SCHOOL OF GLOBAL ENVIRONMENTAL SUSTAINABILITY
COLORADO STATE UNIVERSITY

2018-19 Annual Report
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.

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, 10 from Energy, 2 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.

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.

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.
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 interdisciplinary 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.
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.

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, loss and degradation of freshwater ecosystems and habitats, and agricultural intensification. Developing 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 automation and information products 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.

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.

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.

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. The 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.

$102,660 awarded to CSU researchers

4 research teams

6 faculty fellows

$849,598 won by staff

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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. 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 Mollale, Department of Ecosystem Science and Sustainability
- Kelly Curl, Department of Landscape Architecture
- Sonal Dhill, Department of Design and Merchandising
- Courtney Baum, 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 Sopac, 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 membership 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 Tholmamp, Department of Agricultural and Resource Economics
- Ellison Carter, Department of Civil and Environmental Engineering
- Laura Belloso, 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 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 guests. The symposium brought together researchers, instructors, staff, and students from across the university to discuss the challenges and opportunities for enhancing science communication activities at CSU. The team concluded the year with a proposal for a University-wide Center for Science Communication, which would serve as a hub for faculty, students, and staff to engage in interdisciplinary research and outreach in the field of science communication.

Next-generation Electricity Demand Response

Principal Investigators:
- Sid Suryanarayanan, Department of Electrical and Computer Engineering
- Edwin Chong, Department of Electrical and Computer Engineering
- 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 Hartman, 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 Americas. 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.
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 5% 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 Jemena 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.

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 30 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 inequality, 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: student experiencing virtual reality in Yan’s Fellowship work.  

Photo: courtesy of the USDA-NRCS, depicting concepts for Ocheltree’s Fellowship work in 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 histophotography of tobacco mosaic virus as a model organism for plant biology.

Leadership

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Stephanie Malli, 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 research, development of next generation biomass gasification cookstoves.

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.

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LEADERSHIP

NEIL GRIGG

Department of Civil and Environmental Engineering

SOPHIE ZHU

Department of Sustainable Food Systems

CHERYL H Successful relationships and partnerships with leaders in the community and other institutions.

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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
Sueellen Mellen, Department of Soil and Crop Sciences and SoGES
Ryan Morrison, Department of Civil and Environmental Engineering
Tony 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

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.

Sustainable Water Interdisciplinary Minor

Collaborative with the CSU Water Center

300 students enrolled
75 graduates FY19

Sustainable Energy Minor

Collaborative with the Energy Institute

3 students enrolled
2 graduates FY19

Sustainability and its Role in Peace and Reconciliation Minor

Collaborative with the CSU Water Center

25 students enrolled
10 graduates FY19
GES Courses

GES 101* Foundations of Global Environmental Sustainability
GES 130 Introduction to Sustainability Engagement
GES 141 Introduction 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
GES 520* Issues in Global Environment Sustainability
GES 542 Bio Based Products

* Face-to-face and online options
** Experimental courses

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 Balinek, 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.

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

College of Veterinary Medicine and Biomedical Sciences
Sheena Martorens, Postdoctoral Fellow, Department of Environmental and Radiological Health Sciences

College of Natural Sciences
Trevor Even, Ph.D. Student, Department of Anthropology, Graduate Degree Program in Ecology
Desirée Fiske, Ph.D. Student, Department of Political Science

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

College of Liberal Arts
Trenton Even, Ph.D. Student, Department of Anthropology, Graduate Degree Program in Ecology

College of Agriculture and Life Sciences
Denise Flisko, 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

College of Veterinary Medicine and Biomedical Sciences
Sheena Martorens, Postdoctoral Fellow, Department of Environmental and Radiological Health Sciences

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.

8th cohort
20 fellows
15 depts
6 colleges

Recipients
Katie Sheridan, Innovation Management
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.

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

College of Veterinary Medicine and Biomedical Sciences
Sheena Martorens, Postdoctoral Fellow, Department of Environmental and Radiological Health Sciences

College of Natural Sciences
Trevor Even, Ph.D. Student, Department of Anthropology, Graduate Degree Program in Ecology
Desirée Fiske, Ph.D. Student, Department of Political Science

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

College of Liberal Arts
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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.

Future Earth

Future Earth is 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.

Future Earth | futureearth.org
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 1,917 Facebook followers. Olivia Bruce served as director during the year and brought on incoming director Sara Yan Hattan. Andres Sweetland took over as director of outreach from graduating senior Nevan Mandel.

Africa Center

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.

Global Biodiversity Center

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

• 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, jobs, 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 Monica Bastir (Kenya), Coen Van Vogel (South Africa), and Liv Genot (Sweden).

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.

Photo: student piece from the “Trashion” Show

Photo: student at the SSC “Trashion” Show

Photo: student piece from the “Trashion” Show
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 Cloud 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.


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


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

Apr. 30: Visions 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 IGNE

Symposia, Workshops, & Special Lectures

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.

How Cities are Removing Barriers to Acting on Climate

Partnership 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.

Water in Africa Symposium

110 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.

Photo by: Artie Limmer, Texas Tech University

How Cities are Removing Barriers to Acting on Climate

Photo by: Rob Hope/REACH

SoGES 10th Anniversary Symposium

Photo by: Sir Robert Watson delivering the lecture at the 10th Anniversary Symposium
Finance Report

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Grants, Cooperative Agreements, Gifts

$1,193,704.00. Future Earth CSD. Collaborative Research. Maintenance of the U.S. Hub of Future Earth Secretariat National Science Foundation.

$744,808.00. Patrick Keys. Cross-scale Impacts of SDG5-Achievement: Household decisions, ecosystem change, and atmospheric water recycling. NASA.

$93,147.59. Peter Backlund. Indicators of Climate Change impacts on Agriculture. United States Department of Agriculture.


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


Grants, Cooperative Agreements, Gifts

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Balance for future commitments in FY 20 |

$85,568.00

Publications

Director: Diana H. Wall


Research Scientist: Pat Keys


2017-18 Resident Fellow: Tom Dean


2017-18 Resident Fellow: Andrew Solld


2017-18 Global Challenges Research Team: Clothing and Sustainability


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


2015-16 Resident Fellow: Maria Fernandez-Gimenez


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


2015-16 Resident Fellow: Maria Fernandez-Gimenez


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