESGP's Developmental Fund is used to facilitate better interaction with faculty and students. This fund is currently a pending endowment, the purpose of which is subject to change until the fund is formally approved as an endowment. Prior to such approval, the pending endowment also may be converted to a current- use fund.

2. Environmental Science Graduate Program Discretionary Fund -- The Discretionary Fund

supports the Environmental Science Interdisciplinary Graduate Program for events such as seminars, research events and collaborations, and other programmatic activities.

2.6. Working Relationships with Other Departments/Colleges

ESGP strives to be a One-University inclusive program. Over the last 5 years ESGP has widened the scope of faculty engagement to include, currently, 7 Colleges and 27 Departments and promote a more even distribution of faculty across Colleges and tenure initiating units (TIU). The criteria for accepting a request for faculty affiliation with ESGP are that the faculty's research is focused on aspects of environmental science and is interdisciplinary and that their affiliation request is supported by their TIU. ESGP student admissions criteria remain high with a high rate of success at fellowships and publication. ESGP is an "integrated research and teaching IGP" and provides a platform for collaboration between faculty in different departments and high quality students. As an example for the effectivity of the ESGP as a collaborative platform, ESGP faculty have led four funded Discovery Theme proposals.

Our program coordinator, Maura Eze, works closely with graduate student program coordinators and human resource personnel in 27 departments across campus to make Graduate Teaching Assistant (GTA) and Graduate Administrative Assistant (GAA) appointments in their departments. ESGP solicits feedback from the departmental graduate program coordinators regarding the performance of ESGP GAs and welcomes feedback regarding other administrative issues between ESGP and faculty home departments.

2.7. ESGP Synergy with Departments/Colleges

Through their faculty participation in ESGP, departments (TIUs) gain:

- Revenue from courses and thesis research credit hours returned to the respective TIU of ESGP faculty supervisors.
- Access to high quality graduate students of diverse backgrounds to support their sponsored research.
- Revenue from significant increased ESGP student attendance in department courses listed

as ESGP Core Courses.

- Meaningful interdisciplinary collaboration with other faculty from across OSU colleges.
- Additional resources for their department and research program in the form of fellowships, and Graduate Teaching Associate support.
- Platform for collaboration with faculty and peers across campus and the full breadth of environmental research at Ohio State University.
- Ability to collaborate academically across campus by designing specialization degree tracks. Current specialization tracks include Agroecosystems, Water Issues, Climate Change Science, and Policy.
- Financial support through the endowed Fay fellowship, graduate student recruitment activities, and awards for student travel to scientific conferences.

2.8. Working Relationships / Centers / Institutes / Department / Schools

The interdisciplinary ESGP has established working relationships with Centers, Institutes, and the Discovery Themes Initiatives at OSU. Thirty-five percent of ESGP faculty are active participants in the following five Discovery Themes.

Discovery Themes Initiative	Number of ESGP Faculty
Foods for Health	3
Initiative for Food and AgriCultural Transformation (InFact)	16
Infectious Disease	2
Materials and Manufacturing for Sustainability (M&MS)	3
Sustainable and Resilient Economy (SRE)	14
Total	38

ESGP faculty represent 17% and 13% of all faculty in the InFact and SRE Discovery Theme Initiatives, respectively. Many of the new faculty DT hires have joined the ESGP program because their research programs are highly interdisciplinary, ESGP provides them with high quality interdisciplinary graduate students, and the possibility to effectively collaborate with other faculty in their DT but in other departments as co-supervisors and committee members for

these students. Many faculty have commented that ESGP is essential to meet their DT research projects (please see faculty testimonials in Appendix I).

ESGP has cooperative relationships with several OSU Centers and Institutes by providing graduate students to faculty conducting research at the following centers:

- Ohio Water Resources Center: ESGP provides a GAA to the center annually
- Byrd Polar and Climate Research Center
- Global Water Institute, OSU
- Carbon Management and Sequestration Center
- Subsurface Energy Research Center

Many of the faculty in these centers, institutes, and DTs require students with interdisciplinary backgrounds and academic interests. One way ESGP works closely with centers and institutes to fill these needs is by creating new interdisciplinary specialization tracks; for example, the ESGP Agroecosystem specialization track meets academic needs of the InFact and affiliated programs. We are actively working with the College of Public Health's Environmental Health Science program to create an ESGP degree specialization track to meet their interdisciplinary program needs. The SRE DT and the Subsurface and Energy Research Center (SERC) are interested in exploring an ESGP degree specialization track to meet their interdisciplinary program needs.

2.9. Aspects of Uniqueness of the ESGP program

The dominant problems of the 21st century -- ecological, economic, and political -- will be those of an interconnected, interdependent world population. Ecological issues, such as environmental degradation and resource depletion, are often the ultimate cause of economic and social policies. Environmental scientists and professionals are needed who, after achieving a solid disciplinary education in science-related fields as undergraduates, have integrated and interdisciplinary approaches to deal with these problems. The complex nature of the topics environmental scientists study and the interdependence of environmental problems across the physical, biological, and human domains are essential to solve the environmental problems of the 21st

century and beyond.

The National Science Foundation's "Grand Challenges for Biological and Environmental Research: A Long-Term Vision" stresses that the existential Grand Challenges of the future are (i) inherently interdisciplinary and complex and (ii) involve not just science and engineering, but also policy, government, and geopolitics. The report recommends (i) systematic training for future scientists and engineering to address the Grand Challenges and (ii) strategic support for interdisciplinary research, including interdisciplinary graduate student programs.

The Ohio State University's Environmental Science Graduate Program (ESGP) is the only named Environmental Science graduate degree program at Ohio State. ESGP is designed to cut across traditional academic disciplines, departments and colleges to provide sound and effective graduate education and research on these important environmental issues. It is a unique graduate student program at OSU. Specific uniqueness of the program includes

- We provide a set of students with diverse academic backgrounds required by faculty to successfully complete an interdisciplinary component of their research. We are often the sole source of high quality interdisciplinary students essential to an ESGP faculty member's program. ESGP faculty have provided testimony to us that loss of ESGP would greatly diminish their program at OSU. ESGP faculty strongly attest that they would not simply use students from another existing graduate program to meet their needs.
- We attract a unique set of interdisciplinary students. Student feedback from current graduate students through periodic ESGP student surveys clearly states they would not have applied to non-ESGP programs at OSU. These students would bypass ESGP and pursue graduate studies at another university with an Environmental Science interdisciplinary program. All of the Tier 1 through Tier 3 and many Tier 4 university institutions have ES interdisciplinary degree programs.
- We provide an interdisciplinary academic arm for interdisciplinary research initiatives at OSU, including Discovery Themes. ESGP is designed to provide unique interdisciplinary environmental science graduate education and research by bringing

together disciplines and experts from across campus. Specifically, our academic program provides an interdisciplinary curriculum with disciplinary depth in established specializations. The specialization tracks are designed between ESGP and faculty from Research Centers or Institutes (i.e, Discovery Themes). The intent is to provide an interdisciplinary degree option without duplicating departmental degree programs. The interdisciplinary curriculum to ESGP is unique and designed to avoid overlap with established graduate program curricula at OSU.

- ESGP is unique in that it provides a career-focused education and research experience from a wide range of environmental subdisciplines with 119 faculty across 27 departments and 7 colleges. ESGP’s structure facilitates development of interdisciplinary curriculum across the University. ESGP has the greatest interdisciplinary breadth at OSU.

3. Program Impact

3.1. Admission Characteristics

Average Applicant Student Characteristics										
	2013		2014		2015		2016		Total	
	GPA	GRE	GPA	GRE	GPA	GRE	GPA	GRE	GPA	GRE
MS	3.43	318	3.43	314	3.5	314	3.38	315	3.44	315.25
PHD	3.7	324	3.38	310	3.54	321	3.48	311	3.53	316.5

Average Accepted Student Characteristics										
	2013		2014		2015		2016		Total	
	GPA	GRE	GPA	GRE	GPA	GRE	GPA	GRE	GPA	GRE
MS	3.41	312	3.48	323	3.58	303	3.3	312	3.44	312.5
PHD	3.71	324	3.49	316	3.54	311	3.12	313	3.47	316

ESGP strives to enroll the highest quality graduates into the program. Our applicant population includes domestic and international students of various academic backgrounds and undergraduate degrees. The mean scores for an ESGP applicant (2013-2016) are listed in the table above and represent a high quality applicant pool. The ESGP contributes to recruitment efforts in an attempt to further improve the quality and diversity of our applicants. Potential faculty supervisors can

request up to \$400 to assist with a campus visit of students whose grades are make them eligible for a University fellowship. We also partner with the Office of Recruitment and Diversity during annual recruitment events. The table above contains statistical data on the academic qualifications of all ESGP applicants and admitted students from Fall 2013 to Fall 2016.

3.2. Diversity

The ESGP has been successful in attracting an extraordinarily diverse body of first-rate graduate students not only from the United States but from different continents. Thirty-three percent of our students are international. Over the last 5 years our student body has included 56% female, and 7.5% of the domestic students are from minority groups.

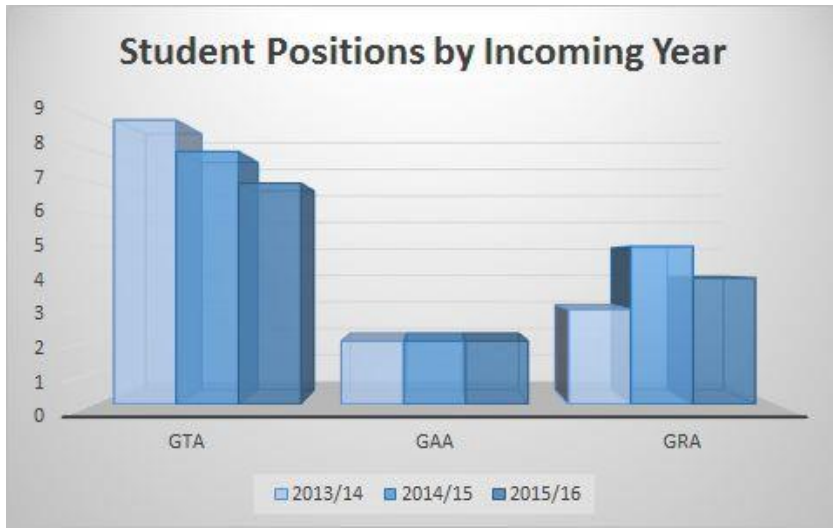
In collaboration with the College of Arts and Sciences Office of Recruitment and Diversity Services, ESGP successfully completed our first year recruiting through the GPS initiative. The GPS program includes: departmental visits with faculty members, administrators and graduate/professional students; workshops regarding essential graduate/professional school components; hotel accommodation at the Blackwell Inn on the Ohio State campus; and up to a \$250 honorarium. Ninety-two prospective minority students were in attendance. Along with other departments this recruitment event was planned for high-scoring, undergraduate minority students in Science fields. Other recruitment events successfully implemented in 2016 include: recruitment campaigns sent to GRE listservs containing contacts of high-scoring students; graduate school fairs aimed at recruitment of domestic students; and an updated website designed to attract prospective students while providing clear information about the program and general requirements.

3.3. Fellowships and Awards

ESGP students successfully competed for and won numerous scholarships and fellowships between 2013 and 2016 (Appendix II). During the report period, 31 students received a nationally competitive external (outside of OSU) fellowship or monetary award, and 15 students received an internal (within OSU) fellowship or monetary award.

3.4. Funding: GRA, GTA, GAA

ESGP has shown a strong commitment to include teaching as well as research in the mentoring of graduate students. Each newly admitted ESGP student is supported for two full semesters in

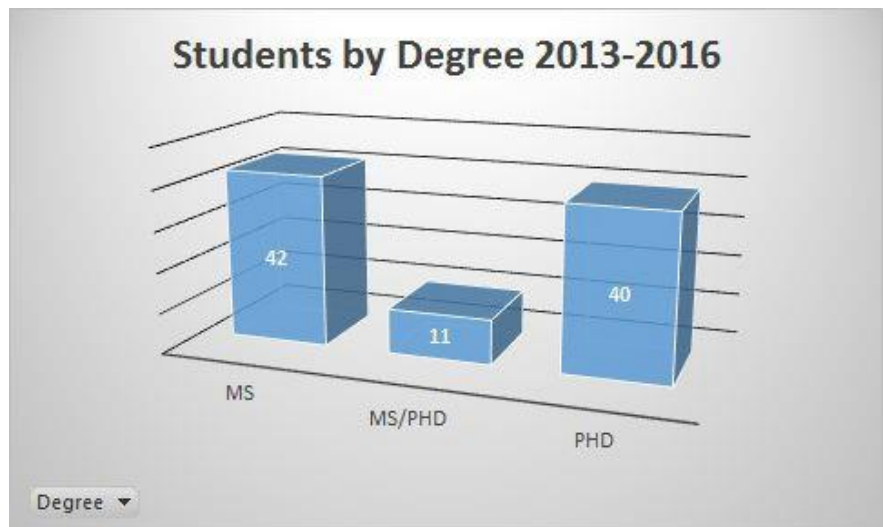


the capacity of the Graduate Teaching Associate (GTA), Graduate Administrative Associate (GAA), or Graduate Research Associate (GRA). The appointment is preferably done as a GTA in the supervisor's department. We have two GAA positions: one in our office, and the

other at the Ohio Water Resources Center; these are reserved for exceptional students that interview for these positions. In some cases, where there is no need for ESGP GTAs in the supervisor's department or other exceptional circumstances, the student may be appointed as a GRA for their supervisor. These graduate associate positions serve them well in the job market, as it gives them both experience and confidence in themselves and within their fields.

3.5. Time to Degree

MS: The average time to completion for the ESGP Masters in Science degree is 2 years. There are two track

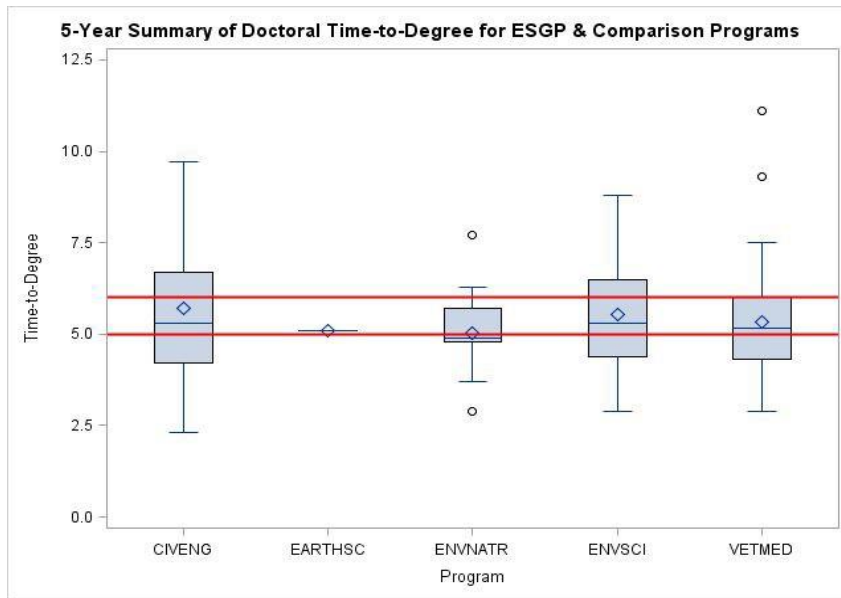


options, thesis (Plan A) or non-thesis (Plan B). Credit requirements for the thesis track is 30 hours while the non-thesis track requires 37 total hours. The majority of ESGP students follow the thesis track (Plan A), which requires the successful completion of research work and publishing a research thesis (Appendix III).

The final thesis is approved or rejected by the student's committee following a Final Master's Examination. The approved Master's thesis must be submitted to the Graduate School electronically as a PDF document and published through OhioLink; The Ohio Library; and Information Network.

For the non-thesis track, students must write an in-depth research paper on a subject agreed upon by the student, advisor, and committee. The paper is written in a style and format designated by a leading refereed journal in the student's field. The completed paper is evaluated by the advisor and committee to ensure that it is rigorous and detailed, analytical, and scholarly work. Further, the student must demonstrate a thorough knowledge of the literature relevant to the topic.

PhD: The average time to completion for the doctoral degree is 5.5 years (Appendix IV), there is some variation with the fastest students having completed the program within 3.5-4 years. The PhD requires 80 total credit hours with a possibility of 30 credits being transferred in from the student's MS degree. The thesis committee must include two additional ESGP-affiliated professors in addition to the student's supervisor and an external committee member not necessarily from ESGP. Students qualify for their candidacy, typically after 2-4 years in the program, by passing an exam. The exam is administered by the student's candidacy exam committee. The Candidacy Examination Committee can choose between two formats for administering the exam: a traditional written exam or a grant proposal-based exam. When the evaluations of the written portion are positive, the student can proceed to give the Graduate School the required two-week notice for the Oral portion of the Candidacy Examination.



3.6. Peer-Reviewed Journal Publications and Conference Presentations

ESGP is committed to scholarship and professional development of our students. We strongly encourage students to deliver presentations of their research at scientific conferences and to



publish their research in peer-reviewed scientific journals. We continually track publications and presentations of ESGP students.

ESGP students have delivered presentations, several invited, at prestigious scientific conferences including: American Chemical Society; American Geophysical

Union; Ecosummit; American Society for Microbiology; International Conference on the Biogeochemistry of Trace Elements; American Geophysical Union; The American Ecological Engineering Society; Goldschmidt Conference; Gordon Research Conference (Appendix V).

ESGP students have published research findings in a wide range of peer-reviewed scientific journals, including the following with high impact factors (listed in parentheses): Royal Society of Chemistry (38.7); Progress in Energy and Combustion Science (17.4); Journal of the American Chemical Society (13.1); Nature Communications (11.5); Nature Climate Change (7.9); Environmental Science & Technology (5.4); Environmental Pollution (5.1); Water Resources Research (5.1) (Appendix VI).

3.7. Placement

ESGP graduates are successful in securing industry, government, and academic positions. From 2013 to 2016 we have graduated 39 total students (20 masters and 18 doctoral, and one student receiving both an MS and a PhD) from ESGP. The table below shows placement data.

Student Placement Since 2013					
Academic	Government	Industry	Secondary Education	Other	Total
12	8	13	1	5	39
31%	21%	33%	3%	13%	100%

ESGP graduates have been awarded positions at prestigious institutions in the US and abroad, including:

Academia

- State University of New York (SUNY), Syracuse, NY
- Arizona State University, Tempe, AZ
- The City University of New York (CUNY), NY
- Corporación Universitaria Lasallista, Medellin, Colombia
- Mount Vernon Nazarene University, Mount Vernon, OH

Post-doctoral Researcher / Research Scientist:

- Passaic River Institute, Montclair State, New York, NY
- University of Hawaii

-
- Department of Science, Technology and Innovation, Bogotá, Colombia
 - The Ohio State University, Columbus, OH

Government

- U.S. Army Corps of Engineers, Engineer Research and Development Center
- U.S. Department of Energy, Washington, DC
- USDA Agricultural Research Service
- Ohio Department of Commerce, Columbus, OH
- Ohio Environmental Protection Agency, Columbus, OH
- National Energy Technology Lab, South Park Township, PA
- California Department of Pesticide Regulation, Sacramento, CA
- Beijing Institute of Water, Beijing, PRC

Industry

- JPMorgan Chase & Co., Columbus, OH
- Beijing Design Carbon Company, Beijing, PRC
- Advanced Cleanup Technologies, Inc., New York, NY
- GANIT Labs, Bengaluru, India
- Montrose Environmental Group, Inc., Portland, OR
- Renewable Energy Group, Inc., Des Moines, IA
- Karen Karp & Partners, New York, NY

3.8. Assessment of Student Learning/Progress

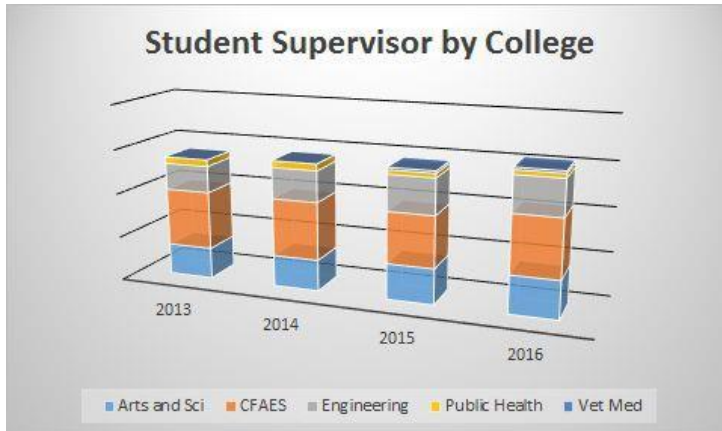
The ESGP participated in a pilot program by the Graduate School during 2015-2016 to define and develop an assessment plan for the program's learning goals. We have completed a learning goals assessment plan and in 2017 have started evaluating our students and program achievements of these learning goals according to the plan. Further feedback is solicited annually through an annual audit form the students submit to the ESGP office every May, through supervisor surveys for performance of GTAs every semester, and through surveys by the ESGP

Graduate Student Association (run by an elected committee of our graduate students)

3.9. Quality of Graduate Students in ESGP

The graduate students are very high quality based on the following metrics:

- The average entrance GPA was 3.5 for M.S. and 3.6 for Ph.D. students. The average GRE combined score was 315 for M.S. and 316 for Ph.D. students, which was above the



national average GRE combined score of 302. Many of the students were above the 75th percentile.

- ESGP students won a significant number of fellowships (15 internal sources; 31 external fellowships/awards).

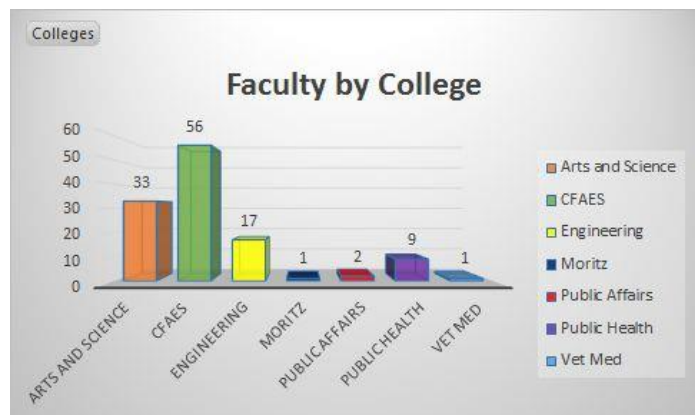
- Student scholarship is high with many presentations at scientific conferences and peer-reviewed publications in scientific journals.

- ESGP graduate students have teaching experience.
- ESGP graduates are trained for oral and written communication skills during 3 semesters in the ESGP graduate student seminar, and their research thesis work.

4. Program Faculty

4.1. How Faculty Involvement is Defined

Graduate Faculty in the ESGP are members of the University Graduate Faculty whose skills and educational qualifications could be supportive of the



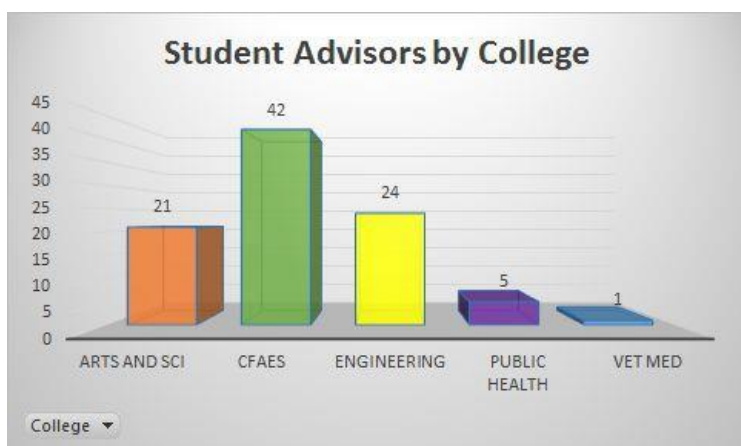
ESGP (Appendix VII). Regular members of the university faculty wishing to be appointed to the graduate faculty in the ESGP must submit a formal written request to the director of the ESGP, accompanied by a current vita, a letter of support from the administrative head of their academic unit, and a statement of purpose. This material is evaluated by the ESGP GSC, which will decide on the disposition of the pending appointment.

Adjunct faculty members must have an appointment as an adjunct graduate faculty member in a non-interdisciplinary graduate program prior to requesting admission to the ESGP faculty. When adjunct faculty members request appointment to ESGP, they will only be considered as “Affiliated Scientists.”

Currently, 119 faculty are affiliated with the ESGP (Appendix VII). Through an intensive recruitment nomination drive, ESGP gains new faculty each year. Once accepted into the program, membership involves consistent ESGP involvement. Faculty involvement surveys are used annually to determine individuals not actively engaged in the program and encourage them to further contribute and engage in the following year. New faculty and faculty not actively engaged are targeted during recruitment to serve as advisors for incoming students and to present their research in a seminar.

As an interdisciplinary program, ESGP facilitates intensive interactions between faculty and

students. This interaction creates an atmosphere where the cross-fertilization of ideas is constant and encouraged. Because all ESGP faculty are active in OSU research in other colleges, students benefit from a truly interdisciplinary program where cross-departmental collaboration is possible.

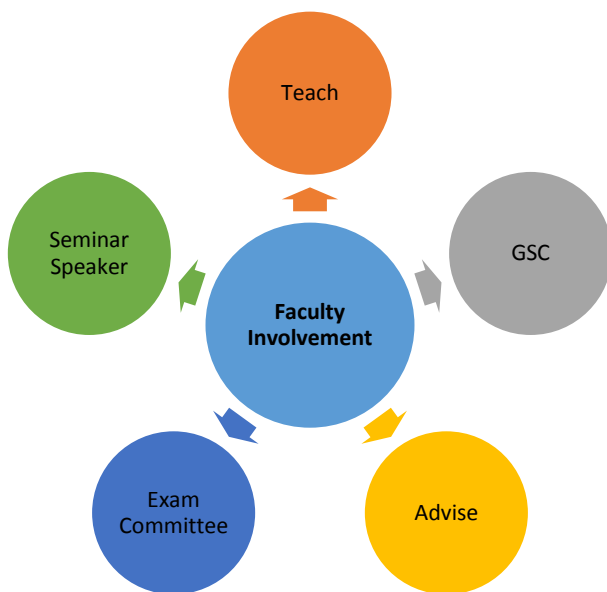


Faculty participation is required and made clear at the time of nomination. Each faculty interested in joining ESGP must first apply with a letter stating how the research they conduct contributes to the body of environmental research and explaining their needs for interdisciplinary collaboration beyond their home TIU. During this time, each potential member must also have support of his or her home department's chair. The application is discussed and voted for approval by the ESGP Graduate Studies Committee.

ESGP currently has affiliated faculty from 7 different colleges and over 27 schools/departments including Environmental and Natural Resources (SENR); Evolution, Ecology and Organismal Biology (EEOB); Food, Agriculture and Biological Engineering (FABE); Plant Pathology; Earth Science; Anthropology; Microbiology; Public Health; Civil, Environmental and Geodetic Engineering (CEGE); Entomology; Law; Geography; and Animal Sciences.

4.2. Faculty Involvement/Participation

A very high portion, 83%, of ESGP-affiliated faculty have been active in the program over the last 3 years and directly contributed to students' education and research experience in this program. There are five main opportunities for faculty to be active and to participate in student interaction: (i) teaching an ESGP core course; (ii) service on the GSC; (iii) advise an ESGP student, (iv) serve on an ESGP student's thesis or examination committee, (v) present in the ESGP graduate student seminar.



Teaching ESGP Core Course

34% of our affiliated faculty taught an ESGP core course. Core courses cover basic topics in three disciplines of environmental science: physical sciences, biological sciences, and Social sciences. Students must take 1(MS) or 2 (PhD) core course in each

discipline. The approval process for core courses requires the instructor (faculty) submit an application describing how the core course complies with the program goals, listed per discipline in the graduate handbook.

4.2.1. Role of Faculty in Program Governance - Graduate Studies Committee (GSC)

Service on the GSC is the second method of gauging faculty involvement. Between 2013 and 2016, 16% of ESGP faculty served at least one term on the six-member committee. Each GSC member serves three consecutive years. A new GSC chair is elected annually by its members.

The Graduate Studies Committee (GSC) is the legislative body of this interdisciplinary program. Policies for the ESGP are made by the graduate faculty in Environmental Science, an interdisciplinary body of professionals in several academic units throughout the university. Administrative responsibility for academic aspects of the operation of the program rests with the Graduate Studies Committee, which is elected by the graduate faculty and students and performs its responsibilities as assigned by the Graduate School's Council on Research and Graduate Studies and by the graduate faculty in Environmental Science. ESGP also receives input from two graduate student representatives.

4.2.2. Advising Graduate Student Research

56% of our affiliated faculty currently supervise or have supervised an ESGP student during the last 3 years. ESGP does not admit graduate students without a confirmed advisor. After being conditionally admitted by the GSC, each student must secure an ESGP faculty member as an advisor before they begin the program. Financial support for the student (as a GTA, GAA, or GRA) is conditioned on a funding plan signed by the supervisors that promises at least 1 or 2 (MS or PhD) years of support from research grants. This relationship is important to a successful completion of a graduate program. The Office of Student Services mediates the relationship. Students and advisors are encouraged to use the Office of Student Services as well as the GSC committee as resources in an effort to decrease the possibility of negative circumstances.

4.2.3.Exam Committees

77% of our faculty served or have recently served on graduate student committees for both ESGP masters and doctoral students. Students must assemble a full committee within the first year of study to help them design and approve individual plans of study. ESGP requires two members of the M.S. committee and 3 members of the Ph.D. committee be ESGP faculty. This requirement ensures that the faculty composition of the committee is highly diverse and interdisciplinary. The student's academic program, including coursework and research topic, must be interdisciplinary. Graduate student committees offer expertise from different areas of study and provide opportunities for even more interdisciplinary training and research. Committee membership in an interdisciplinary program allows for more in-depth research across disciplines.

4.2.4.Presenting in ESGP Seminar

All students must take three semesters of a one-credit seminar specifically designed for ESGP. Students give an entry presentation during the first year, and an exit presentation during the final year. This opportunity allows for interaction between ESGP students and faculty as faculty are invited to attend and critique each presentation. The seminar also helps train our students in presentation skills both in oral presentation, and with an annual student poster session that is part of the seminar. The seminar schedule is a 50-50% mixture of student presentations and external speaker presentations. Invited seminar speakers can be ESGP-affiliated OSU faculty or non-OSU affiliated. 16% of our affiliated faculty presented their research in the ESGP graduate seminar. We aim for a mixture of career stages, disciplines, and backgrounds among our invited speakers. Some non-OSU speakers from the last year include:

- **William Arnold**, Distinguished McKnight University Professor and Associate Department Head, University of Minnesota, Department of Civil, Environmental, and Geo-Engineering
- **Darren Drewry**, Scientist, NASA Jet Propulsion Laboratory
- **Matthew Reid**, Assistant Professor, School of Civil and Environmental Engineering, Cornell University
- **John Craynon**, Director, Appalachian Research Initiatives for Environmental Science

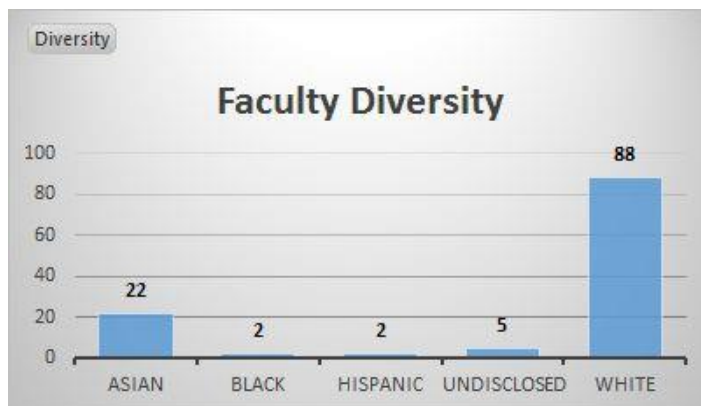
-
- **Karen Seidel**, The Nature Conservancy
 - **Lauren Kinsman-Costello**, Assistant Professor, Biological Sciences, Kent State University

4.3. Mechanisms for Student and Faculty Interaction

In an effort to facilitate and encourage connections between program faculty and students, the ESGP staff utilize a number of methods to foster meaningful interactions. Meaningful interaction is made during the seminar by being exposed to faculty research topics and with feedback on student presentations. A second tool used for communication and interaction is a monthly newsletter prepared by the student services office. The main topics addressed are student and faculty focused and include: student spotlights, publications, job postings, research opportunities, relevant workshops, and campus events. Students and faculty are asked for input in each edition, allowing more opportunities for involvement.

4.4. Diversity

Interdisciplinary programs such as ESGP draw from many academic disciplines that work together to create effective learning experiences and emphasize integrative learning, critical thinking, and creative problem solving. This program is valuable not only for its immediate benefits to our research, but also for keeping the door open to diverse career paths in the sciences. For this reason, diversity not only in subject matter but human interaction is crucial. There is a need for increased diversity within the STEM hiring in general at the university. This effort will positively affect ESGP's diversity within its pool of faculty.



5. Goals for Improvement and Development

5.1. Enhance Funding to Support More ESGP Students

The ESGP program does not admit approximately 50% of high quality student applicants accepted into the program because of insufficient financial support. At the same time, faculty are looking for high quality interdisciplinary students to support their research in Discovery Themes and other interdisciplinary research. ESGP is interested in closer coordination with Discovery Theme faculty to place high quality student applicants in their extramural research projects. ESGP will work with its faculty to encourage formation of other faculty focus groups.

5.2. Enhance Student Recruitment Portfolio

Our student diversity has to be increased. We are improving our recruitment efforts through existing OSU diversity student recruitment programs (i.e., GPS, SROP). We should expand our recruitment to Honors programs at institutions with diverse student bodies. Discovery Theme efforts to recruit diverse faculty will help ESGP improve its student recruitment.

Future recruitment plans include visits to historically black colleges and universities to present “Why ESGP” application workshops; attendance at an increased number of graduate school fairs; building pipelines with 4-year universities as well as universities without graduate degrees in Environmental Science.

5.3. Structural Management and Reporting at the University Level

Since conception in 1991, the program has reported to the College of Biological Sciences. Shortly after, ESGP reported to the College of Food, Agricultural, and Environmental Sciences (CFAES). The Task Force on Environmental Sciences, established by Provost Alluto in 2008, recommended ESGP be more centrally organized rather than located in a specific College (i.e., CFAES). ESGP was placed under the newly created Environmental Science Network (ESN), which reported to the Graduate College. After elimination of ESN in 2015, ESGP currently

reports directly to the Graduate College. The program under the Graduate College is viewed as a “centrally organized” IGP meeting the vision of the 2008 Environmental Task recommendation.

5.4. Improve Awareness and Communication with Departmental Units

Many department chairs and faculty are not aware of the benefits of ESGP to their TIU. Many do not realize resources provided by ESGP to their TIU are synergistic and not competitive. ESGP has to improve communication to provide information to TIUs on a continuing basis. Also, improved communication from TIU to ESGP will help ESGP improve its program to be synergistic.

6. Appendices

Appendix I - Faculty Testimonials

Appendix II - Fellowships and Awards

Appendix III - Graduate Student Theses

Appendix IV - Time to Degree

Appendix V - Student Presentations

Appendix VI - Student Publications

Appendix VII - Faculty List



Karen C. Dannemiller, PhD

Assistant Professor

College of Engineering, Civil, Environmental & Geodetic Engineering

College of Public Health, Environmental Health Sciences

Environmental Science Graduate Program

The Environmental Science Graduate Program (ESGP) has been crucial in supporting my interdisciplinary research here at Ohio State. I was hired in January 2016 under the Sustainable and Resilient Economy Discovery Theme with a joint position between Civil, Environmental and Geodetic Engineering and Environmental Health Sciences. My research focuses on the “indoor exposome,” the complex mixture of microbes and chemicals that we are exposed to daily. My work is inherently interdisciplinary, bridging engineering, public health, and microbiology.

The environmental issues of today are critically important as well as increasingly complex. Most of these challenges require an interdisciplinary approach spanning multiple traditional disciplines. Fortunately, ESGP allows Ohio State researchers to remain on the cutting-edge to tackle the emerging problems of today by providing a diverse pool of students. For instance, my interdisciplinary research requires high-quality students interested in environmental challenges from diverse backgrounds including public health, microbiology, engineering, and other related fields. The opportunity to work with ESGP students has been a tremendous catalyst for my work. The ESGP students complement the students from my departments to provide a broader and more diverse approach to challenges than would otherwise be possible.

I currently have one ESGP student, Ashleigh Bope, working in my group as of May 2016. I was thrilled to invite her into my lab with her wide range of coursework in physical, biological, and chemical sciences. For my group she was a perfect fit. This demonstrates how ESGP ensures that talented, multidisciplinary students have a path to enroll at Ohio State, even students with broad interests that do not necessarily “fit” into traditional departments. I am hoping to incorporate 1-2 additional ESGP students into my group next academic year to work on more interdisciplinary projects.

Ashleigh has been working on two research projects. The first is the “Sleep Loss and Environmental Exposures in Asthma Patients (SLEEAP)” study, which is funded from a Sustainable and Resilient Economy Discovery Theme Seed Grant. In this project, we are collaborating with researchers within and

outside the university to measure microbial and chemical exposures in bedroom dust of adult women with asthma. Collaborators include Matthew Sullivan (ESGP, Microbiology and Civil, Environmental and Geodetic Engineering), Andrew May (ESGP, Civil, Environmental and Geodetic Engineering), and Jessica Castner (Nursing, external to OSU). We will be able to compare these indoor exposures to asthma severity scores. The second project involves characterizing the use of cutting-edge digital PCR technology for measurement of microbes in the indoor environment. She has already produced enough data to present her work in a poster at the National Council for Science and the Environment (NCSE) conference in January 2017.

I can see the tremendous support that the program provides to its students as well. First of all, the flexibility in course choice allows the students and advisor to work together to tailor a class schedule specifically to the needs and interests of the student. This allows them the optimal path to prepare to achieve their future career goals. Additional, ESGP provides GTA/GAA support, travel support, and opportunities to present in the ESGP seminar series.

ESGP integrates perfectly with the Discovery Themes initiative on campus. The Discovery Themes launched in 2012 to further enhances excellence at Ohio State in Energy and Environment, Food Production and Security, Health and Wellness and the Humanities and the Arts. Much of this involves forming interdisciplinary linkages between departments across campus. First, I was able to meet additional ESGP faculty members across campus through my involvement. Second, after interdisciplinary collaborations are formed, it is critical to find high-quality interdisciplinary students with an appropriate background to work on the project. In this case, I plan to turn to ESGP in the future.

As I complete my first year as a faculty member on campus, I am extremely thankful for the ESGP program. This program has catalyzed my interdisciplinary research activities and provided tremendous support and flexibility for my student. This program provides a tremendous services to researchers in environmental science, and I look forward to seeing the great accomplishments at Ohio State that will result from the program in the future.



June 28, 2017

W. Randy Smith, Vice Provost for Academic Programs
Office of Academic Affairs Ohio State University
Columbus, OH 43210

RE: Letter of Support for the OSU Environmental Science Graduate Program (ESGP)

Dear Dr. Smith:

Please accept this letter as an expression of enthusiastic support from myself, as Interim Chair, and the faculty members in the College of Public Health Division of Environmental Health Sciences for the interdisciplinary Environmental Science Graduate Program (ESGP) at The Ohio State University (OSU). Environmental quality and the need to manage and control levels of contaminants in air, water, soil and foods, as well as, environmental sustainability to protect natural resources represent major concerns and issues domestically and internationally. In relation, at the core, are more specific concerns for potential and real adverse direct and indirect impacts of various contaminants and/or depleting resources on the health of humans, animals and plants.

Given the ongoing expanded scope and depth of applicable faculty expertise and research and teaching interests at OSU, the interdisciplinary ESGP will continue to improve and evolve to higher-levels of greatness. Indeed, although ESGP has an impressive history to date, there is much more to establish and achieve as part of a cooperative and collaborative continuous quality improvement process. The leadership of ESGP and its Graduate Studies Committee are working toward expanding ESGP specializations. For one example, faculty members and I have worked together to develop curricula for a specialization in Environmental Public Health (EPH) as a new specialization under the ESGP's MS and PhD degrees in Environmental Science. Curricula for the EPH specialization have been developed for each degree and are currently under GSC review. This is a creative interdisciplinary effort to move basic and applied specializations from the College of Public Health for incorporation into the ESGP. This action will serve to help consolidate existing programs, strengthen curricula and collaborative research, and improve the quality, efficiency and effectiveness of ESGP. In addition, ESGP activities are aligned with several Discovery Theme initiatives (e.g. Sustainability; Infectious Diseases) and emergence of new institutes (i.e., Infectious Disease; Global Water). Additional examples involving other units within OSU will likely emerge.

OSU is in a position to be among the leaders in environmental science education, training and research to prepare the future workforce, generate new knowledge, and address societal needs relevant to environmental concerns and issues. On behalf of the College of Public Health Division of Environmental Health Sciences we respectfully encourage the University to continue its support to expand, strengthen and sustain the ESGP.

Sincerely,

Michael S. Bisesi
Senior Associate Dean for Academic Affairs College of Public Health
Professor and Chair (interim), Division of Environmental Health Sciences

2013-2016

Fellowship/Award	Number of Students	Internal/External
OARDC	7	External
National Science Foundation (NSF)	5	External
Fulbright	1	External
Korean-American Scientists and Engineers Association	1	External
Marian P. and David M. Gates Graduate Student Fund Fellowship	1	External
Little Garden Club of Columbus Presentation Award	1	External
Ohio Farm Bureau Foundation Scholar Award	1	External
Katharine M. Grosscup Scholarship	2	External
Artist in Landscape Design by Fullmer's Landscaping, Inc Scholarship	1	External
JASSO long-term study abroad program	1	External
American Society of Microbiology (ASM) Student travel grant	2	External
NASA Earth & Space Science (NESSF) Grant	1	External
Phil Kozel Memorial Scholarship	1	External
Dade FNGLA Living Legends Scholarship	1	External
Ohio Sea Grant	1	External
U.S. Depart. of Energy Office of Science Graduate Student Research	2	External
Stimson-Duvall Fellowship	1	External
Knauss Fellowship	1	External
University Fellowship	3	Internal
FAY	6	Internal
The Ohio State University SENR GradRoots Minigrant	1	Internal
OSU Presidential Fellowship	1	Internal
OSU Subsurface Energy Resource Center Seed Grant	1	Internal
Office of Energy and Environment Grant	3	Internal
Total	46	

Spring 2013 Grads

Ansari, Maryam I. (Cluff): Cluff, M. (2013). Microbial Aspects of Shale Flowback Fluids and Response to Hydraulic Fracturing Fluids . (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Kerrick, Benjamin: Kerrick, B. C. (2013). Borrowed Ground: Evaluating the Potential Role of Usufruct in Neighborhood-Scale Foodsheds (Doctoral dissertation, The Ohio State University).

Kolbe, ElizabethKolbe, E. L. (2013). Visualizing and Quantifying a Normative Scenario for Agriculture in Northeast Ohio (Doctoral dissertation, The Ohio State University).

Mou, Qian: Non-Thesis/Exam

Xu, Jie Xu, J. (2013). Using Tall Fescue to Remove Nutrients from Renovated Turkey Processing Wastewater. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Yin, Tingting: Non-Thesis/Exam

Zaret, Shannon Zaret, S. L. (2013). Volunteer Establishment of *Miscanthus× giganteus* Vegetative Propagules: Implications for Biofuel Production (Doctoral dissertation, The Ohio State University).

SU 2013 Grads

Hottle, Ryan: Hottle, R. D. (2013). Quantifying the impact of biochar on plant productivity and changes to soil physical and chemical properties on a maize soybean rotation in the US (Doctoral dissertation, The Ohio State University).

AU 2013 Grads

Dey, Swagata: Dey, S., (2013): Exploring "Metal to Change" Charge Transfer Process in AWO₄ and AMoO₄ Type Compounds

Hua, Wei: Hua, W. (2013). Interfacial Water Organization and Ion Distributions Investigated with Vibrational Sum Frequency Spectroscopy: Answering Fundamental Questions for Environmental Chemistry. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Li, Yueh-Fen: Li, Y. (2013). An Integrated Study on Microbial Community in Anaerobic Digestion Systems. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Naor Azrieli, Liel: Naor Azrieli, L. (2013). Determining the Meteorological Forcing that Affects the Dynamics of Methane Emissions from Wetlands. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu>

Xie, Yina: Xie, Y. (2014). Watershed Modeling, Farm Tenancy and Adoption of Conservation Measures to Facilitate Water Quality Trading in the Upper Scioto Watershed, Ohio. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

SP 2014 Grads

Nye, Mark E.: Nye, M. E. (2014). Microbial Community Structure in Soils Amended With Glyphosate Tolerant Soybean Residue (Doctoral dissertation, The Ohio State University).

Stuckman-Yi, Mengling: Stuckman, M. Y. (2014). Biotic Arsenic Mobilization in Natural and Anthropogenic Systems from Redox Transformations of Arsenic, Iron and Sulfur (Doctoral dissertation, The Ohio State University).

Villa Betancur, Jorge A: Villa Betancur, J. (2014). Carbon Dynamics of Subtropical Wetland Communities in South Florida. (Electronic Thesis or Dissertation).

SU 2014 Grads

Sharma, Kuhuk: Sharma, K. (2014). Assessment of heavy metal contamination and restoration of soil food web structural complexity in urban vacant lots in two post-industrial cities (Doctoral dissertation, The Ohio State University).

Xu, Fuqing: Xu, F. (2014). Experimental Studies and Modeling of Solid-State Anaerobic Digestion for Enhanced Methane Production from Lignocellulosic Biomass. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Zhang, Feng: Zhang, F. (2014). Cyanobacterial blooms: causes, innovative monitoring and human health impact. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

AU 2014 Grads

McDonough, Peter: McDonough, P. (2014). The effects of Food Aid in Agricultural Practices in Jumla, Nepal. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Wojno, Michal: Wojno, M. (2014). Improved diet utilization of intensively cultured fish to address environmental sustainability - amino acid requirement in carp (*Cyprinus carpio*). (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

SP 2015 Grads

Boaz, Lindsey: Boaz, L. (2015). Influences of fluvial geomorphology on aquatic-to-terrestrial Hg transport: evidence from protected and urban streams of central Ohio, USA. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Chatziefstratiou, Efthalia: Chatziefstratiou, E. (2015). Simulation of Tree Stem Injury, Air Flow and Heat Dispersion in Forests for Prediction of Fire Effects. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Kim, Taewook: Kim, T. (2015). GSFLOW Modeling of the Souhegan River watershed, New Hampshire, USA. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Wang, Yaoping: Wang, Y. (2015). Statistical Downscaling along the US Eastern Coast by Two Methods with Application on Intensity-Duration-Frequency curve Changes. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Zhao, Yiming: Zhao, Y. (2015). Trends of Air Temperature, Precipitation and Potential Evapotranspiration in Southeastern United States and East-central China. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

SU 2015 Grads

Eidson, Christopher: Eidson, C. (2015). Soil quality and corn-soybean yields as affected by winter rye at three sites in the U.S. Corn Belt. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Hariharan, Janani: Hariharan, J. (2015). Predictive Functional Profiling of Soil Microbes under Different Tillages and Crop Rotations in Ohio. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Liang, Zhenfei: Non-Thesis/Exam

Moonilall, Nall: Moonilall, N. (2015). Impact of Amendments on Soil Properties and Agronomic Productivity in Guyana. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Sutton, Claire: Sutton, C. (2015). Impact of Management on Soil Fertility and Rice Yields in Smallholder Farms in Tanzania. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

AU 2015 Grads

Evert, Mary: Evert, M. (2015). Influence of NOM Molecular Characteristic on Uranium Cycling in a Catchment. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Hsu, Tsung-Ta: Hsu, T. (2015). Public Health Ecosystem Services and Potential Concerns of Freshwater Wetlands. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Kenny, William: Kenny, W. (2015). The Development and Application of the Hi-Resolution VOC Atmospheric Chemistry in Canopies Model. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

McClain, Krystaal: McClain, K. (2015). Environmental Drivers of Migration in Two Israeli Raptor Species. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

SP 2016 Grads

Bossley, Jon: Bossley, J. (2016). Environmental Impact from Outdoor/Environmental Education Programs: Effects of Frequent Stream Classes on Aquatic Macroinvertebrates. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Johnson, Reed: Johnson, R. (2016). On-Farm Assessment of Soil Properties under Different Management Practices in West-Central Ohio. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Peng, Qicheng: Peng, Q. (2016). Impact of Precipitation Variability on Above- and Below-ground Carbon Allocation of Maize (*Zea Mays*. L.). (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Sovic, David: Sovic, D. (2016). Estrogens, Endocrine Disruption, and Approaches to Assessing Gametogenesis and Reproductive Condition in Freshwater Mussels (Bivalvia: Unionidae). (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

SU 2016 Grads

Albanese, Katie: Albanese, K. (2016) .Environmental Impact from Outdoor/Environmental Education Programs: Effects of Frequent Stream Classes on Aquatic Macroinvertebrates

Bell, Patrick: Bell, P. (2016). Sustainable Intensification for Food Security and Climate Change Adaptation in Tanzania. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Bond, Laura: Bond, L. (2016). Impacts of Hydraulic Fracturing Infrastructure on Storm Runoff Characteristics

Reppun, Frederick: Reppun, F. (2016). Invasive Marine Algae as a Soil Amendment for Island Farmers: Agronomic and Ethnographic Assessment of Implications for Nutrient Management. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Stevens, Brooke: Stevens, B. (2016). Bioaccessibility, Bioavailability, and Chemical Speciation of Arsenic in Contaminated Soils and Solid Wastes

Stinner, Jedediah: Stinner, J. (2016). Effects of Agroecosystem Management on water quality in multiple watersheds in Ohio. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

Sutula, Glenn: Sutula, G. (2016). Developing a Framework for the Purposes of Locating Undiscovered Hydrogeologic Windows. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>

AU 2016 Grads

Stuckman, Scott: Stuckman, S. (2016). Global Three-Dimensional Atmospheric Structure of the Atlantic Multidecadal Oscillation as Revealed by Two Reanalyses

	CIVENG	EARTHSC	ENVNATR	ENVSCI	VETMED
# of Grads	19	1	21	24	60
# of AY included	5	1	4	5	5
Mean	5.71	5.10	5.04	5.53	5.33
Median	5.30	5.10	4.90	5.30	5.15

Albanese, Katie

Albanese, K., Lanno R., Chakraborty, M., Hadad, C., Chin, Y, (2013). "Fate and Toxicology of Emerging Environmental Contaminants." Poster Presentation, American Chemical Society National Meeting, Indianapolis, ID.

Betancur, Jorge A Villa

Betancur, J. A. (2013). Oral Presentation. Annual Society of Wetland Scientists (SWS), Duluth, MN.

Bond, Laura

Bond, L., (2015). "The Impact of Hydraulics Fracturing Infrastructure on Storm Runoff Characteristics." Oral Presentation. World Environmental & Water Resources Congress, West Palm Beach, Florida.

Bond, L., (2016). "Infrastructure on Storm Runoff Characteristics." Poster Presentation, World Environmental & Water Resources Congress, Sacramento, CA.

Borton, Mikayla

Borton, M., (2016). "Methanohalophilus is the dominant source of biogenic methane in hydraulically fractured shales." Poster Presentation. The Eastern Section of the American Association of Petroleum Conference, Lexington, Kentucky.

Chatziefstratiou, Eftalia K

Chatziefstratiou, E.K., Bohrer, G., (2014). "Resolving the effects of canopy structure on fire-emitted heat transport using large eddy simulations." Oral Presentation. 31st Conference on Agricultural and Forest Meteorology, Portland, OR.

Chatziefstratiou, E.K., William, K.T., Heilman, W.E., Bohrer, G., (2014). "Resolving the effects of canopy structure on fire-emitted smoke dispersion using large eddy simulations." Oral Presentation. Large Wildland Fires: Social, Political and Ecological Effects Conference, Missoula, MT.

Cluff, Maryam

Cluff, M.A., (2013). "Deconstructing Microbial Community Profiles in Hydraulic Fracturing Fluids to Elucidate in-situ Subsurface Community Dynamics." Poster Presentation. American Society for Microbiology 113th general meeting , Denver, CO.

Evert, Mary

Evert, M., (2014). "NOM Molecular Characterization to Better Understand Uranium Mobility in Aquifer Sediments and Groundwater." Oral Presentation. Goldschmidt Conference, Sacramento, CA.

Fair, Heather

Fair, H., (2016). "Osmotic Regulation as a Potential Factor in Distribution of Aquatic Nymphs in Glacier Watersheds." Poster Presentation. Society for Freshwater Science, Sacramento, CA.

Fen, Li

Fen, L., (2013). "Investigation of the Microbial Community in a Mixed Plug-Flow Loop Reactor (MPFLR) Fed with Dairy Manure." Poster Presentation. American Society for Microbiology, Denver, CO.

Fen, L. (2013). "Development of a whole-cell bacterial biosensor for the detection and measurement of propionate." Poster Presentation. American Society for Microbiology, Denver, CO.

Guo, Yanting

Guo, Y., (2015). "The Potential of Applying Water Quality Trading in the Former Great Black Swamp under Changing Climate." Poster Presentation. EPA-USDA National Workshop on Water Quality Markets Conference Lincoln, NE.

Hua, Wei

Hua, W., (2013). Poster Presentation. ACS Spring Meeting, New Orleans, LA.

Hsu, Tsung-Ta

Hsu, T.D., Lee, J., (2015). "Sustainable Water Quality Management and Public Health Protection by Urban Wetlands." Poster Presentation. Water Management Association of Ohio Fall Conference and Annual Meeting, Columbus, OH.

Hsu, T.D., Lee, J., (2015). "Arcobacteria in urban wetland water: Characterization of Antimicrobial resistance patterns." Poster Presentation. OARDC Research Conference, Columbus, OH.

Hsu, T.D., Lee, J., (2014). "Toward Urban Sustainability: Reducing Waterborne and Foodborne Pathogens with Constructed Wetlands." Poster Presentation. American Society of Microbiology General Meeting in Boston, MA.

Lattin, Esther

Lattin, E., (2016). "Characterization of Soil Microbial Communities in Shrub/Millet Systems of the Sahel with EL-Fame Analysis." Oral Presentation. Soil Science Society of America, Phoenix, AZ.

Laudick, Julie

Laudick, J., (2016). "Trends in bioproduct use on organic vegetable farms: A 2009-2014 survey of Ohio organic system plans." Oral Presentation. The American Society for Horticultural Science Conference. Atlanta, Georgia.

Laudick, J., (2016). "On-farm evaluation of six commercially available biofertilizers on organic tomato and broccoli." Poster Presentation. The American Society for Horticultural Science Conference. Atlanta, Georgia.

Lee, Seungjun

Lee, S., (2016). "Profile of soil microbiome in US cattle farms and distribution of antibiotic resistance genes and zoonotic pathogens." Poster Presentation. The 16th International Symposium on Microbial Ecology. Montreal, Canada.

Lee, S., (2015). "Photocatalytical enhanced inactivation of internalized salmonella typhimurium in lettuce using UV with TiO₂." Poster Presentation, Institute of Food Technologists Annual Meeting, Chicago, Illinois.

Lee, S., (2015). "Understanding the Role of Soil in Zoonotic Pathogen Transmission and Water Contamination in Cameroon using One Health Approach". Poster Presentation. Water Microbiology Conference, Chapel Hill, NC.

Lee, S., (2015). "The Effects of Beneficial Bacteria and Other Treatments on Bacterial and Fungal Community Profiles in Window-based Hydroponic Systems." General Meeting American Society for Microbiology, New Orleans, LA.

Lee, S. (2015). "Arcobacter internalization in fresh produce: An emerging food safety issue under frequent extreme weather events." OARDC Research Conference, Columbus, OH.

Liel, Naor-Azrieli

Liel, N. A, Morin, T.H., Bohrer, G., Schäfer, K.V.R., Brooker, M., Mitsch, WJ., (2013). "Effects of environmental conditions on an urban wetland's methane fluxes." Poster Presentation. American Geophysical Union Meeting 2013, San Francisco, CA.

Lin, Long

Lin, L., Li, Y., (2016). "Recirculating digestate as inoculum for semi-continuous solid-state anaerobic digestion: reactor performance and microbial communities." Poster Presentation. ASABE Annual Meeting. Orlando, FL.

Lin, L., Li, Y., (2016). "Semi-continuous solid-state anaerobic digestion of lignocellulosic biomass for biogas production: recirculating digestate as inoculum." OARDC Annual Research Conference, Wooster, OH.

Lin, L., Yang, L., Li, Y., (2014). "Side-by-side comparison of solid-state anaerobic digestion and composting of yard trimmings with effluent from liquid anaerobic digestion." Poster Presentation. ASABE Annual meeting, Montreal, QC, Canada.

Lin, L., Yang, L., Xu, F., Li, Y., (2014). "A side-by-side comparative study of solid-state anaerobic digestion and composting using yard waste and liquid anaerobic digestion effluent." OARDC Annual Research Conference, Wooster, OH.

Lin, L., Xu, F., Michel, F.C. Jr., Li, Y., (2013). "Yard trimmings and liquid AD effluent - dry digestion vs. composting comparisons." BioCycle 13th Annual Conference, Columbus, OH.

Mori, Hiroko

Mori, H., Wu, J., Ibaraki, M., Schwartz, F., (2016). "Predicting Human Disease Cases of West Nile Virus from mosquito abundance and transmission factors." Poster Presentation. American Society of Tropical Medicine and Hygiene 2016, Georgia, Atlanta.

Morin, Timothy

Morin, T.H., Bohrer, G., Naor-Azrieli, L., Mesi, S., Schäfer, K.V.R., Stefanik, K., Mitsch, W.J., (2013). "Effects of environmental conditions on an urban wetland's methane fluxes." Poster Presentation. 13th Annual American Ecological Engineering Society Meeting. East Lansing, MI.

Morin, T., Bohrer, G., Vogel, C., (2013). "Environmental drivers influence carbon emissions and storage of a freshwater lake." Poster Presentation. American Geophysical Union Meeting 2013, San Francisco, CA.

Morin, T.H., Bohrer, G., Naor-Azrieli, L., Mesi, S., Schäfer, K.V.R., Stefanik, K., Mitsch, W.J., (2013). "Effects of environmental conditions on urban wetland's methane fluxes." Poster Presentation. 42nd Annual Water Management Association of Ohio Conference: Innovations in Water Resource Management, Columbus, OH.

Morin, T.H., Bohrer, G., Naor-Azrieli, L., Frasson, R.P., Schäfer, K.V.R., Mitsch, W.J., (2014). "Modeling an urban wetland's methane fluxes using the eddy covariance method." Oral Presentation. 14th Annual Meeting of the American Ecological Engineering Society, Charleston, SC.

Morin, T.H., Bohrer, G., Naor-Azrieli, L., (2014). "Environmental causes of methane fluxes from an urban wetland." Oral Presentation, 43rd Annual Water Management Association of Ohio Meeting, Columbus, OH.

Morin, T.H., Bohrer, G., Frasson, R.P., (2014). "Optimizing a gapfill model for an urban wetland's methane fluxes." Poster Presentation, Ameriflux Annual PI Meeting, Potomac, MD.

Morin, T.H., Bohrer, G., Rey-Sanchez, A.C., Stefanik, K.C., Mitsch, W.J., (2015). "Combining eddy-covariance and chamber measurements to determine the methane budget from a small, heterogeneous urban wetland park". Poster Presentation. Potsdam GHG Flux Workshop - from natural to urban systems, Potsdam, Germany.

Morin, T.H., Bohrer, G., Stefanik, K.C., (2015). "Footprint-driven gap filling strategies for fluxes from mixed forest-aquatic systems". Poster Presentation. 5th NACP PI Meeting and AmeriFlux Principal Investigators Meeting, Washington, D.C.

Morin, T.H., Bohrer, G., Rey-Sanchez, A.C., Stefanik, K.C., Mitsch, W.J., (2015). "Combining eddy-covariance and chamber measurements to determine the methane budget from a small, heterogeneous urban wetland park". Poster Presentation. American Geophysical Union Fall Meeting 2015, San Francisco, CA.

Morin, T.H., Bohrer, G., Rey-Sanchez, A.C., Stefanik, K.C., Mitsch, W.J., (2016). "Combining eddy-covariance and chamber measurements to determine the methane budget from a small, heterogeneous urban wetland park." 5th International EcoSummit – Ecological Sustainability Engineering Change, Montpellier, France, 2016. -Invited

Morin, T.H., Bohrer, G., Rey-Sanchez, A.C., Stefanik, K.C., Mitsch, W.J., (2016). "Modeling greenhouse gas chemistry and transport in heterogeneous wetlands." 5th International EcoSummit – Ecological Sustainability Engineering Change. Montpellier, France.

Morin, T.H., Bohrer, G., Rey-Sanchez, A.C., Stefanik, K.C., Riley, R.J., Angle, J., Mekonnen, Z.A., Wrighton, K.C., (2016). "Utilizing patch and site level greenhouse-gas concentration measurements in tandem with the prognostic model, ecosystem" Poster Presentation. American Geophysical Union Fall Meeting 2016, San Francisco, CA.

Ogland-Hand, Jonathan

Ogland-Hand, J.D., (2016). "The Value of CO₂-Geothermal Bulk Energy Storage to CO₂." Oral Presentation. The CO₂ Summit II: Technologies and Opportunities. Santa Ana Pueblo, New Mexico.

Ogland-Hand, J.D., Bielicki, J.M., Buscheck, T.A., (2016). "The Value of CO₂-Geothermal Bulk Energy Storage to Reducing CO₂ Emissions." Poster Presentation. AGU Fall Meeting 2016 in San Francisco, CA.

Bielicki, J.M., Buscheck, T.A., Saar, M.O., Kuehn, T., Taff, S.J., Randolph, J.B., Edmunds, T.A., Ogland-Hand, J.D., (2014). "Using CO₂ for Renewable Energy Production from Geothermal, Wind, and Solar Resources." Poster Presentation. 1st Annual Ohio Conference on the Sustainable Use of Greenhouse Gases in Columbus, OH.

Panescu, Jenny

Panescu, J., Evert, M., Hespen, J., Daly, R.A., Wrighton, K.C., Mouser, P.J., (2016). "Arcobacter isolated from the produced fluids of a Marcellus shale well may play a currently unappreciated role in sulfur cycling." Poster Presentation. 45th Annual Meeting, Eastern Section, American Association of Petroleum Geologists, Lexington, KY.

Panescu, J., Evert, M., Hespen, J., Daly, Sharma, S., Cole, D., Darrah, T.H., Wilkins, Welch, S., M., Wrighton, K.C., Mouser, P.J., (2016). "Temporal Changes in Fluid Biogeochemistry and Microbial Cell Abundance after Hydraulic Fracturing in Marcellus Shale." Poster Presentation. 45th Annual Meeting, Eastern Section, American Association of Petroleum Geologists, Lexington, KY.

Rey-Sanchez, Andres Camilo

Rey-Sanchez, A.C., Morin, T.H., Stefanik, K.C., Wrighton, K., Bohrer, G., (2016). "The carbon balance in a heterogeneous estuarine wetland in Northern Ohio." Oral Presentation. 16th Annual Meeting of the American Ecological Engineering Society, Knoxville, TN.

Rey-Sanchez, A.C., Morin, T.H., Stefanik, K.C., Wrighton, K., Bohrer, G., (2016). "Carbon fluxes in a heterogeneous estuarine wetland in Northern Ohio, comparing eddy covariance and chamber measurements." Poster Presentation, American Geophysical Union Fall Meeting San Francisco, CA.

Rey-Sanchez, A.C., Morin, T.H., Bohrer, G., (2016). "Semi-continuous monitoring of methane in wetlands' soils through the use of pore water dialysis 'peepers'." Oral Presentation, Innovative Environmental Monitoring Symposium, Athens, Ohio. – Best student presentation award

Semones, Molly

Semones, M., (2016). "Photodegradation of UV filters oxybenzone and sulisobenzene in natural waters." Poster Presentation. Gordon Research Seminar- Environmental Sciences. Holderness, NH.

Sharma, Kuhuk

Sharma, K., (2014). "Heavy metal contamination and nematode community: Restoring structural complexity of the urban soil food web." Oral Presentation. 6th International Conference on Nematology, Cape Town, South Africa.

Stevens, Brooke

Stevens, B., Whitacre, S., Bradham, K., Thomas, D., Casteel, S., Anderson, R., Basta, N., (2016). "Comprehensive Evaluation of in vitro Bioaccessibility and in vivo Bioavailability of Arsenic in Contaminated Soils," Oral Presentation. 18th International Conference on Heavy Metals in the Environment, Ghent, Belgium.

Stevens, B., Whitacre, S., Bradham, K., Thomas, D., Casteel, S., Anderson, R., Basta, N., (2016). "Comparison of Bioavailability Measurements determined using Juvenile Swine and Adult Mouse Models for Arsenic Contaminated Soils". Poster Presentation. 18th International Conference on Heavy Metals in the Environment, Ghent, Belgium.

Stevens, B., (2015). Poster Presentation, International Conference on Environmental Science and Technology. American Academy of Sciences in Houston, Texas.

Stevens, B., Whitacre, S., Bradham, K., Thomas, D., Casteel, S., Scheckerl, K., Casteel, S., Basta, N., (2014). "Evaluation of Bioaccessibility Methods to Predict Relative Bioavailability of Arsenic in Contaminated Soils." Oral Presentation. Goldschmidt 2014 Conference, Geochemical Society and European Assoc. of Geochemistry, Sacramento, CA.

Stuckman, Mengling

Stuckman, M., (2013). "Factors Controlling Arsenic Release from Spent Drinking Water Adsorbents by Microorganisms." Poster Presentation. International Conference on the Biogeochemistry of Trace Elements, Athena, GA.

Trexler, Ryan V.

Trexler, R.V., Akondi, R., Pfiffner, S.M., Daly, R.A., Wilkins, M.J., Sharma, S., Wrighton, K.C., Mouser, P.J., (2016). "Phospholipid Fatty Acid Evidence of Recent Microbial Life in Pristine Marcellus Shale Core." Poster Presentation. The 45th Annual Meeting of Eastern Section of the American Association of Petroleum Geologists, Lexington, KY.

Volker, Morgan

Volker, M., (2016). "In situ biodegradation of alkyl ethoxylates by halotolerant bacteria in a hydraulically fractured shale well." Oral presentation. American Chemical Society National Meeting. Philadelphia, Pennsylvania.

Wang, Yaoping

Wang, Y., (2016). "Evaluation of two precipitation-downscaling methods from a multi-model ensemble in the eastern United States." Poster presentation. International Conference on Regional Climate-CORDEX. Stockholm, Sweden.

Wang, Y., Bielicki, J., (2016). "Evolutions in Water Withdrawal and Consumption Factors for Thermoelectric Power Plants in the United States" Oral Presentation. AGU Fall Meeting 2016. San Francisco, CA.

Wang, Y., Sivandran, G., (2016). "Investigate the impact of climate change on daily extreme precipitation in the eastern U.S." Poster Presentation. AGU Fall Meeting 2016. San Francisco, CA.

Wang, Y., (2015). "Testing the k-Nearest Neighbor resampling method in downscaling precipitation to hourly resolution in the eastern US." Poster Presentation. Gordon Research Conference Catchment Science: Interactions of Hydrology, Biology & Geochemistry, Andover, NH.

Wang, Y., (2014). "Hourly Precipitation Downscaling With Empirical Statistical Methods", Poster Presentation. American Geophysical Union Fall Meeting 2014, San Francisco, CA.

William, Kenny

William, K.T., Bohrer, G., Chatziefstratiou, E., (2015). "Large eddy simulations as a parameterization tool for canopy-structure X VOC-flux interactions." Poster, European Geosciences Union Meeting, Vienna, Austria.

William, K.T., Bohrer, G., Chatziefstratiou, E.K, (2014). "Development and application of the High resolution VOC Atmospheric Chemistry in Canopies (Hi-VACC) model." Oral Presentation, 2nd Conference on Atmospheric Biogeosciences, Portland, OR.

William, K.T., Morin, T.H., Bohrer, G., (2014). "Development of the High resolution VOC Atmospheric Chemistry in Canopies (Hi-VACC) model and application to a lake flux scenario." Poster Presentation, Advancing the Science of Gas Exchange between Fresh Waters and the Atmosphere, Hyytiälä, Finland.

William, K.T., Bohrer, G., Chatziefstratiou, E., (2013). "Development and application of the High resolution VOC Atmospheric Chemistry in Canopies (Hi-VACC) model." Oral presentation, American Geophysical Union Meeting, San Francisco, CA.

William, K.T., Bohrer, G., Chatziefstratiou, E., Heilman, W.E., (2013). "Using the High resolution VOC Atmospheric Chemistry in Canopies (Hi-VACC) model to simulate smoke dispersion from forest fires." Oral Presentation, American Meteorological Society 10th Symposium of Fire and Forest Meteorology, Bowling Green, KY.

Xu, Fuqing

Xu, F., (2014). "A mass diffusion-based interpretation of the effect of total solids content on solid-state anaerobic digestion of cellulosic biomass", Oral Presentation, ASBE Conference, Montreal, Canada.

Zhang, Xu

Zhang, X., Zhao, Y., (2013). "Creating particulate microstructures for two- and three-dimensional cell patterning," Oral Presentation, Transducers & Eurosensors XXVII: The 17th International Conference on Solid-State Sensors, Actuators and Microsystems (TRANSDUCERS & EUROSENSORS XXVII), Barcelona, Spain.

73 Total Presentations

Ansari, Maryam I. (Cluff)

Cluff, M. A., Hartsock, A., MacRae, J. D., Carter, K., & Mouser, P. J. (2014). Temporal changes in microbial ecology and geochemistry in produced water from hydraulically fractured Marcellus Shale gas wells. *Environmental science & technology*, 48(11), 6508-6517.

Mouser, P. J., Liu, S., Cluff, M. A., McHugh, M., Lenhart, J. J., & MacRae, J. D. (2016). Redox Conditions Alter Biodegradation Rates and Microbial Community Dynamics of Hydraulic Fracturing Fluid Organic Additives in Soil–Groundwater Microcosms. *Environmental Engineering Science*, 33(10), 827-838.

Bell, Patrick

Bell, P.R., J.A. Hattey, M. Dicks (2013). A Model for Service Abroad Courses: Agricultural Development in Sierra Leone. *NACTA Journal* 57(3a).

Penn, C.J., P.R. Bell, B. Carver, D.B. Arnall, A. Klatt (2015). Comparison of phosphorus uptake efficiency in the rhizosphere of wheat grown in acid and calcareous soils. *Journal of Plant Nutrition* 38: 2279-2293.

Bell, P.R., D. Kimaro, R. Lal, (2015). Agricultural drought analysis for sustainable smallholder maize production in semi-arid areas: A case study of the Lower Moshi Irrigation Scheme, Tanzania. *Tanzanian Journal of Agricultural Sciences* 14(1):34-42.

Boaz, Lindsey

Sullivan, P., Mažeika, S., Boaz, L. E., & Hossler, K. (2016). Fluvial geomorphology and aquatic-to-terrestrial Hg export are weakly coupled in small urban streams of Columbus, Ohio. *Water Resources Research*, 52(4), 2822-2839.

Borton, Mikayla

Mouser, Paula J., Mikayla Borton, Thomas H. Darrah, Angela Hartsock, and Kelly C. Wrighton. (2016) Hydraulic fracturing offers view of microbial life in the deep terrestrial subsurface. *FEMS Microbiology Ecology* 92, no. 11:166.

Bossley, Jon

Yoder, J. A., Benoit, J. B., Nelson, B. W., Main, L. R., & Bossley, J. P. (2015). Behavioral correction to prevent overhydration and increase survival by larvae of the net-spinning caddisflies in relation to water flow. *The Journal of Experimental Biology*, 218, 363-9.

Brooker, Michael

Kekacs, D., Drollette, B.D., Brooker, M., Plata, D.L. and Mouser, P.J., (2015). Aerobic biodegradation of organic compounds in hydraulic fracturing fluids. *Biodegradation*, 26(4), pp.271-287.;

Brooker, M.R., Bohrer, G. and Mouser, P.J., (2014). Variations in potential CH₄ flux and CO₂ respiration from freshwater wetland sediments that differ by microsite location, depth and temperature. *Ecological Engineering*, 72, pp.84-94.

Chatziefstratiou, Eftalia

Chatziefstratiou, E. K., Bohrer, G., Bova, A. S., Subramanian, R., Frasson, R. P., Scherzer, A., ... & Dickinson, M. B. (2013). Firestem2d—a two-dimensional heat transfer model for simulating tree stem injury in fires. *PloS one*, 8(7), e70110.;

Chatziefstratiou, E. K., Velissariou, V., & Bohrer, G. (2014). Resolving the effects of aperture and volume restriction of the flow by semi-porous barriers using large-eddy simulations. *Boundary-Layer Meteorology*, 152(3), 329-348.;

Dey, Swagata

Dey, S., Ricciardo, R.A., Cuthbert, H.L. and Woodward, P.M., (2014). Metal-to-metal charge transfer in AWO₄ (A= Mg, Mn, Co, Ni, Cu, or Zn) compounds with the wolframite structure. *Inorganic chemistry*, 53(9), pp.4394-4399.

Deniro, Julia

Parker, J.S., DeNiro, J., Ivey, M.L. and Doohan, D., (2016). Are small and medium scale produce farms inherent food safety risks?. *Journal of Rural Studies*, 44, pp.250-260.

Eidson, Christopher

Basche, A. D., Roesch-McNally, G. E., Pease, L. A., Eidson, C. D., Lahdou, G. B., Dunbar, M. W., ... & Pantoja, J. (2014). Challenges and opportunities in transdisciplinary science: The experience of next generation scientists in an agriculture and climate research collaboration. *Journal of Soil and Water Conservation*, 69(6), 176A-179A.

Hottle, Ryan

Lipper, L., Thornton, P., Campbell, B. M., Baedeker, T., Braimoh, A., Bwalya, M., ... & Hottle, R. (2014). Climate-smart agriculture for food security. *Nature Climate Change*, 4(12), 1068-1072.;

Sekar, S., Hottle, R. D., & Lal, R. (2014). Effects of biochar and anaerobic digester effluent on soil quality and crop growth in Karnataka, India. *Agricultural Research*, 3(2), 137-147.

Hsu, Tsung-Ta

Hsu, T. T. D., Rea, C. L., Yu, Z., & Lee, J. (2016). Prevalence and diversity of Shiga toxin genes in Canada geese and water in western Lake Erie Region. *Journal of Great Lakes Research*, 42(2), 476-481.

Hsu, T-T D, & Lee, J. (2015). Global Distribution and Prevalence of *Arcobacter* in Food and Water. *Zoonoses and Public Health*. 62(8):579-589.

Hua, Wei

Casper, C. B., Verreault, D., Adams, E. M., Hua, W., & Allen, H. C. (2016). Surface Potential of DPPC Monolayers on Concentrated Aqueous Salt Solutions. *The Journal of Physical Chemistry B*, 120(8), 2043-2052.;

Hua, W., Verreault, D., & Allen, H. C. (2015). Relative Order of Sulfuric Acid, Bisulfate, Hydronium, and Cations at the Air–Water Interface. *Journal of the American Chemical Society*, 137(43), 13920-13926.;

Hua, W., Verreault, D., & Allen, H. C. (2015). Solvation of Calcium–Phosphate Headgroup Complexes at the DPPC/Aqueous Interface. *ChemPhysChem*, 16(18), 3910-3915.;

Hua, W., Verreault, D., & Allen, H. C. (2014). Surface Electric Fields of Aqueous Solutions of NH_4NO_3 , $\text{Mg}(\text{NO}_3)_2$, NaNO_3 , and LiNO_3 : Implications for Atmospheric Aerosol Chemistry. *The Journal of Physical Chemistry C*, 118(43), 24941-24949.;

Hua, W., Verreault, D., Huang, Z., Adams, E. M., & Allen, H. C. (2014). Cation Effects on Interfacial Water Organization of Aqueous Chloride Solutions. I. Monovalent Cations: Li^+ , Na^+ , K^+ , and NH_4^+ . *The Journal of Physical Chemistry B*, 118(28), 8433-8440.;

Hua, W., Verreault, D., & Allen, H. C. (2013). Surface Prevalence of Perchlorate Anions at the Air/Aqueous Interface. *The journal of physical chemistry letters*, 4(24), 4231-4236.;

Huang, Z., Hua, W., Verreault, D., & Allen, H. C. (2013). Influence of Salt Purity on Na^+ and Palmitic Acid Interactions. *The Journal of Physical Chemistry A*, 117(50), 13412-13418.;

Huang, Z., Hua, W., Verreault, D., & Allen, H. C. (2013). Salty Glycerol versus Salty Water Surface Organization: Bromide and Iodide Surface Propensities. *The Journal of Physical Chemistry A*, 117(29), 6346-6353.;

Kenny, William

Maurer KD, Bohrer G, Kenny WT, Ivanov VY. (2015) Large eddy simulations of surface roughness parameter sensitivity to canopy structure characteristics. *Biogeosciences*, 12:2533-2548.;

Hadlocon LS, Bohrer G, Kenny WT, Garrity SR, Wang J, Wyslouzil B, Upadhyay, J. (2015) Modeling of particulate matter dispersion from a poultry facility using AERMOD. *Journal of the Air & Waste Management Association* 65:206-217.;

Morin TH, Bohrer G, Naor-Azrieli L, Mesi S, Kenny WT, Mitsch WJ, Schäfer KVR. (2014) The seasonal and diurnal dynamics of methane flux at a created urban wetland. *Ecological Engineering*, 72:74-83.;

Lee, Seungjun

Lee, S, An, R, Grewal, P, Yu, Z, Borherova, Z, & Lee, J. (2016). High Performing Windowfarm Hydroponic System: Transcriptomes of Fresh Produce and Microbial Communities in Response to Beneficial Bacterial Treatment. *Molecular Plant-Microbe Interactions*. 29(12):965-976.

Healy, J, Piperata, P, Moritz, M, Lee, J, Garabed, R, Gundich, M, Mouhaman, A, Ahmadou M, & Lee, S. (2016). One Health Research in Cameroon: A Critical Role for Anthropologists. *Practicing Anthropology*. 38(4):27-30.

Healy, J, Lee, S, Mouhaman, A, Garabed, R, Moritz, M, Piperata, P, & Lee, J. (2016). Neighborhood diversity of potentially pathogenic bacteria in drinking water from the city of Maroua, Cameroon. *Journal of Water and Health*. 14(3):559-570.

Lee, S, & Lee, J. (2015). A Review of Beneficial Bacteria in Hydroponic Systems: Types and Characteristics of Hydroponic Food Production Methods. *Scientia Horticulturae*. 195:206-215.

Lee, S, Bohrerova, Z, Grewal, P, & Lee, J. (2015). Enhancing plant productivity while suppressing biofilm growth in a windowfarm system using beneficial bacteria and ultraviolet irradiation. *Canadian Journal of Microbiology*. 61:7:457-466.

Li, Yueh-Fen

Sheets JP, Ge X, Li YF, Yu Z, Li Y. (2016). Biological conversion of biogas to methanol using methanotrophs isolated from solid-state anaerobic digestate. *Bioresour Technol* 201:50-57.

Zhang W, Ge X, Li YF, Yu Z, Li Y. (2016). Isolation of a methanotroph from a hydrogen sulfide-rich anaerobic digester for methanol production from biogas. *Process Biochemistry* 51(7): 838-844.

Li YF, Shi J, Nelson MC, Chen PH, Graf J, Li Y, Yu Z. (2015). Impact of different ratios of feedstock to liquid anaerobic digestion effluent on the performance and microbiome of solid-state anaerobic digesters digesting corn stover. *Bioresour Technol* 200: 744-752.

Li YF, Abraham C, Nelson MC, Chen PH, Graf J, Yu Z. (2015). Effect of organic loading on the microbiota in a temperature-phased anaerobic digestion (TPAD) system co-digesting dairy manure and waste whey. *Appl Microbiol Biotechnol* 99(20):8777-8792.

Li YF, Nelson MC, Chen PH, Graf J, Li Y, and Yu Z. (2014). Comparison of the microbial communities in solid-state anaerobic digesters (SS-ADs) operated at mesophilic and thermophilic temperatures. *Appl Microbiol Biotechnol* 99(2): 969-980.

Li YF, and Yu Z. (2014). Development of a whole-cell bacterial biosensor for the detection and measurement of propionate. *Biotechnol Bioeng* 112(2): 280-287.

Li YF, Chen PH, and Yu Z. (2014). Spatially homogenous and temporally stable microbial community in a mixed plug-flow loop reactor (MPFLR) fed with dairy manure. *Microb Biotechnol* 7(4): 332-346.

Li YF, Shan W, and Yu Z. (2013). Feedstocks affect the diversity and distribution of propionate CoA-transferase genes (pct) in anaerobic digesters. *Microb Ecol* 66(2): 351-362."

Lin, Long

Xu, F., Wang, F., Lin, L., Li, Y., 2016. Comparison of digestate from solid anaerobic digesters and dewatered effluent from liquid anaerobic digesters as inocula for solid state anaerobic digestion of yard trimmings. *Bioresource Technology*. 200, 753–760.

Lin, L., Yang, L., Li, Y., 2015. Effect of feedstock components on thermophilic solid-state anaerobic digestion of yard trimmings. *Energy & Fuels*, 29, 3699–3706.

Lin, L., Yang, L., Xu, F., Michel, F.C. Jr., Li, Y., 2014. Comparison of solid-state anaerobic digestion and composting of yard trimmings with effluent from liquid anaerobic digestion. *Bioresource Technology*, 169, 439–446.

Liu, Guangdong

G. Liu, F.W. Schwartz, Y. Kim (2013) Complex Baseflow in Urban Streams: An Example from Central Ohio, USA. *Environmental Earth Sciences Journal*, DOI 10.1007/s12665-013-2358-3

McClain, Krystaal

Friedemann, G., Leshem, Y., Kerem, L., Shacham, B., Bar-Massada, A., McClain, K. M., Bohrer G ... & Izhaki, I. (2016). Multidimensional differentiation in foraging resource use during breeding of two sympatric top predators. *Scientific Reports*, 6.

Moonilall, Nall

Moonilall, N.I., Reed, S., Jayachandran, K. (2016). The Effects of Insect Rearing Waste Compost on *Helianthus annuus* and *Tithonia rotundifolia*. *Agrotechnology*, 5(2):1-5.

Mori, Hiroko

Mori, H., Sakaki, T., & Illangasekare, T. H. (2015). Laboratory study of geological carbon sequestration using surrogate fluids: Dielectric measurement and scaling of capillary pressure – saturation relationships. *International Journal of Greenhouse Gas Control*, 37, 146 - 157.

Mori, H., Trevisan, L., & Illangasekare, T. H. (2015). Evaluation of relative permeability functions as inputs to multiphase flow models simulating supercritical CO₂ behavior in deep geologic

formations. *International Journal of Greenhouse Gas Control*, 41, 328-335. doi:<http://dx.doi.org/10.1016/j.ijggc.2015.05.023>.

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Total = 97

Appendix VII - ESGP Faculty List

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Last Name	First Name	College	M/F	Diversity
Adetona	Olorunfemi	Public Health	Male	Black
Allen	Heather	Arts and Science	Female	White
Alsdorf	Douglas	Arts and Science	Male	White
Bakshi	Bhavik	Engineering	Male	Asian
Barker	Joel	Arts and Science	Male	White
Basta	Nicholas	CFAES	Male	White
Bauer	James	Arts and Science	Male	White
Bennett	Katherine	Engineering	Female	White
Bielicki	Jeffrey	Engineering	Male	White
Bisesi	Michael	Public Health	Male	White
Bohrer	Gil	Engineering	Male	Undisclosed
Bonello	Pierluigi	CFAES	Male	White
Brown	Larry	CFAES	Male	White
Bruskotter	Jeremy	CFAES	Male	White
Cardina	John	CFAES	Male	White
Carey	Anne	Arts and Science	Female	White
Carlarne	Cinnamon	Moritz	Female	White
Chin	Yu-Ping	Arts and Science	Male	Asian
Christy	Ann	CFAES	Female	White
Clark	Jill	Public Affairs	Female	White
Conroy	Maria	Engineering	Female	White
Costa	Ozeas	Arts and Science	Male	Hispanic
Crawford	John Mac	Public Health	Male	White
Culman	Steven	CFAES	Male	White
Curtis	Peter	Arts and Science	Male	White
Dabrowski	Konrad	CFAES	Male	White
Dannemiller	Karen	Engineering	Female	White
Davies	G. Matt	CFAES	Male	White
Demyan	Michael	CFAES	Male	White
Desai	Anand	Public Affairs	Male	Asian
Dick	Richard	CFAES	Male	White
Dick	Warren	CFAES	Male	White
Dietsch	Alia	CFAES	Female	White
Doohan	Douglas	CFAES	Male	White
Durand	Michael	Arts and Science	Male	White
Fausey	Norman	CFAES	Male	White
Fisher	Susan	CFAES	Female	White
Gates	Robert	CFAES	Male	White
Goebel	P.	CFAES	Male	White
Gopalakrishnan	Sathya	CFAES	Female	Asian
Gordon	Steven	Engineering	Male	White
Grewel	Pariwinder	CFAES	Male	Asian
Herms	Daniel	CFAES	Male	White
Hix	David	CFAES	Male	White
Hood	Darryl	Public Health	Male	Black

Hoy	Casey	CFAES	Male	White
Hyder	Ayaz	Public Health	Male	Asian
Ibaraki	Motomu	Arts and Science	Male	Asian
Irwin	Elena	CFAES	Female	White
Jackson-Smith	Douglas	CFAES	Male	White
Jaeger	Kristin	CFAES	Female	White
Janini	Thomas	CFAES	Male	White
Jekeli	Christopher	Arts and Science	Male	White
Jenkins	Craig	Arts and Science	Male	White
Johnson	Reed	CFAES	Male	White
Kalcic	Margaret	CFAES	Female	White
Kawa	Nicholas	Arts and Science	Male	Undisclosed
Kleinhenz	Matthew	CFAES	Male	White
Kovach	Joseph	CFAES	Male	White
Lal	Rattan	CFAES	Male	Asian
Lanno	Roman	Arts and Science	Male	White
Lee	Chanhee	CFAES	Male	Asian
Lee	Jiyoung	Public Health	Female	Asian
LeJeune	Jeffrey	Public Health	Male	White
Lekies	Kristi	CFAES	Female	White
Lenhart	John	Engineering	Male	White
Li	Yebo	CFAES	Male	Asian
Lin	Jialin	Arts and Science	Male	Asian
Liu	Desheng	Arts and Science	Male	Asian
Lower	Brian	CFAES	Male	White
Lower	Steven	CFAES	Male	White
Ludsin	Stuart	Arts and Science	Male	White
Lyons	William	Arts and Science	Male	White
MacKay	Allison	Engineering	Female	White
Mancl	Karen	CFAES	Female	White
Mark	Bryan	Arts and Science	Male	White
Marschall	Elizabeth	Arts and Science	Female	White
Martin	Jay	CFAES	Male	White
May	Andrew	Engineering	Male	White
Metzger	James	CFAES	Male	White
Michel	Frederick	CFAES	Male	White
Miranda	Mario	CFAES	Male	Hispanic
Mitsch	William	CFAES	Male	White
Moritz	Mark	Arts and Science	Male	White
Mosley-Thomp	Ellen	Arts and Science	Female	White
Mouser	Paula	Engineering	Female	White
Olesik	Susan	Arts and Science	Female	White
Phelan	P. Larry	CFAES	Male	White
Pintor	Lauren	CFAES	Female	White
Prakash	Shaurya	Engineering	Male	Asian
Qin	Rongjun	Engineering	Male	Asian
Rakowski	Cathy	CFAES	Female	White

Rich	Virginia	Arts and Science	Female	White
Schwartz	Franklin	Arts and Science	Male	White
Shah	Ajay	CFAES	Male	Undisclosed
Shum	CK	Arts and Science	Male	Asian
Sivandran	Gaj	Engineering	Male	Asian
Snow	Allison	Arts and Science	Female	White
Sohnngen	Brent	CFAES	Male	White
Sulc	Mark	CFAES	Male	White
Sullivan	Matthew	Arts and Science	Male	White
Sullivan	Mazeika	CFAES	Male	Undisclosed
Sun	Qinghua	Public Health	Male	Asian
Tabita	F. Robert	Arts and Science	Male	White
Toman	Eric	CFAES	Male	White
Tonra	Christopher	CFAES	Male	White
Van Maasakker	Mattijs	Engineering	Male	Undisclosed
Weavers	Linda	Engineering	Female	White
Weir	Mark	Public Health	Male	White
White	Sam	Arts and Science	Male	White
Willow	Anna	Arts and Science	Female	White
Wilson	Robyn	CFAES	Female	White
Wolfe	Barbara	Vet Med	Female	White
Wrighton	Kelly	Arts and Science	Female	White
Wyslouzil	Barbara	Engineering	Female	White
Xiao	Ningchuan	Arts and Science	Male	Asian
Yu	Zhongtang	CFAES	Male	Asian
Zhao	Kaiguang	CFAES	Male	Asian
Zhao	Lingying	CFAES	Female	Asian