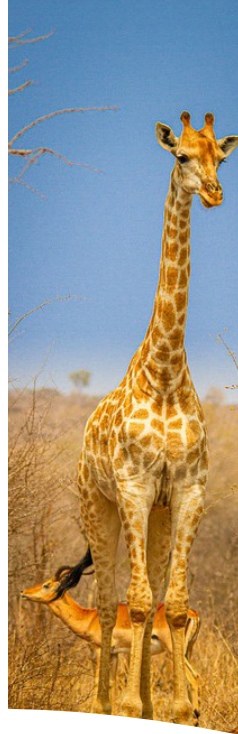
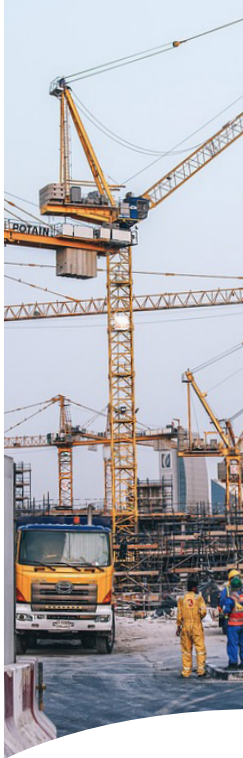




SCHOOL OF GLOBAL
ENVIRONMENTAL SUSTAINABILITY
COLORADO STATE UNIVERSITY



2018-19 Annual Report



INVEST in a SUSTAINABLE FUTURE

The 2018-19 academic year marked the 10th anniversary of Colorado State University's School of Global Environmental Sustainability (SoGES). The school has made an important impact on research, education, and engagement at CSU. During its first decade, it has:

- ▶ Supported over 100 interdisciplinary projects conducted by teams and individuals
- ▶ Educated thousands of students about the fundamentals of global environmental sustainability
- ▶ Organized hundreds of lectures, workshops, and panel discussions that have engaged more than 25,000 participants in discussions of sustainability challenges and opportunities, including students, faculty, community members, visiting experts, and other stakeholders

These efforts, along with numerous university improvements in operational sustainability, have helped CSU become the first university to receive a platinum rating from the Association for the Advancement of Sustainability in Higher Education.

Donations play a key role at SoGES. Your support advances research, educates future leaders in sustainability, and enables convening events and symposiums. Please consider a gift to make an impact in sustainability.

Gifts can be general in nature or dedicated to any activity listed in the annual report. Thank you for considering a donation.

<https://advancing.colostate.edu/SOGES/GIVE>

2018-19 AT A GLANCE

RESEARCH

pages 6-13

SoGES provides funding for CSU research teams and faculty fellows, conducts research supported by outside sponsors, and hosts visiting fellows from academia and the private sector

\$102,660 was awarded by SoGES to CSU sustainability researchers
4 teams funded with **23** investigators from **18** departments across **7** colleges
6 resident faculty fellows funded from **6** departments across **3** colleges
\$849,598 was awarded to SoGES staff from outside sponsors

EDUCATION & TRAINING

pages 14-17

SoGES offers 13 global environmental sustainability courses, conducts a graduate student training program, and oversees 4 undergraduate minors and a set of graduate certificates

635 students completed GES courses
343 students were enrolled in **4** undergraduate minors
89 students graduated with SoGES minors (**75** from GES **2** from Energy **10** from Water **2** from Peace and Reconciliation)
20 Sustainability Leadership Fellows from **15** departments across **6** colleges
 Developed proposal for new undergraduate major in Global Environmental Sustainability

CENTERS & PROGRAMS

pages 18-21

SoGES provides space and support to 4 CSU centers and one international program

\$1,197,704 was won from NSF for continued support of the international Future Earth program
\$66,908 of philanthropic donations were given to the Salazar Center for North American Conservation
A Water in Africa Symposium was organized by the CSU Africa Center with help from SoGES
 A new director was selected for the Student Sustainability Center
370 people attended Global Biodiversity Center panels and networking events

ENGAGEMENT

pages 22-23

SoGES works with diverse stakeholders and audiences and interacts with the media to identify, discuss, and increase awareness of sustainability issues and ensure that sustainability research is informed by societal needs and concerns

2,986 people attended **45** events organized and hosted by SoGES and collaborators
 A new, more user-friendly SoGES website was developed and launched
 More than **250** people attended the SoGES *10th Anniversary Symposium*
87 stories in popular and scientific media mentioned SoGES, with a total estimated readership of **52 million**



SCHOOL OF GLOBAL ENVIRONMENTAL SUSTAINABILITY

About the School

The School of Global Environmental Sustainability (SoGES) was created in 2008 to advance sustainability research, education, and engagement at Colorado State University. The school is a Special Academic Unit, attached to the Office of the Provost and Executive Vice President, that works with and across the university's eight colleges.

SoGES brings together researchers, teachers, students, and stakeholders to address one of the greatest challenges of the coming century: preserving our planet's environmental quality while meeting the human and societal needs of today and tomorrow. Our approach to this challenge is centered on exploring, documenting, and explaining the links between environmental, societal, and economic sustainability, and fostering ongoing dialogue about choices, trade-offs, and solutions.

The SoGES Mission

- Conduct innovative research that transcends boundaries and leads to new and deeper understanding of sustainability issues
- Provide a challenging, integrative, and provocative education that gives future leaders knowledge and tools that enable them to contribute to environmental sustainability
- Engage with the public and decision-makers in translating discoveries into useful information and practical solutions to pressing environmental problems

The challenge of achieving sustainability is inherently interdisciplinary, requiring the development and integration of knowledge, perspectives, and understanding from the natural and social sciences, engineering, business, art, and the humanities. The CSU faculty members who are affiliated with and contribute to SoGES include experts from all of these intellectual domains. Promoting and supporting discussion, connection, and collaboration across disciplinary and institutional boundaries is one of our School's most important functions.



Diana H. Wall, Director

Diana is a University Distinguished Professor and Professor of Biology at CSU and Science Chair of the Global Soil Biodiversity Initiative. She is a world-renowned ecologist and the inaugural director of the School of Global Environmental Sustainability. Since the School's beginning in 2008, Diana has been a driving force for connecting CSU faculty, researchers, and students by providing innovative programs and tools to address the world's greatest sustainability challenges. Under her leadership, the School has become a strong platform for building an academic community at CSU that crosses boundaries to share knowledge and solve the most pressing environmental problems we face. Diana is an elected member of National Academy of Sciences and the American Academy of Arts and Sciences and is the 2013 Laureate of the Tyler Prize for Environmental Achievement. Her collaborative nature and pioneering global scale studies of soil biodiversity are hallmarks of her career. Diana has a Ph.D. from the University of Kentucky, Lexington.

Leadership



Peter Backlund, Associate Director

Peter is a science and policy researcher whose current focus is assessing the impacts of climate change on people, society and ecosystems. Before joining CSU, he held senior positions at the U.S. National Center for Atmospheric Research, the White House Office of Science and Technology Policy, and NASA. Peter is a fellow of the American Association for the Advancement of Science and a 2016 recipient of the Abraham Lincoln Honor Award from the U.S. Department of Agriculture. He received his B.A. from the University of New Mexico and his M.A. from The George Washington University.



Kathleen Galvin, Assistant Director of Educational Programs

Kathy is Professor of Anthropology, Senior Research Scientist at the Natural Resource Ecology Laboratory, Head of the CSU Africa Center, and an advising faculty member in the CSU Graduate Degree Program in Ecology. She conducts interdisciplinary human-ecological research in Africa and Asia, and is interested in pastoral land use, conservation, climate variability, resilience, dryland adaptation strategies, and household decision-making under environmental uncertainty. Kathy has served on many National Research Council and National Science Foundation panels and is an Aldo Leopold Leadership Fellow. Her B.A. and M.A. are from CSU and her Ph.D. is from Binghamton University.



Eugene Kelly, Faculty Research Liaison

Gene is a Professor of Pedology, Deputy Director of the CSU Agricultural Experiment Station, Associate Dean for Extension in the College of Agricultural Science, and former head of CSU's Department of Soil and Crop Sciences. His scientific specialization is in pedology and geochemistry and his current research centers on the influence of climate change and land use on soil degradation and sustainability in water limited systems. He is an advisor to the United States Department of Agriculture's National Cooperative Soil Survey and a fellow of the Soil Science Society of America. He received his B.S. and M.S. degrees from CSU and his Ph.D. from the University of California-Berkeley.

Executive Council

- Michele Betsill, Department of Political Science
- Thomas Borch, Department of Soil and Crop Sciences
- Joe Champ, Department of Journalism and Media Communication
- Tom Dean, Department of Management
- Brian Dunbar, Institute for the Built Environment
- Emily Fischer, Department of Atmospheric Sciences
- Chris Funk, Global Biodiversity Center
- Alan Knapp, Graduate Degree Program in Ecology
- Jan Leach, Department of Bioagricultural Sciences and Pest Management
- Kelly Martin, Department of Marketing
- Barry Noon, Department of Fish, Wildlife, and Conservation Biology
- Dennis Ojima, Department of Ecosystem Science and Sustainability
- Kenneth Reardon, Department of Chemical and Biological Engineering
- Elizabeth Ryan, Department of Environmental and Radiological Health Sciences
- Dave Thompson, Department of Atmospheric Sciences
- Joe Von Fischer, Department of Biology



RESEARCH

SoGES invests in innovative research activities to advance global sustainability science, including cultivation of interdisciplinary partnerships, experimentation with new methods, and development of projects that integrate disparate knowledge and approaches.

SoGES 2018-19 research activity included support of **Global Challenge Research Teams** (one-year interdisciplinary “seed” projects conducted by teams of CSU researchers), **Resident Faculty Fellows** (CSU researchers), **Visiting Fellows** (researchers from other institutions), and the **CSU Environmental Justice Working Group**. In addition, SoGES continued its role as secretariat of the **Global Soil Biodiversity Initiative**. SoGES leadership and staff are also conducting a variety of sustainability research projects in collaboration with researchers from CSU colleges and departments and/or other academic institutions, this year winning grants from NASA, NSF, USDA, and the State of Colorado. Finally, SoGES selected two GCRTs, one longer-term research project (see below), and four Resident fellows for the upcoming 2019-20 academic year.



Photo: faculty recipients of GCRT and resident fellow awards

New Project – Food, Water, and Sustainability

Rising global population, rapid urbanization, changing diets, and economic growth are increasing global demand for food and water resources. These resources face mounting threats, including pollution, climate change impacts, the destruction and degradation of freshwater ecosystems and habitats, and agricultural intensification. Devising effective responses will require a systems-oriented, multidisciplinary approach to reshape the food-water nexus so that it works for all people sustainably.

SoGES partnered with the CSU Water Center and the CSU CO Agricultural Experiment Station during 2018-19 to create a food, water, and sustainability grant program to address this challenge. A single 2-year project was selected for funding in spring 2019. *The Internet of Soil: Developing open-source, low-cost, IoT technology for monitoring soil moisture*, led by principal investigator Jay Ham of the Department of Soil and Crop Sciences, will focus on developing technology for new networked soil moisture monitoring systems. This effort holds promise of reducing the cost of such systems, thus making them easier to deploy and contributing to more effective management of soil and water resources.

Research Conducted by SoGES Personnel

Assessing the Impacts of Global Climate Change

As part of his ongoing work on assessing climate change vulnerability and impacts, SoGES Associate Director Peter Backlund is collaborating with colleagues from Cornell, Iowa State, Purdue, the Desert Research Institute, the National Institute of Food and Agriculture, and the Agricultural Research Service to identify and document measurements and observations that can be used to describe and track the effects of global climate change on U.S. agriculture over time. The team has identified a series of physical, agronomic, biological, phenological, and socioeconomic data sets that show how climate change interacts with various aspects of the agricultural system and how this system is responding. The project, which is sponsored by USDA, is expected to result in a USDA Technical Bulletin and a set of information products that will be published during 2019.

Social-ecological Interactions with the Atmospheric Water Cycle

Pat Keys examines the ways in which human societies and the environment can lead to changes in the atmospheric water cycle. Keys and SoGES Assistant Director and CSU Africa Center Director Kathleen Galvin organized a major conference in spring 2019 on “Water in Africa,” sponsored by a grant from the CSU Water Center (see Africa Center section on p. 14). Keys also won a \$744k competitive research grant from NASA, examining how achievement of the UN Sustainable Development Goals (SDG) may lead to unexpected consequences. Specifically, the research team will explore how Kenya’s efforts to protect ‘Life on Land’ (i.e. SDG #15), will lead to changes in forest cover, which will affect evapotranspiration and potentially the precipitation that falls downwind. This NASA-funded research is part of a broader research program at SoGES led by Keys that examines coupled interactions of human societies and the water cycle.

Soil Ecology in Antarctica and Other Regions

SoGES director Diana Wall also leads the Wall Lab, which is a joint effort of SoGES and the CSU Biology Department. The lab is focused on soil ecology and the intersection of soil biodiversity and climate change. The lab’s activities during 2018-19 have included continuation of its multi-decadal tracking and analysis of the status of soil invertebrates in Antarctica’s Dry Valleys and development of new projects that address soil ecology of dryland systems in North America and rainforest systems in Brazil.



Photo: Diana Wall in Antarctica

fy 19

\$102,660

awarded to
CSU researchers

4

research
teams

6

faculty
fellows

2

visiting
fellows

\$849,598

won by
staff



Global Challenges Research Teams

Collaborative teams of faculty that build cross-campus partnerships to address the world's most pressing regional and global sustainability issues. The program provides seed funding to new interdisciplinary teams of faculty for creative and innovative approaches to sustainability scholarship. **Since its inception, SoGES has funded 41 research teams with PIs from 46 departments across all eight CSU colleges.**



Fort Collins Urban Sustainability Research Network

Principal Investigators:

- Melissa McHale**, Department of Ecosystem Science and Sustainability
- Kelly Curl**, Department of Landscape Architecture
- Sonali Diddi**, Department of Design and Merchandising
- Courtney Daum**, Department of Political Science
- Paula Yuma**, Department of Social Work
- Edward Gage**, Department of Forest and Rangeland Stewardship
- Colin Day**, Institute for the Built Environment
- Molly Saylor**, City of Fort Collins

The Fort Collins Urban Sustainability Research Network GCRT used a bottom-up approach to network science that supports urban planning with management decisions and development of sustainability policy in Fort Collins and other cities along Colorado's Front Range. They convened a network of more than 80 members from CSU, the City of Fort Collins, and other organizations to build a foundation for ongoing trust and partnerships. The team engaged CSU and Fort Collins stakeholders in discussion about common sustainability challenges, data and information gaps, and collaborative solutions. They hosted two workshops to facilitate discussion and strategize future partnership efforts. During the year they also collaboratively mapped land cover in the City for integrated research and decision making, provided mentorship and networking opportunities to graduate students, and pursued several grant opportunities to continue their work. Their work created a platform for enhancing research and collaboration locally to build a sustainable future for Fort Collins and that can be translated to other cities.



Scaling up CSU's Center for Science Communication: Enhancing Interdisciplinarity to Communicate about Science and Sustainability

Principal Investigators:

- Ashley Anderson**, Department of Journalism and Media Communication
- Dawn Thilmany**, Department of Agricultural and Resource Economics
- Ellison Carter**, Department of Civil and Environmental Engineering
- Laura Bellows**, Department of Food Science and Human Nutrition
- Joe Champ**, Department of Journalism and Media Communication
- Gaya Sivakumar**, Department of Journalism and Media Communication
- Meena Balgopal**, Department of Biology

In addition to confronting today's most pressing global scientific and sustainability issues, scientists are also faced with the added burden of polarized political, media, and public spheres. The *Scaling up CSU's Center for Science Communication* GCRT took a collaborative approach to examine possible interest in the development of a University-wide center for science communication-related activities. During the year, the team held eight strategy and planning meetings; conducted six informal focus groups aimed at discovering the needs of CSU researchers, instructors, staff, and students; and worked to identify the landscape of existing science communication activities and centers across campus. At the end of the year, the team hosted a World Café Symposium with 60 invited CSU faculty, staff, executive members and outside research partners from government agencies and NGOs. The recommendations that emerged from these activities will place CSU in an even stronger position in the study of science communication and in its application, and will likely lead to the development of a science communication center. The team will continue its work developing the center beyond their funding year with planned grant proposals and establishment of an advisory committee.

Photo: CSU and City of Fort Collins groups engaged in a collaborative exercise at a Fort Collins Urban Sustainability Research Network GCRT workshop

Next-generation Electricity Demand Response

Principal Investigators:

- Sid Suryanarayanan**, Department of Electrical and Computer Engineering
- Edwin Chong**, Department of Electrical and Computer Engineering and Department of Mathematics
- Jesse Burkhardt**, Department of Agricultural and Resource Economics

Renewable energy can contribute to reducing the carbon footprint of a city's energy grid, however timing of supply from wind, for example, does not necessarily match demand during peak energy usage. Because of this, most power grids still must pull from "dirty" sources of energy in those peak times. The Next-generation Electricity Demand Response GCRT worked to develop methods to reduce the electricity load in cities at peak times using new pricing techniques for retail electricity vendors (known as aggregators) by moving them away from the time of peak demand in the electricity grid. During the year, the team applied sophisticated machine learning methodologies to create a dynamic pricing mechanism for accommodating excess wind energy in the electric grid for charging electric vehicle fleets in the city. They were also able to probe many machine learning techniques to discern and predict the coincident peak times using almost 30 years of data. GCRT funds allowed the team to bring a visiting collaborating scholar from India and support a CSU Ph.D. candidate working on the project. The team completed a manuscript, in review, relevant to electric vehicles, wind energy utilization, and competitive pricing for maximizing the use of green sources and cutting down the use of dirty generators in the grid.

Developing Innovative Solutions for Human-Bison Coexistence Across North America

Principal Investigators:

- Ana Davidson**, Colorado Natural Heritage Program
- Liba Pejchar**, Department of Fish, Wildlife, and Conservation Biology
- Jennifer Barfield**, Department of Biomedical Sciences
- Cynthia Hartway**, Wildlife Conservation Society

The reintroduction and management of bison is among the most challenging human-wildlife coexistence issues today in North America, yet there is widespread interest in restoring this iconic species across the America West. This GCRT met bi-monthly to prioritize, discuss, and plan for bringing together a diverse group of experts on the topic to share their experiences. The team organized a two-day technical workshop of 27 practitioners and scholars representing the private sector, government agencies, tribes, and academic institutions from across the U.S., Canada, and Mexico. The workshop addressed knowledge gaps in the management of bison including key policy, communication, and research considerations. Working groups on these themes were established and exemplars for best practices were identified; as the team moves forward with their work, these groups will help guide the next steps for bison reintroduction efforts. Additionally, the team created and administered a survey to reach a broader audience of experts that gathered information to assess and improve science and practice of bison reintroduction and management including challenges, keys to success, and research needs.

Photo: discussion at the Human-Bison Workshop





Resident Faculty Fellows

Faculty members engaged in creative sustainability research and problem solving. We provide seed funding to enhance scholarly contributions to sustainability, accelerate progress, and engage in the academic life of the School. **Since its inception, SoGES has funded 33 Resident Faculty Fellows from 21 departments across all eight CSU colleges.**

Marcela Velasco Department of Political Science

Marcela Velasco's Fellowship research evaluated the state of indigenous and Afro-Colombian territories in Colombia's Pacific Coast after a peace accord was signed between the government and the Revolutionary Armed Forces of Colombia in 2016. Colombia's indigenous and traditional Afro-Colombian population together represent less than 6% of the national total, but have collective property rights to more than 30% of the country's territory, mostly in strategic areas for biodiversity and natural resource conservation. Velasco partnered with the 2018 and 2019 student cohorts of the Jenzerá Working Group, a non-governmental organization that organizes an inter-ethnic school for training new leaders in the Pacific, to design and execute interviews. Students conducted interviews in 12 local communities to collect information on governance, resilience, economic activities, and the environment. With guidance from Velasco, the students conducted 47 individual and 4 collective interviews by the end of Velasco's fellowship year, with more to go in 2019-20. Velasco wrote a manuscript in Spanish that will be used for training purposes locally, and to share information with participants and their communities.

Ruoh-Nan (Terry) Yan Department of Design and Merchandising

Terry Yan's Fellowship explored the utility of virtual reality technology as a way to address the attitude-behavior gap around clothing consumption and sustainability. Consumers do not internalize the environmental and social costs of clothing when making decisions about their clothing purchases. While seeing the apparel industry production system first-hand via study abroad experiences is an effective way for students gain a better understanding of sustainability challenges facing the world, this experience is only possible for a small portion of students. Yan's Fellowship research sought to evaluate the effectiveness of virtual reality to bring the study abroad experience to students locally on campus. Yan evaluated students' experience and attitudes toward virtual reality in the classroom and how the technology may be used to increase understanding of clothing and sustainability. While virtual reality cannot replace an in-person study abroad experience, Yan explored its feasibility as a potential tool to help address the challenges of the global and 'distant' nature of the apparel industry and increase student's understanding.



Photo: student experiencing virtual reality in Yan's Fellowship work.

Troy Ocheltree Department of Forest and Rangeland Stewardship

Troy Ocheltree's Fellowship research aimed to quantify the amount of water plants use through time and identify the different strategies plants can use to survive droughts. Crop agriculture uses a large portion of water globally, and understanding the root systems of these plants and how and where they get their water is key to understanding the impact of climate change and increasing aridity on crops. A plant's roots can extend more than 10 feet below the soil surface, and existing tools and methods to understand a plant's root structure are too costly and time-intensive to implement to be useful for food system sustainability. Ocheltree's Fellowship focused on developing improved methods to quantify plant rooting depth without the need to dig up a plant's roots. His Fellowship research focused on developing a set of criteria and conditions that can be used to accurately quantify the plant rooting depth using stable water isotopes extracted from soil and plant tissue.

Anders Fremstad Department of Economics

Anders Fremstad's Fellowship investigated models for taxing carbon without increasing social inequity, since carbon taxes can disproportionately burden lower-income households. Fremstad's work looked at how rebating carbon tax revenues in equal dividends could protect the purchasing power of most Coloradans, and in particular people on the bottom half of the income distribution. During the year, he modeled the distributional impact of carbon dividends at the state level, co-authored a paper, "The impact of a carbon tax on inequality", forthcoming in *Ecological Economics*, and co-authored a report, "Decarbonizing the US Economy: Pathways toward a Green New Deal", published by the Roosevelt Institute.

Doug Cloud Department of English

Doug Cloud's Fellowship focused on the changing representations of scientists in public deliberation surrounding climate change. His work looked at how disagreeing parties simultaneously criticize scientists for being 'corrupted' (i.e. compromised by money, ideology, or politics) and how this characterization might re-shape our understanding of the role of scientists and scientific expertise in public policy debate. During his Fellowship he finished a paper, currently in review, titled "The Corrupted Scientist Archetype and its Implications for Climate Change Communication and Public Perception of Science". As part of his Fellowship, Cloud also gave presentations at two national conferences, conducted three invited workshops, and revised a training program for SoGES Sustainability Leadership Fellows using the findings of this work.

Mark Easter Natural Resource Ecology Laboratory

Mark Easter used the Fellowship to work on his book, "The Blue Plate: A Food Lover's Guide to Climate Change". Fellowship funds supported research trips to meet with growers, writing time, and research support from peers. In this book, Easter tells the stories of farmers, chefs, fishers, community activists, garbage collectors, and others throughout the country who are changing the story of food. He describes the food they produce, how that food ends up on our dining room tables, and the consequences of throwing the leftovers in the garbage. The Blue Plate is a journal of discovery about food, climate change, and paths to a climate-friendly food system. During the year he completed a detailed book outline, conducted literature reviews, and drafted four chapters.

Photo: courtesy of the USDA-NRCS, depicting concepts for Easter's Resident Fellow work for the book The Blue Plate





Visiting Fellows

Faculty scholars from universities worldwide with expertise in broad areas of sustainability. They are housed at SoGES in order to collaborate and connect with CSU experts addressing economic, societal, and environmental issues.

Michael Shepard Inyenyeri | March 2018 - April 2019

Michael Shepard is the former chairman and CEO of E Source, a firm that fosters efficient use and sustainable production of energy. His current work is in Colorado and Rwanda with Inyenyeri, a company that provides clean cooking from sustainably sourced biomass to the world's poorest families. Shepard's Fellowship focused on working with CSU experts to improve understanding of motivations, technical developments, and economic factors that affect the adoption of clean cooking technology. He also worked closely with the CSU Energy Institute on proposals for the development of next generation biomass gasification cookstoves.

Karen Scholthof Texas A&M University | summers 2018, 2019

Karen Scholthof is a professor in the Department of Plant Pathology and Microbiology at Texas A&M University and the faculty director of the Bioenvironmental Sciences undergraduate honors program. Scholthof spends summers in Fort Collins as a Visiting Fellow with SoGES, where she shares her scholarship in the history of plant virology with faculty across campus, and contributes to SoGES activities. At Texas A&M, Scholthof maintains two research programs: the molecular biology of plant viruses, and the historiography of tobacco mosaic virus as a model organism for plant biology.

Environmental Justice Working Group | environmentaljustice.colostate.edu

Environmental justice is the view that all people deserve a healthy and safe environment in which to live, work, and play - regardless of their race, ethnicity, class status, age, gender, citizenship, and other social variables. The Environmental Justice Working Group is focused on supporting collaboration among CSU researchers interested in these issues.

Leadership

- Neil Grigg, Department of Civil and Environmental Engineering
- Melinda Laituri, Department of Ecosystem Science and Sustainability
- Stephanie Malin, Department of Sociology
- Dimitris Stevis, Department of Political Science
- Kathryn Powlen, Human Dimensions of Natural Resources
- Stacia Ryder, Department of Sociology

In 2018-19, the Environmental Justice Working Group (EJWG) focused on building capacity to operate as a new CSU Center. They engaged in discussions with CSU deans, department heads, chairs, and faculty to build support across the university, as well as organizing several open

houses to gather ideas and receive feedback from interested faculty and staff. The EJWG also continued to build and maintain collaborative networks of community members and CSU students by hosting "Java and Justice" networking events.

2018-19 Activity

- 2 open house events, 2 *Java & Justice* events, 2 documentary showings, 1 book release event, 1 symposium.
- Completion of an exploratory analysis of food-energy-water justice systems in the Rio Grande River Basin. This project, which was funded by the CSU Water Center, included a webinar with six research groups representing multiple universities, two poster presentations at conferences and a round-table in New Mexico in June 2019.



Global Soil Biodiversity Initiative | globalsoilbiodiversity.org

An ongoing worldwide effort to plan and coordinate soil biodiversity research and support soil biodiversity for the benefit of people and ecosystems. The GSBI Secretariat is housed in SoGES.

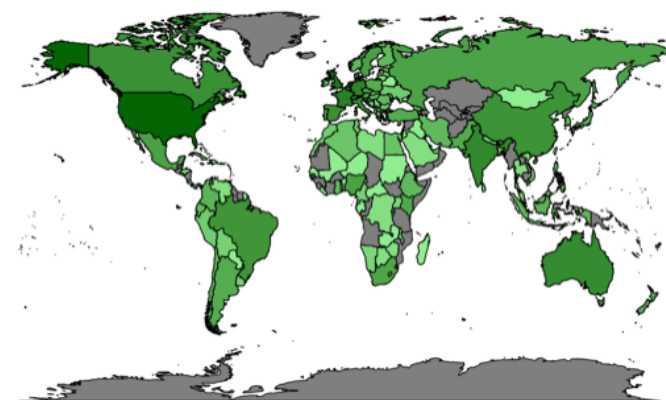


Photo: springtail (*Collembola*) that eats fungi in soils

Leadership

- Diana H. Wall (Scientific Chair), Colorado State University, United States
- Carl Wepking (Executive Director), Colorado State University, United States

The Global Soil Biodiversity Initiative was very active during 2018-19 in developing concepts for the Soil Biodiversity Observation Network (Soil BON) that is being implemented through the international Group on Earth Observations (GEO). It also contributed to the definition of a Global Urban Soil Ecology Education Network that is seeking funding support from the National Science Foundation. Finally, the GSBI organized sessions at the annual meeting of the Ecological Society of America, an international meeting of the Soil Science Society of America, and the biennial meeting of the Soil Ecology Society.



Map: Global Soil Biodiversity Initiative membership by country. Darker green indicates higher numbers of members.

2018-19 Activity

- Provided reviews and input on soil biodiversity issues for reports from the Intergovernmental Panel on Climate Change, the Intergovernmental Platform on Biodiversity and Ecosystem Services, the US Biodiversity Collections Network, and the UN Convention on Biological Diversity.
- Redesigned the Global Soil Biodiversity Atlas website, featuring downloadable chapters. The site had 14,054 unique visitors and 36,174 pageviews between launch of the redesign and Jul. 1, 2019.
- Scientific Chair Diana Wall delivered invited presentations at the 21st World Congress of Soil Science in Rio de Janeiro, Brazil, the *First Soil BON Workshop* in Leipzig, Germany, the *Second Soil BON Workshop* in Ispra, Italy, the *Soil Biodiversity and Global Environmental Challenges* meeting at UC Riverside, and a meeting of the Kellogg Biological Station in Hickory Corners, MI.
- Executive Director Carl Wepking gave an invited presentation at the Soil Health Institute's *Conference on Connections Between Soil Health and Human Health* in Silver Spring, MD.

EDUCATION & TRAINING

The School is actively involved in educating and equipping students with knowledge and tools to tackle sustainability challenges.

SoGES continued to administer and oversee a set of undergraduate minors and graduate certificates during 2018-19. These include the SoGES Global Environmental Sustainability minor; minors in Sustainable Water, Sustainable Energy, and Sustainability and its Role in Peace and Reconciliation; and graduate certificates in Applied Global Stability. The School also offered 13 Global Environmental Sustainability courses during the year. SoGES has developed a proposal for an undergraduate major in global environmental sustainability and will be working to refine this and gain approval during the next academic year. **3,858 students have completed GES courses and 458 students have graduated with a GES minor since the initiation of SoGES education efforts in 2010.**

Interdisciplinary Curriculum

Curricula for the School's minors focus on a comprehensive understanding of the linkages between society, economics, and the environment, upon which sustainable human actions can be based. Students who complete the curriculum will be able to determine solutions to problems that have developed from human interactions with the environment.

Curriculum Committee

The SoGES curriculum committee provides oversight and advice for all SoGES educational activities, including development of courses and degree programs. The committee includes representation from all CSU colleges and the CSU library.

Kathleen Galvin (Chair), Department of Anthropology; The Africa Center; and SoGES

Jocelyn Boice, CSU Libraries

Rich Conant, Department of Ecosystem Science and Sustainability and Natural Resource Ecology Laboratory

Dale Lockwood, Department of Biology and SoGES

Suellen Melzer, Department of Soil and Crop Sciences and SoGES

Ryan Morrison, Department of Civil and Environmental Engineering

Troy Mumford, Department of Management

Johnny Plastini, Department of Art and Art History

Howard Ramsdell, Department of Environmental and Radiological Health

Rodolfo Valdes-Vasquez, Department of Construction Management

Pat Aloise-Young, Department of Psychology

fy 19

343
students
enrolled in 4
minors

89
graduates

635
students
completed GES
courses

Global Environmental Sustainability (GES) Minor

Provides a deep understanding of the complexity surrounding the problems we face and the solutions that we need to implement to address climate change, biodiversity, pollution, public health, oceans, food security and development on a global scale. As of this fiscal year, the GES minor is now available as an online option for students.

300 students enrolled

75 graduates FY19

Sustainable Energy Minor

Collaborative with the Energy Institute

3 students enrolled

2 graduates FY19

Sustainable Water Interdisciplinary Minor

Collaborative with the CSU Water Center

25 students enrolled

10 graduates FY19

Sustainability and its Role in Peace and Reconciliation Minor

15 students enrolled

2 graduates FY19

Photo: spring 2019 minor graduates





EDUCATION & TRAINING

GES Courses

GES 101*
Foundations of Global Environmental Sustainability

GES 130
Introduction to Sustainability Engagement

GES 141
Introductions to Sustainable Energy

GES 180A4**
Water in the Western U.S.

GES 330
Sustainability in Practice

GES 441
Analysis to Sustainable Energy Solutions

GES 450
Sustainability and Health

GES 460
The Law and Sustainability

GES 470*
Applications in Global Environment Sustainability

GES 480A3**
Sea Level Rise and a Sustainable Future

GES 481A1**
Sustainable Solutions to Electronic Waste

GES 520*
Issues in Global Environment Sustainability

GES 542
Bio Based Products

* Face-to-face and online options

** Experimental courses



Photo: student Andres Sweetland holding an Earth balloon at a Student Sustainability Center Event

CGW Scholarships

The \$2,500 Charles Gladstone Wright, Jr. Scholarship, supported by a philanthropic donation from the CGW foundation, is awarded annually to Junior or Senior level students enrolled in the GES Minor and who have completed the GES 101 course with a GPA of 3.0 or better.

Recipients

- Emma Balunek, Ecosystem Science and Sustainability
- Olivia Bruce, Human Dimensions of Natural Resources
- Grady Davis, Business Administration, Organization, and Innovation Management
- Noah Fishman, Business Administration, Supply Chain Management
- Hannah Heath, English
- Katie Sheridan, Mechanical Engineering

Graduate Certificates

The Graduate Certificates in Applied Global Stability are designed to meet the global stability needs of senior non-commissioned officers and mid-career officers in the Special Operations Forces community as well as the global stability needs of other Department of Defense, USAID, Peace Corps, and development professionals. **There are 46 students currently enrolled and 5 certificates were awarded in FY 19.**

Sustainability Leadership Fellows

The year-long Fellowship provides early career scientists with training to effectively communicate science to the media and public, professional development skills and techniques, and strategies to build meaningful careers that incorporate engagement and interdisciplinarity. The program helps the scientists that will be solving tomorrow's grand challenges of sustainability have greater impact, reach broader audiences, and think more expansively about their work and its role in the world. **160 Sustainability Leadership Fellows from 31 departments across 7 colleges have completed the program since it was founded in 2011.**

Each cohort of Fellows begins the year with an orientation, followed by an intensive two-day science communication training workshop run by COMPASS, science communication specialists. Fellows then participate in six formal training sessions led by local and University experts on a range of topics including time management and workload optimization, interacting with policy-makers, data visualization, talking science with skeptical audiences, and storytelling. Fellows also take part in additional skill-building and networking opportunities throughout the year, including practice pitching their ideas to the University provost and writing and peer-review for the SoGES blog.

Photo: 2018-19 Sustainability Leadership Fellow cohort



8th cohort

20 fellows

15 depts

6 colleges

College of Agricultural Sciences

Bethany Avera, Ph.D. Candidate, Department of Soil and Crop Sciences, Graduate Degree Program in Ecology, and Natural Resource Ecology Laboratory

Theresa Barosh, Ph.D. Candidate, Department of Bioagricultural Sciences and Pest Management and Graduate Degree Program in Ecology

Ryan Paul, Ph.D. Candidate, Department of Bioagricultural Sciences and Pest Management and Graduate Degree Program in Ecology

College of Liberal Arts

Trevor Even, Ph.D. Student, Department of Anthropology, Graduate Degree Program in Ecology, Natural Resource Ecology Laboratory, and North Central Climate Science Center

Desirée Fiske, Ph.D. Student, Department of Political Science

College of Natural Sciences

Whitney Beck, Ph.D. Candidate, Department of Biology and Graduate Degree Program in Ecology

Joshua Hewitt, Ph.D. Candidate, Department of Statistics

Gretchen Kroh, Ph.D. Candidate, Department of Biology

Michael Link, Ph.D. Candidate, Department of Chemistry

Alejandro López-Cerón, Ph.D. Candidate, Department of Biology

College of Veterinary Medicine and Biomedical Sciences

Sheena Martenies, Postdoctoral Fellow, Department of Environmental and Radiological Health Sciences

Walter Scott, Jr. College of Engineering

Erin Dougherty, Ph.D. Student, Department of Atmospheric Science

Molly McLaughlin, Ph.D. Student, Department of Civil and Environmental Engineering

Evan Sproul, Ph.D. Student, Department of Mechanical Engineering

Warner College of Natural Resources

Kevin Jablonski, Ph.D. Student, Department of Forest and Rangeland Stewardship

Megan Jones, Ph.D. Student, Department of Human Dimensions of Natural Resources

Courtney Larson, Ph.D. Student, Department of Fish, Wildlife, and Conservation Biology and Graduate Degree Program in Ecology

Cara Steger, Ph.D. Candidate, Department of Ecosystem Science and Sustainability, Graduate Degree Program in Ecology, and Natural Resource Ecology Laboratory

Thomas Timberlake, Ph.D. Candidate, Department of Forest and Rangeland Stewardship

Nicholas Van Lanen, Ph.D. Student, Department of Ecosystem Science and Sustainability, Graduate Degree Program in Ecology, and Natural Resource Ecology Laboratory

CENTERS & PROGRAMS

The School houses four CSU centers and one international organization.

Salazar Center for North American Conservation

Focused on conservation throughout the North American continent and will play a leading role in building and maintaining effective links between science, policy development, and management. It is intended as a new venue for discussion of difficult issues, definition of opportunities for innovation, and development of new approaches to key challenges.

The Salazar Center for North American Conservation was founded by former US Interior Secretary Ken Salazar and is external-facing and impact-oriented. The Center began operations in 2018-19 after several years of planning and development. It is working with a wide range of nonprofit, public, and private partners to drive conservation innovation and explore best-in-class solutions to the challenges faced by our planet—including global warming, the alarming disappearance of healthy connected ecosystems, and a growing world population that now exceeds 7.5 billion people.

2018-19 Activity

- Elizabeth Conover was appointed as Director in November 2018. She most recently served as senior vice president at the Gates Family Foundation in Denver and has spent her entire career working at the intersection of environmental policy and community development.
- Catie Boehmer began providing administrative and communication support to the center in February, and Dominique Gomez accepted the position of Program Director in June.
- Established partnerships with the Biennial of the Americas, the Network for Landscape Conservation, the Center for Diversity and the Environment, the City Parks Alliance, the CSU National Western Center, the Center for Large Landscape Conservation, the Wildlife Conservation Society, and the S.D. Bechtel, Jr. Foundation.
- Established an advisory board of representatives from conservation organizations, foundations, universities, museums, and the legal and investment communities.
- Began planning to host its inaugural International Symposium for Conservation Impact in fall 2019 to convene thought leaders from the arenas of conservation policy, practice, and research around the theme of landscape connectivity. This event will also see the launch of an incentive prize for conservation—one of the many ways the Salazar Center is pursuing bold new pathways to advance impactful, community-based partnerships that support conservation at scale.

Support from Mr. Salazar, the Bohemian Foundation, and CSU alumnus Patrick Phillips has been critical to the Center's development.



Photo: Beth Conover and Ken Salazar

Future Earth | futureearth.org

A 10-year international research initiative to coordinate new, interdisciplinary actionable science efforts and solutions to sustainability challenges and global environmental change. Future Earth has five global hubs based in Colorado, Montreal, Paris, Stockholm, and Tokyo. The Colorado Hub resides within the School of Global Environmental Sustainability at CSU and the Sustainability, Energy, and Environment Complex at CU-Boulder.

Future Earth is a global research program designed to provide the knowledge needed to support transformations towards sustainability. The program is focused on systems-based approaches to 1) deepen understanding of complex Earth system and human dynamics across different disciplines, and 2) underpin the development and evaluation of evidence-based policies and strategies for sustainable development.

2018-19 Colorado Hub Activity

- Helped organize a Future Earth Summit in Bonn, Germany in Aug. 2018, which focused on identification and definition of major global challenges that require a systems-based approach. The Summit provided the Future Earth community with the opportunity to strengthen working relationships and refine plans for production of an annual *Our Future On Earth* report and the Earth Targets initiative.
- Organized, in partnership with the Science and Technology for Sustainability Program of the U.S. National Academies of Sciences, several dialogues on the status and future of sustainability science in the US. These sessions were held in Denver, CO, and Arlington, VA in spring 2019. Participants included sustainability research and innovation leaders from different sectors around the country. The focus of these cross-sector dialogues was on societal needs, the capacity of the "research ecosystem" to respond to such needs, the frameworks for support of sustainability science, and methods for linking research, innovation, and technology communities.
- Continued partnership with the CSU Global Biodiversity Center on the PEGASuS program, funded by the Gordon and Betty Moore Foundation. PEGASuS brings together researchers from different disciplines and across borders to take creative approaches to exploring the relationships between people and the planet. 2018-19 saw completion of five projects on Biodiversity and Natural Assets and initiation of two new projects on Ocean Sustainability, both in partnership with the National Center for Ecological Analysis and Synthesis at the University of California, Santa Barbara.
- Future Earth is the only partner of the Belmont Forum – an international group of national government agencies that support sustainability research – mandated to scope and co-design Collaborative Research Actions, major multinational funding opportunities. The Colorado Hub is leading the scoping and co-design of two topics for consideration by the Belmont Forum at their annual plenary event in 2019, one proposal on Human Migration and Global Change, and one on Systems of Sustainable Consumption and Production.
- The Colorado Hub is also involved in the UN Decade of Ocean Science for Sustainable Development, and has facilitated the participation of the Future Earth community, including the PEGASuS Teams, in the planning process for this effort.





Student Sustainability Center

A University-wide, student run organization whose mission is to empower students to advance sustainability practices and principles. The Student Sustainability Center (SSC) involves students in volunteer projects, hosts events to raise awareness about sustainability, consolidates and distributes sustainability information and news, and builds relationships across campus to promote environmental initiatives.

The SoGES Student Sustainability Center had 40 members in 2018-19, and trained 15 students through its LEAF program, aimed at students interested in incorporating sustainability into their careers. The Center increased its number of email subscribers to 2,027 and had 957 Facebook followers. Olivia Bruce served as director during the year and brought on incoming director Sara Van Hatten. Andres Sweetland took over as director of outreach from graduating senior Nevan Mandel.



Photo: student at the SSC "Trashion" Show



Photo: student piece from the "Trashion" Show

2018-19 Activity

- Continued representing the student body on campus groups and committees, such as the President's Sustainability Commission, and contributed student perspectives to the CSU strategic planning process
- Hosted regular Club meetings and organized multiple on-campus student events, including outreach discussions to describe CSU sustainability activities and recruit interested students, a "Trashion" show (fashion created from discarded materials), and a panel on homelessness and mental health in our community
- Continued leadership of the Coalition of Sustainable Student Organizations
- Collaborated with partners during community events, including Earth Day Fort Collins and the second annual Zero Waste Symposium
- Awarded the 2019 Exceptional Achievement in Service-Learning Student Award from The Institute for Learning and Teaching for their work with the student body.

Africa Center | africacenter.colostate.edu

Advancing innovative interdisciplinary and transdisciplinary research to tackle the continent's environmental and sustainability issues.

The Africa Center this year focused on water challenges and innovations across the continent. Water – from climate change impacts on precipitation, stream flows, floods, and droughts to clean and sufficient water for urban dwellers to water for agriculture, wildlife, livestock, biodiversity, and ecosystem services – is one of the defining environmental challenges of this century. It is connected to social, cultural, economic, political and ecological issues, and improving water management strategies and methods is a key step towards achieving environmental sustainability in Africa. The Africa Center hired three staff members to facilitate all these activities along with Director Kathleen Galvin: Frances Sopia, Sarah Walker, and Tomas Pickering.

2018-19 Activity

- Held 11 networking events to help support those that do and wish to do research and studies in Africa, including eight coffee socials, two lunches for students, and the annual *Africa and Ale* reception.
- The Center's key event for the year was a *Water in Africa* Symposium held April 16 - 18. Approximately 130 people from Colorado State University, other U.S. universities, and international institutions participated. The event examined three key themes: 1) water, land, and conservation, 2) water and societal change, and 3) water in Africa 2050. These topics were discussed in a series of panels and keynote presentations from Munira Bashir (Kenya), Coleen Vogel (South Africa), and Line Gordon (Sweden).

Global Biodiversity Center | biodiversity.colostate.edu

A network of faculty working on biodiversity research at the University encouraging knowledge transfer and cross-campus collaboration.

The mission of the Global Biodiversity Center, led by Christopher Funk, is to advance understanding, conservation, and appreciation of life's variation, ranging from genetics and organisms to ecosystems and their interactions. The GBC organized and hosted a series of events during the year.

2018-19 Activity

- *Biodiversity, Bluegrass, and Brews* was a networking and discussion session designed to highlight the importance of biodiversity, raise awareness about species of conservation concern, and engage the public about the mission of the GBC. Three local microbreweries created biodiversity-themed brews for the event, which also featured a performance by the bluegrass band *Lineage*. Approximately 120 people attended.



ENGAGEMENT

Working with diverse stakeholders and audiences to discuss sustainability issues and ensure that research is informed by societal needs and concerns.

Communications

Website | sustainability.colostate.edu

We created a new website this year. The transition to the new site resulted in a large but temporary increase in site visits. Total annual visit data are thus not directly comparable to previous years.

466,827 visits, international traffic constituted **46%** of total visits

Social Media

4,920 email subscribers, **1,600** Facebook Likes, **2,491** Twitter followers

Media Mentions

87 mentions in the media, **87%** domestic, **13%** international

Events

Managing the Planet Panel Discussions

Interactive public events that address a wide range of sustainability issues. Each features a panel of CSU experts who field questions from community members and students. The four panels held during 2018-19 attracted about **400 participants**.

Sept. 12 *The Heat over Water: Will Glade Reservoir Bring us Closer to Water Security or be an Example of Ecosystem Degradation?*

Oct. 10 *CRISPR Gene Editing: Environmentally Friendly Choice?*

Nov. 14 *What Does Sustainability Mean to You?*

Feb. 20 *Drones for Sustainability? The Privacy, Accessibility, and Ethics Behind BIG Data*

Antarctic Lecture Series

Lectures featuring Antarctic researchers who describe various aspects of life, work, and conducting science "on the ice". Approximately **290 people attended** the 2018-19 lectures, held at the Old Town Library.

Sept. 18 *International Cooperation in Antarctica: Protecting the World's Most Intact Ocean in the Ross Sea*, Cassandra Brooks, CU Boulder

Oct. 30 *Glacial meltwater streams in the McMurdo Dry Valleys of Antarctica: Resilient ecosystems that abide through climate extremes* Diane McKnight, CU Boulder

Nov. 20 *Ocean Legacy: Inspiring Marine Conservation in the Ross Sea, Antarctica, and Beyond*, John Weller, Nature Photographer, Filmmaker, and Writer

Feb. 26 *The First U.S. Geology Field Party in Antarctica*, James Collinson, The Ohio State University

Apr. 30 *Vibrations on Earth's Largest Ice Shelf*, Rick Aster, Colorado State University

Global Biodiversity Center Events

Public lectures and discussions that highlight biodiversity issues and the work of CSU researchers focused on this critical sustainability challenge. The Center held four events in 2018-19, **attended by about 370 people**.

Sept. 26 *Biodiversity, Bluegrass, and Brews*

Nov. 15 *Guns and Biodiversity: Threat or Conservation tool?*

Feb. 19 *Putting the "Diversity" into Biodiversity*

Apr. 23 *Biodiversity IGNITE*

Symposia, Workshops, & Special Lectures



Photo by: Artie Limmer, Texas Tech University

Mitigate, Adapt, or Suffer: Connecting Global Change to Local Impacts and Solutions

Low-carbon virtual lecture with Katharine Hayhoe, Texas Tech University, March 7, **120 attendees**.



Photo by: Rob Hope/REACH

Water in Africa Symposium

130 attendees from universities and NGOs in the U.S. and Africa to address water-related challenges in Africa. Co-sponsored with the Office of the Vice President for Research, Office of the Provost, CSU Water Center, and The Africa Center, Apr. 16-18.



How Cities are Removing Barriers to Acting on Climate

Partnered event with the City of Fort Collins, Oct 18. **Gathered 120 people**, including CSU researchers, City of Fort Collins staff, and interested citizens, to discuss local-scale responses to climate change.



SoGES 10th Anniversary Symposium

Held on March 26, the symposium included panels on the future of sustainability, the Green New Deal, and sustainability leadership. The event also featured a spoken word and music performance from a SoGES-funded research team and a keynote lecture on climate change and biodiversity loss from Sir Robert Watson, Chair, Intergovernmental Platform of Biodiversity and Ecosystem Services (IPBES). **More than 250 people participated**, including students, CSU faculty and researchers, members of the public, CSU administrators, and SoGES external advisory board members.



Photo: Sir Robert Watson delivering his lecture at the 10th Anniversary Symposium

fy 19

45
total
events

21
SoGES
events

24
collaborative
events

3,016
total
attendees



Photo by Pat Keys

External Advisory Board

Oswaldo Sala (chair), Julie A. Wrigley and Foundation Professor, School of Life Sciences, Arizona State University
Joyce Berry, Emeritus Dean, Warner College of Natural Resources
Rosina Bierbaum, Professor, School for Environment and Sustainability, University of Michigan
William "Bill" Brennan, Water and Sustainability Investor
Thomas Dietz, Assistant Vice President for Environmental Research, Michigan State University
Maggie L. Fox, President and CEO, The Climate Reality Project
Rob Jackson, Michelle and Kevin Douglas Provostial Professor, School of Earth Sciences, Stanford University
Thomas Lovejoy, University Professor, Department of Environmental Science and Policy, George Mason University
James B. Martin, Senior Counsel, Beatty & Wozniak, P.C.
Jonathan Patz, Director, Global Health Institute, University of Wisconsin-Madison
Former Colorado Governor Bill Ritter, Jr., Director, Center for the New Energy Economy
Scott J. Sternberg, Former President, Vaisala USA, Inc.

Staff

Jarvis Choury, Fiscal and Operations Manager
Ryan Deming, Web Content Specialist
Pat Keys, Research Scientist
Dale Lockwood, Academic Coordinator;
 Assistant Professor, Department of Biology and SoGES
Suellen Melzer, Assistant Professor,
 Department of Soil and Crop Sciences and SoGES
Laurel Milliken, Information Technology Officer,
 Future Earth Colorado Global Hub
Matt Norton, Fiscal Assistant Manager
Laura Shaver, Event and Administrative Coordinator
Craig Starger, Research Enabling Lead, Future Earth Colorado
 Global Hub and SoGES Research Scientist
Sara Van Hatten, incoming Director, Student Sustainability Center
Aleta Weller, Senior Research and Engagement Officer

Senior Scholars

Former Governor Bill Ritter, Jr., Director, Center for the New Energy Economy, Colorado State University
Edward B. Barbier, Professor, Department of Economics, Colorado State University
Josh Tewksbury, Director, Colorado Global Hub, Future Earth

Affiliate Faculty

Ruth Alexander	History	Mary-Ann Kokoska	Art and Art History
Patricia Aloise-Young	Psychology	Boris Kondratieff	Bioagricultural Sciences and Pest Management
Rick Aster	Geosciences	Sonia Kreidenweis	Atmospheric Science
Peter Backlund	SoGES	Stephan Kroll	Agricultural and Resource Economics
Ken Barbarick	Soil and Crop Sciences	Melinda Laituri	Ecosystem Science and Sustainability
Edward Barbier	Economics	Jan Leach	Bioagricultural Sciences and Pest Management
Jo Burgess Barbier	Economics	Katherine Leigh	Design and Merchandising
Jennifer Barfield	Veterinary and Biomedical Sciences	Dale Lockwood	Biology & SoGES
Elizabeth Barnes	Atmospheric Science	Sheryl Magzamen	Environmental and Radiological Health Sciences
Jill Baron	Ecosystem Science and Sustainability	Stephanie Malin	Sociology
Dan Beachy-Quick	English	Anthony Marchese	Mechanical Engineering
Del Benson	Fish, Wildlife, and Conservation Biology	Katie McShane	Philosophy
Alexandra Bernasek	Economics	Sue Ellen Melzer-Drinnen	Soil and Crop Sciences
Autumn Bernhardt	University Honors Program	Stephen Mumme	Political Science
Michele Betsill	Political Science	Donald Mykles	University Honors Program
Aditi Bhaskar	Civil and Environmental Engineering	Troy Ocheltree	Forest and Rangeland Stewardship
Jens Blotevogel	Civil and Environmental Engineering	Paul Ode	Bioagricultural Sciences and Pest Management
Thomas Borch	Soil and Crop Sciences & Chemistry	Dennis Ojima	Ecosystem Science and Sustainability
Cynthia Brown	Bioagricultural Sciences and Pest Management	Svetlana Olbina	Construction Management
Daniel Bush	Biology	Erika Osborne	Art and Art History
Phil Cafaro	Philosophy	Mehmet Ozbek	Construction Management
Martin Carcasson	Communication Studies	Merlyn Paulson	Horticulture and Landscape Architecture
Jonathan Carlyon	Languages, Literatures, and Cultures	Keith Paustian	Soil and Crop Sciences
Michael Carolan	Sociology	Lori Peek	Sociology
Joseph Champ	Journalism and Technical Communication	Jennifer Peel	Environmental and Radiological Health Sciences
Suren Chen	Civil and Environmental Engineering	Graham Peers	Biology
Tony Cheng	Forest and Rangeland Stewardship	Liba Pejchar	Fish, Wildlife, and Conservation Biology
Jane Choi	Horticulture and Landscape Architecture	LeRoy Poff	Biology
Stephanie Clemons	Design and Merchandising	Jason Quinn	Mechanical Engineering
Doug Cloud	English	Jorge Ramirez	Civil and Environmental Engineering
Rich Conant	Ecosystem Science and Sustainability	Howard Ramsdell	Environmental and Radiological Health Sciences
Daniel Cooley	Statistics	Dave Randall	Atmospheric Science
M. Francesca Cotrufo	Soil and Crop Sciences	Tony Rappe	Chemistry
Kevin Crooks	Fish, Wildlife, and Conservation Biology	Kristen Rasmussen	Atmospheric Science
Sandra Davis	Political Science	Ravi Ravishankara	Chemistry
Charles Davis	Political Science	Laura Reynolds	Sociology
Tom Dean	Management	Ken Reardon	Chemical and Biological Engineering
Scott Denning	Atmospheric Sciences	Sarah Reed	Fish, Wildlife, and Conservation Biology
Sonali Diddi	Design and Merchandising	Elizabeth Ryan	Environmental and Radiological Health Sciences
Robert Duffy	Political Science	Kyle Saunders	Political Science
Brian Dunbar	Institute for the Built Environment	Meagan Schipanski	Soil and Crop Sciences
Colleen Duncan	Microbiology, Immunology, and Pathology	Robert Schorr	Fish, Wildlife and Conservation Biology
Maria Fernandez-Gimenez	Forest and Rangeland Stewardship	Courtney Schultz	Forest and Rangeland Stewardship
Emily Fischer	Atmospheric Sciences	Andy Seidl	Agricultural and Resource Economics
Erica Fleischman	Director of CEMML	Arathi Seshadri	Soil and Crop Sciences
Steven Fonte	Soil and Crop Sciences	Sybil Sharvelle	Civil and Environmental Engineering
Brian Foy	Microbiology, Immunology, and Pathology	Kenneth Shockley	Philosophy
Jason Frazier	Art and Art History	Melinda Smith	Biology
Chris Funk	Biology	Bruno Sobral	Microbiology, Immunology, and Pathology
Kathy Galvin	Anthropology	Dimitris Stevis	Political Science
Cameron Ghalambor	Biology	Peter Taylor	Sociology
Scott Glick	Construction Management	Dawn Thilmany McFadden	Agricultural and Resource Economics
Susan Gollicic	Management	David Thompson	Atmospheric Sciences
Neil Grigg	Civil and Environmental Engineering	Bill Timpson	School of Education
Elizabeth Hobbs	Horticulture and Landscape Architecture	Craig Trumbo	Journalism and Technical Communication
Thomas Holtzer	Bioagricultural Sciences and Pest Management	Rodolfo Valdes-Vasquez	Construction Management
Amy Hoseth	Library	Sue VandeWoude	Microbiology, Immunology, and Pathology
Paul Hudnut	Management	Subhas Venayagamoorthy	Civil and Environmental Engineering
Ruth Hufbauer	Bioagricultural Sciences and Pest Management	Chandrasekar Venkatachalam	Electrical and Computer Engineering
Michael Humphrey	Journalism & Media Communication	Diana Wall	SoGES & Biology
Rebecca Jablonski	Agriculture & Resource Economics	Reagan Waskom	Colorado Water Institute
Gene Kelly	Soil and Crop Sciences	Ellen Wohl	Geosciences
Raj Khosla	Soil and Crop Sciences	Ruoh-Nan (Terry) Yan	Design and Merchandising
Julia Klein	Ecosystem Science and Sustainability	Jill Zarestky	School of Education
Alan Knapp	Biology		

Finance Report

	Budget	Expenses	Credits
FY 2018-19 base budget	\$1,018,417.00		
Salaries			
Director, Associate Directors		\$448,616.00	
Staff		\$468,969.00	
Salaries Total		\$917,585.00	
Program Activities			
Global Challenges Research Teams and Working Groups		\$45,000.00	
Resident Fellows		\$44,000.00	
Sustainability Leadership Fellow program (workshop, trainings, operations, supplies)		\$33,900.00	
GES traditional and online courses (professors, TAs, supplies, trips)		\$100,724.00	
Student Sustainability Center salaries		\$5,667.00	
Student Sustainability Center operations and events		\$3,985.33	
Program Activities Total		\$233,276.33	
General Administration			
Supplies		\$23,036.00	
Operating charges (events, phone, data, etc.)		\$92,199.61	
Travel		\$27,621.00	
General Administration Total		\$142,856.61	
Expense Total		\$1,293,717.94	
Miscellaneous Income			
1 X monies			\$88,217.00
1 X Tyler Prize gift match from central			\$41,570.94
Differential tuition			\$27,984.00
Sponsored projects overhead return			\$11,323.00
2-3-6 distribution			\$26,630.00
FY 18 carry forward			\$63,017.00
Online courses revenue			\$32,211.00
Salary savings from grants			\$69,656.00
Balance for future commitments in FY 20	\$85,308.00		

Grants, Cooperative Agreements, Gifts

\$1,197,704.00. Future Earth CSU. *Collaborative Research: Maintenance of the U.S. Hub of Future Earth Secretariat.* National Science Foundation.

\$744,808.00. Patrick Keys. *Cross-scale Impacts of SDG15-Achievement: Household decisions, ecosystem change, and atmospheric water recycling.* NASA.

\$99,147.59. Peter Backlund. *Indicators of Climate Change Impacts on Agriculture.* United States Department of Agriculture.

\$40,336.00. Salazar Center for North American Conservation. Private Donation.

\$26,572.00. Salazar Center for North American Conservation. Private Donation.

\$10,000.00. To support scholarships for GES students. Charles G. Wright (CGW) Foundation..

\$5,641.96. Peter Backlund. *Scoping and Feasibility Study of a Colorado State Climate Vulnerability and Impacts Report.* University of Colorado Boulder.

Publications

Director: Diana H. Wall

Aanderud, Z. T., Saurey, S., Ball, B. A., Wall, D. H., Barrett, J. E., Muscarella, M. E., ... & Adams, B. J. (2018). Stoichiometric shifts in soil C: N: P promote bacterial taxa dominance, maintain biodiversity, and deconstruct community assemblages. *Frontiers in microbiology*, 9, 1401. doi: 10.3389/fmicb.2018.01401.

Andriuzzi, W. S., & Wall, D. H. (2018). Soil biological responses to, and feedbacks on, trophic rewilding. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1761), 20170448. doi: 10.1098/rstb.2017.0448.

Ball, B. A., Adams, B. J., Barrett, J. E., Wall, D. H., & Virginia, R. A. (2018). Soil biological responses to C, N and P fertilization in a polar desert of Antarctica. *Soil Biology and Biochemistry*, 122, 7-18. doi: 10.1016/j.soilbio.2018.03.025.

Cameron, E. K., Martins, I. S., Lavelle, P., Mathieu, J., Tedersoo, L., Bahram, M., ... & Wall, D.H. (2019). Global mismatches in aboveground and belowground biodiversity. *Conservation Biology*. doi: 10.1111/cobi.13311

Cameron, E. K., Martins, I. S., Lavelle, P., Mathieu, J., Tedersoo, L., Gottschall, F., ... & Wall, D.H. (2018). Global gaps in soil biodiversity data. *Nature ecology & evolution*, 2(7), 1042. doi: 10.1038/s41559-018-0573-8.

Caruso, T., Hogg, I.D., Nielsen, U.N., Bottos, E.M., Lee, C.K., Hopkins, D.W., ... & Wall, D.H. (2019). Nematodes in a polar desert reveal the relative role of biotic interactions in the coexistence of soil animals. *Communications biology*, 2(1), 63.

Franco, A. L., Sobral, B. W., Silva, A. L., & Wall, D. H. (2019). Amazonian deforestation and soil biodiversity. *Conservation Biology*, 33(3), 590-600. doi: 10.1111/cobi.13234.

Lee, C. K., Laughlin, D. C., Bottos, E. M., Caruso, T., Joy, K., Barrett, J. E., ... & Wall, D.H. (2019). Biotic interactions are an unexpected yet critical control on the complexity of an abiotically driven polar ecosystem. *Communications biology*, 2(1), 62. doi: 10.1038/s42003-018-0274-5.

Shaw, E. A., Boot, C. M., Moore, J. C., Wall, D. H., & Baron, J. S. (2019). Long-term nitrogen addition shifts the soil nematode community to bacterivore-dominated and reduces its ecological maturity in a subalpine forest. *Soil Biology and Biochemistry*, 130, 177-184. doi: 10.1016/j.soilbio.2018.12.007.

Research Scientist: Pat Keys

Wang-Erlandsson, L., Fetzer, I., Keys, P. W., Van Der Ent, R. J., Savenije, H. H., & Gordon, L. J. (2018). Remote land use impacts on river flows through atmospheric teleconnections. *Hydrology and Earth System Sciences*, 22(8), 4311-4328. doi: 10.5194/hess-22-4311-2018

2017-18 Resident Fellow: Tom Dean

Sarason, Y., & Dean, T. (2019) Lost battles, Trojan horses, open gates, and wars won: How entrepreneurial firms co-create structures to expand and infuse their sustainability missions in the acquisition process. *Academy of Management Perspectives*, (ja). doi: 10.5465/amp.2017.0133

2017-18 Resident Fellow: Andrew Seidl

Pascal, N., Brathwaite, A., Brander, L., Seidl, A., Philip, M., & Clua, E. (2018). Evidence of economic benefits for public investment in MPAs. *Ecosystem Services*, 30, 3-13. doi: 10.1016/j.ecoser.2017.10.017

2017-18 Global Challenges Research Team: Clothing and Sustainability

Diddi, S., Yan, R. N., Bloodhart, B., Bajtelsmit, V., & McShane, K. (2019). Exploring young adult consumers' sustainable clothing consumption intention-behavior gap: A Behavioral Reasoning Theory perspective. *Sustainable Production and Consumption*, 18, 200-209. doi: 10.1016/j.spc.2019.02.009

2015-16 Global Challenges Research Team: Food Systems Research Group

Nogeire-McRae, T., Ryan, E. P., Jablonski, B. B., Carolan, M., Arathi, H. S., Brown, C. S., ... & Schipanski, M. E. (2018). The role of urban agriculture in a secure, healthy, and sustainable food system. *BioScience*, 68(10), 748-759. doi: 10.1093/biosci/biy071

2015-16 Resident Fellow: Maria Fernández-Giménez

Fernández-Giménez, M. E., Jennings, L. B., & Wilmer, H. (2019). Poetic inquiry as a research and engagement method in natural resource science. *Society & Natural Resources*, 32(10), 1080-1091. doi: 10.1080/08941920.2018.1486493



**SCHOOL OF GLOBAL
ENVIRONMENTAL SUSTAINABILITY
COLORADO STATE UNIVERSITY**



Photo by: Christopher T. Weller