



WALTER SCOTT, JR. GIFT
IMPACT REPORT

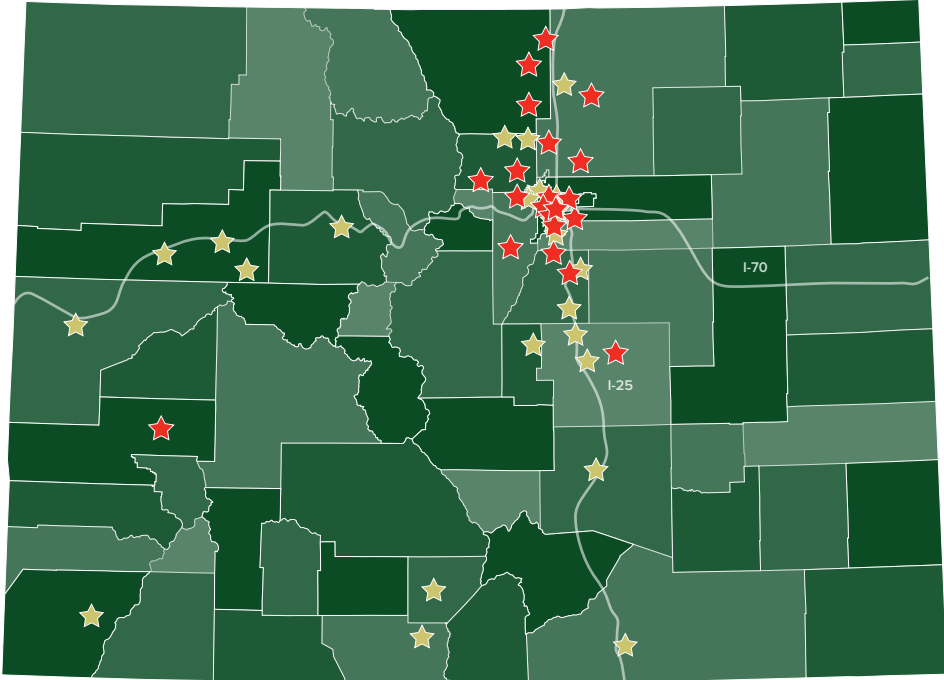
2023



WALTER SCOTT, JR.
COLLEGE OF ENGINEERING
COLORADO STATE UNIVERSITY

WALTER SCOTT, JR.
UNDERGRADUATE
SCHOLARS

As of 2023, we’ve graduated three classes and recruited our seventh class of Scott Scholars. They are 33 of the most outstanding students from all Colorado regions who will help the college continue to build a reputation of excellence in our engineering programs and benefit from a world-class education.



- ★
Fall 2023 Cohort
Arvada
Aurora (4)
Boulder
Centennial (3)
Conifer (2)
Denver
Falcon
Fort Collins (3)
Fort Lupton
Franktown
Golden
Greeley
Highlands Ranch (2)
Lakewood
Littleton (3)
Loveland (2)
Mead
Montrose
Nederland
Wellington
Wheat Ridge

- ★
2017-2022 Cohorts
Alamosa
Arvada
Aurora
Broomfield
Boulder

- Carbondale
Castle Rock
Centennial
Colorado Springs
Denver
Edwards
Eldorado Springs
Englewood
Fort Collins
Fort Lupton
Golden
Grand Junction
Greeley
Highlands Ranch
La Jara
Lakewood
Larkspur
Littleton
Longmont
Loveland
Lyons
Mancos
Monument
New Castle
Parachute
Parker
Pueblo
Thornton
Trinidad
Westminster
Windsor
Woodland Park

ENRICHMENT
ACTIVITIES

A critical piece of the Scott Scholars program is enrichment, which allows Colorado State University students to participate in educational and professional development programs that ensure their success. These activities are things students otherwise could not do outside the classroom without financial assistance and the support of the Scott Scholars program. Students have told us this has been hugely valuable as part of their overall educational experience.

In 2022, Scott Scholars enjoyed a wide variety of activities with these funds including, but not limited to:

- Study abroad in Peru: Grand Challenges in Engineering (5 students)
- Volunteer in Rome last summer (6 students)
- Avalanche safety course (1 student)
- Present research in Germany at the International Prion conference (1 student)
- Attend and present at the USPAA Student Summit at UTSA (3 students)
- Participate in the Lockheed Martin Ethics in Engineering Competition (4 students)



Enrichment activities for Scott Scholars include Education Abroad programs. These students spent Summer 2022 volunteering in Italy: Pictured left to right, Andy Quach, Jevannah Vigil, Sam Swing, Loretta Nicodemus, and Bri Stanley.

FALL 2019-FALL 2023 COHORTS
SCOTT SCHOLARS BY MAJOR

- Biomedical Engineering with CBE (11)
- Biomedical Engineering with ME (13)
- Chemical and Biological Engineering (13)
- Civil Engineering (10)
- Computer Engineering (5)
- Electrical Engineering (9)
- Engineering Open Option (1)
- Environmental Engineering (7)
- Mechanical Engineering (27)



“Being a Scott Scholar has brought me together with some of my closest friends and taken a huge financial burden off my shoulders, allowing me to put a better effort into my classes. It has also allowed me to help incoming students as they navigate CSU.”

– SARAH DANN,
Environmental Engineering



“For me, being a Scott Scholar means being able to attend a school that, otherwise, would have been completely unattainable to me. It means that I am able to get the education that will springboard me into the career I’ve always wanted to pursue.”

– ELIJAH JACKSON,
Chemical and Biological
Engineering/Biomedical
Engineering



“Being a Scott Scholar has allowed me to focus on school and take advantage of the opportunities at CSU. I can succeed in and out of CSU, thanks to the resources provided to the Scott Scholars.”

– MICHELLE VASQUEZ,
Electrical and Computer
Engineering

SCOTT SCHOLARS — Academic Profiles

	FALL 2023 COHORT	INCOMING ENGINEERING AVERAGE
HIGH SCHOOL GPA	4.31	4.05
SAT AVERAGE*	1277	1251
ACT AVERAGE*	32	27
GENDER	46% identify as women	27% identify as women
RACIALLY MINORITIZED	26%	32%
FIRST GENERATION	14%	18%
HONORS PROGRAM	20%	10%**

FALL 2017–2022 COHORTS

63/67
RENEWED IN FALL 2023

3.574
AVG. CSU GPA

*Average of the students who submitted test scores, which are no longer required

**Reflects all engineering students

RESEARCH TOPIC
BY SIGNATURE
RESEARCH THEME

ENGINEERING FOR
ENVIRONMENTAL
SUSTAINABILITY:

- PFAS transport and fate
- Energy systems and aircraft design

HEALTH AND HUMAN-
ENVIRONMENT SYSTEMS:

- Design, synthesize, and characterize polymeric biomaterials for biomedical applications and biosensing
- Biomaterials, mathematical modeling, and polymer science
- Orthopedic bioengineering

DATA, INFORMATION, AND
SYSTEMS:

- Modeling cell metabolism using complex nonlinear models that require methods for nonlinear and non-convex optimization
- Artificial intelligence and data science for radar and satellite remote sensing of the environment

PREDICTION OF CLIMATE
AND WEATHER:

- Tropical meteorology, in particular a deeper understanding of how tropical cyclones form and intensify
- Improving meteorological monitoring in countries with highly diverse meteorological phenomena

INFRASTRUCTURE
RESILIENCE:

- Increasing our understanding of urban intensification for energy use, carbon cycles, and water cycles to inform decision making and investment.

WALTER SCOTT, JR.

GRADUATE RESEARCH ASSISTANTSHIPS

The Scott Research Assistantship program attracts talented graduate students to assist faculty with groundbreaking research and to train the next generation of innovators. In 2021, the program formerly known as the Scott Fellows, was renamed the Scott Graduate Research Assistantships.



“The graduate research assistantship has bestowed upon me a remarkable chance to engage in vital research that contributes to the betterment of our global community, within a progressive and forward-looking environment here at CSU.”

– JOSHUA OLUWATUMISE, Graduate Research Assistant, Systems Engineering



“The Scott Graduate Research Assistantship program has enabled me to add a transportation focus to my human dimensions and behavioral modeling research. Joshua’s exceptional capabilities and inherent curiosity of the interplay between electric vehicle charging behavior and the electric grid will provide valuable insights in my lab and to the broader academic community.”

– STEVE CONRAD, Professor, Systems Engineering



“Working in Dr. Bandhauer’s lab has been an invaluable experience, enabling me to pursue my passion for energy engineering, contribute meaningfully to sustainability amidst growing climate concerns, and expand my professional expertise in thermodynamics and heat transfer through hands-on work.”

– TAYLOR STOLL, Graduate Research Assistant, Mechanical Engineering



“Having Taylor receive the Scott GRA was fantastic. Not only was I able to use this to effectively recruit her to come to CSU, but she was able to start on a new project early. Taylor’s work is focused on a new cooling system that is driven by waste heat that is lower cost and more efficient than incumbent technologies. She has been evaluating this system for multiple applications, including for the rapidly growing data center market.”

– TODD BANDHAUER, Professor, Mechanical Engineering



Taylor Stoll and Professor Todd Bandhauer working together in Bandhauer’s lab at the Powerhouse campus.

2023 SCOTT GRADUATE RESEARCH ASSISTANTS come from across the U.S. and around the world



WALTER SCOTT, JR.

DISCRETIONARY FUND

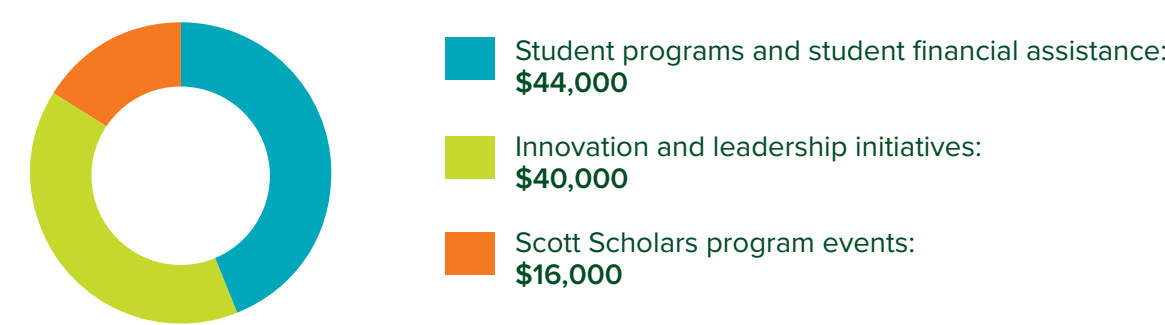
The Scott Discretionary fund allows the dean flexibility to invest in areas that advance college excellence.

Examples include student scholarships, additional funding for Scott Scholar enrichment activities, unique laboratory research experiences and paid internships through the Scott Undergraduate Research Experience, and facilitation of student internship placement and access to professional development programs.

The Scott Discretionary fund has also supported the Colorado Science and Engineering Policy Fellowship, which seeks to develop the next generation of policy and science leaders in Colorado. Students attended an eight-week intensive internship on the legislative process, which included developing model laws and policies, collaborating with policymakers in the state Legislature, and visiting corporate and research sites throughout Colorado.

2022-2023

USE OF SCOTT DISCRETIONARY FUND



SCOTT UNDERGRADUATE RESEARCH EXPERIENCE

The Scott Undergraduate Research Experience, known as SURE, helps promote student success by providing a path for undergraduates to learn about applications, scientific methods, collaborations, and social impacts of being an engineer. The Scott Foundation’s investment in this program has spurred other donors to contribute to the program, enabling more of our first-generation students to participate at no cost to the faculty supervisor.

Research opportunities help retain undergraduate students. Analysis by Scott Scholar program manager Susan Benzel shows students participating in SURE also persist at a higher rate:

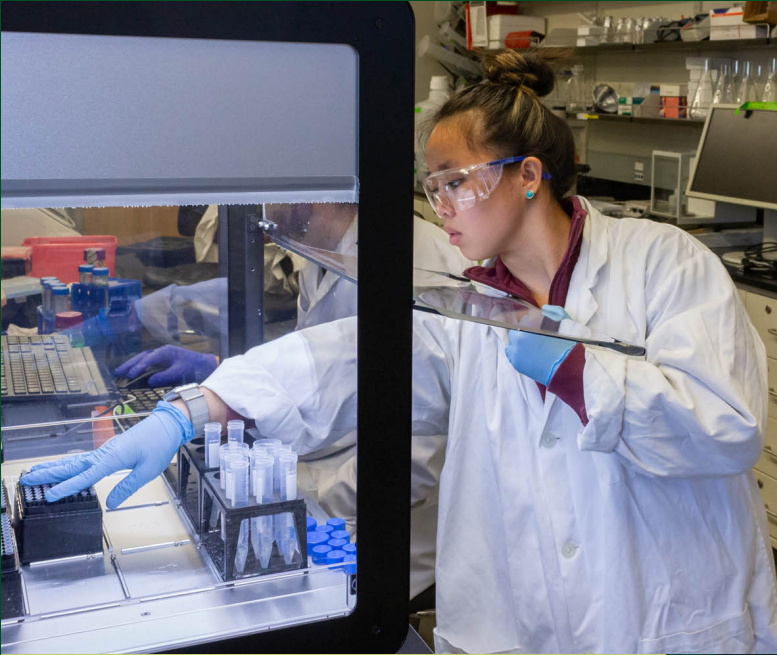
100 PERCENT of SURE students who replied to the 2023 survey said the SURE program strengthened their desire to become an engineer.

ABOUT 40 STUDENTS per year have participated in SURE over the past four years.

MORE THAN 94 PERCENT of students participating in SURE stay in engineering.

MORE THAN 99 PERCENT of SURE students stay at CSU.

ABOUT 51 PERCENT of SURE students identified as first in their families to attend university.



Scott Undergraduate Research Experience student Jacy Butler works in the laboratory of Assistant Professor Joshua Chan, in chemical and biological engineering, in the Scott Bioengineering Building.



Justin Bayer, graduate researcher, right, works with SURE student Ben Elick.



SURE student Cody Saunders works with electrical and computer engineering Professor Steven Reising in the Microwave Systems Laboratory.

2022-2023 SCOTT HIGH-IMPACT RESEARCH GRANT PROJECTS

Cutting-edge engineering research received a boost in Fall 2022 with the new Scott High-Impact Research grants to faculty addressing some of the world's greatest engineering challenges. This first batch of projects tackled health, decarbonizing energy systems, and climate change. The researchers involved represent a wide spectrum of disciplines and contributed to the

college's nearly \$100 million in annual research expenditures. The grants are organized around the college's signature research themes and focus areas: Engineering for Environmental Sustainability; Prediction of Climate and Weather; Health and Human-Environment Systems; Infrastructure Resilience; and Data, Information, and Systems. Seed money from the Scott Foundation for groundbreaking, high-impact research has also

spurred major proposals. Faculty who received these startup funds have got early results leading to full proposals to such agencies as the National Science Foundation, U.S. Department of Energy, and the National Institutes of Health. These faculty are engaging undergraduate and graduate students in their work and ensuring that we're preparing students for the workforce and additional scientific research that is impacting the world.

HYDROGEN PRODUCTION VIA ELECTROLYSIS RESEARCH TEST BED

RESEARCH THEME:

Engineering for Environmental Sustainability

DEPARTMENTS INVOLVED:

Mechanical Engineering, Systems Engineering

STUDENTS INVOLVED:

2 Scott Scholars, 3 undergraduates, 1 graduate

DURATION:

2 years

GOAL:

Develop and commission the HyPER test bed to enable hydrogen system research at the largest scale at any U.S. university.

SUPPORT:

Refurbishing, installing, and commissioning electrolysis equipment.

FUNDING IMPACT:

- Large-scale H₂ generation facility supports current and future research.
- Test bed for advanced electrolysis technologies.
- Exposes students to H₂ generation, storage, and end-use technologies.
- Test bed enables future funding.



Researcher Andrew Zdanowicz, left, Associate Professor Bret Windom, and students Evan Veatch and Thomas Waido have been working on the HyPER Test Bed project on the Powerhouse campus.



Electrolysis equipment at the CSU Powerhouse campus that is featured in Dr. Bret Windom's research.

COLORADO BIOFOUNDRY

RESEARCH THEME:

Health and Human-Environment Systems; Data, Information, and Systems

DEPARTMENTS INVOLVED:

Chemical and Biological Engineering, Statistics, Microbiology

STUDENTS INVOLVED:

1 Scott Scholar, 2 SURE students, 2 graduate

DURATION:

2 years

GOAL:

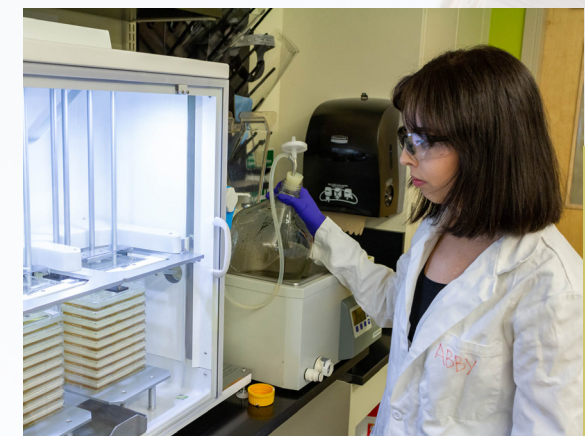
Launch the Colorado Biofoundry, a high-throughput facility to develop biologic drugs such as vaccines, gene therapies, and cellular therapies. The Biofoundry uses robotics and machine learning to rapidly design, assemble, and test libraries of drug candidates.

SUPPORT:

Purchased high-performance robotic equipment.

FUNDING IMPACT:

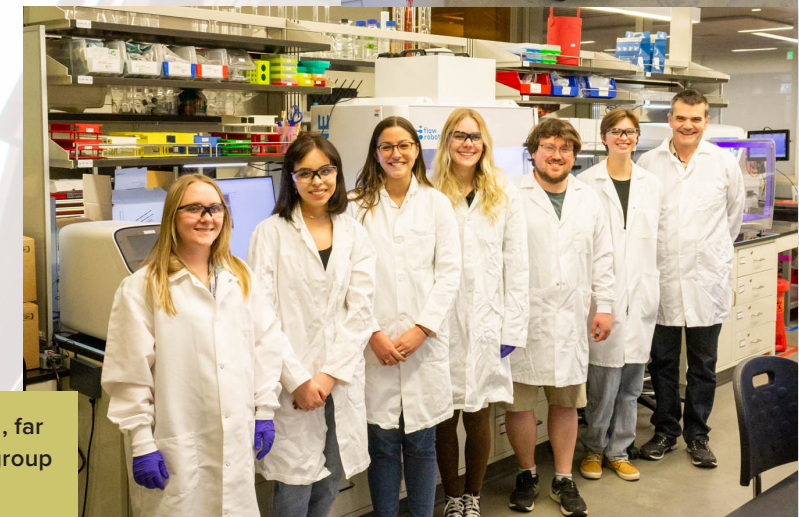
- Makes it possible to apply AI methods to drug development.
- Provides undergraduate students with opportunities to operate high-end instruments that are rarely available in academic laboratories.
- Enables future funding.



Carissa Davalos, a SURE student, operating the plate pouring robot in the Peccoud laboratory.



Brianna Stanley, a Scott Scholar, works in the Peccoud laboratory.



Professor Jean Peccoud, far right, and his research group in his laboratory.

INCORPORATING INNATE IMMUNE AGONISTS INTO 3D-PRINTED SCAFFOLDS TO STIMULATE IMMUNOGENIC AND REGENERATIVE TENDON HEALING

RESEARCH THEME:

Health and Human-Environment Systems

DEPARTMENTS INVOLVED:

Mechanical Engineering, Clinical Sciences

STUDENTS INVOLVED:

3 SURE students, 1 graduate

DURATION:

2 years

GOAL:

Develop “immune-instructive implants” to improve healing of injured and/or degenerated tendons. These implants secrete biological molecules from structural 3D-printed gels; these recruit macrophages to stimulate tendon healing.

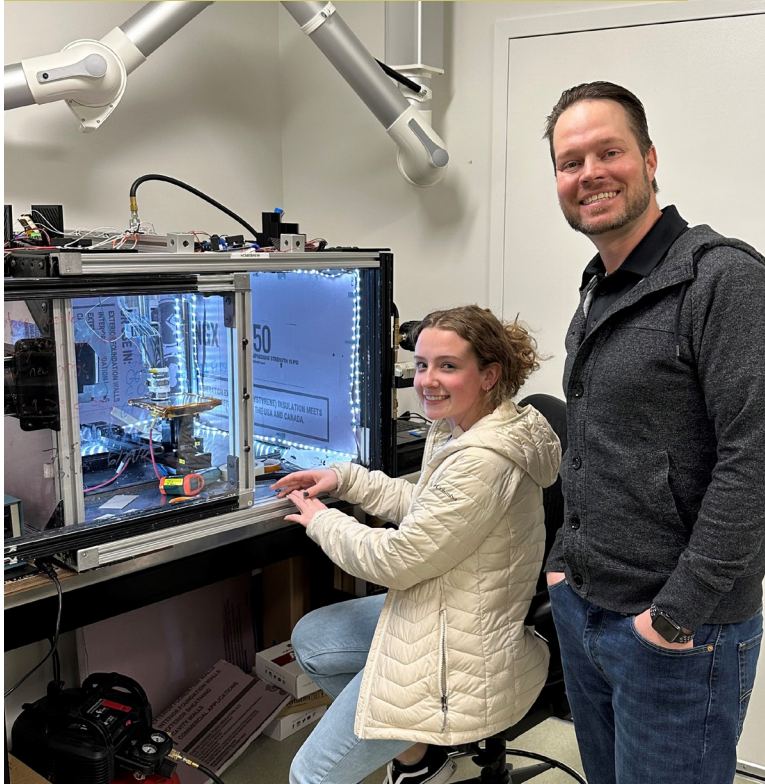
SUPPORT:

Students, experimental and analytical expenses.

FUNDING IMPACT:

- Developed new tissue engineering approach to emulate the tendon-bone connection.
- Fabricated polycaprolactone angle-ply scaffolds.
- International conference presentation (May 2023).
- Future funding enabled: NIH, NSF, and DOD funding for orthopedic healing.

SURE student Natalie Green and Associate Professor Kirk McGilvray work to develop 3D-printed tissue scaffolds using naturally occurring biomaterials such as silk.



SURE student Ella Olander works with Associate Professor Kirk McGilvray in his histology lab, creating slides from biological samples so they can look at tissue-level architecture and cellular response.

REMOTELY SENSED GLOBAL MONITORING OF HUMAN DEVELOPMENT AMID CLIMATE HAZARDS WITH A MULTIYEAR INDEX OF HUMAN FOOTPRINT

RESEARCH THEME:

Prediction of Climate and Weather, Infrastructure Resilience

DEPARTMENTS INVOLVED:

Atmospheric Science, Civil and Environmental Engineering

STUDENTS INVOLVED:

1 SURE student

DURATION:

2 years

GOAL:

Develop and launch software that maps global human activity and climate hazards using AI and satellite images.

SUPPORT:

Students, experimental and analytical expenses.

FUNDING IMPACT:

- Created a way to track human infrastructure development.
- SURE student used the software to evaluate regional sustainable development and risks from climate hazards.
- Future funding enabled: NASA grants; additional philanthropy.



Frances Davenport, assistant professor of civil and environmental engineering, left, looks over data with SURE student Madisyn Bietz and Pat Keys, assistant professor of atmospheric science.

WALTER SCOTT, JR. PRESIDENTIAL CHAIRS

Scott Presidential Chairs Tami Bond and Jim Hurrell continue to work on the most pressing challenges facing the globe today, working across CSU and the nation to collaborate on climate change and sustainability research. They also co-led the college's strategic planning process, which steers the college for the next five years and beyond.



Tami Bond

Bond, Scott Presidential Chair for Energy, Environment, and Health, is leading two new multi-investigator, multi-institution projects funded by the National Science Foundation. One of these is focused on air management within homes to protect occupants from polluted outdoor air, including wildfire smoke. The project develops scientific understanding and interventions by integrating a physical understanding

of home operation, engineering controls, and human response to stimuli. The second project is exploring new scenarios of social and technical change that are connected to emissions of greenhouse gases. Also focusing on occupants and residences, the project connects engineers, economists, and sociologists to

understand how human well-being and perceptions affect and are affected by transitions to cleaner energy sources. She is in the middle of a three-year NSF grant for Research Experiences for Undergraduates, which is designed to build excitement for research with societal impact, particularly among undergraduate students with underrepresented or nontraditional backgrounds. Nine students joined the program this summer.



Jim Hurrell

Hurrell, the Scott Presidential Chair in Environmental Science and Engineering, continues to work toward establishing CSU as a world leader in emerging areas of climate science, such as Solar Climate Intervention or SCI research. SCI is the only way to quickly reduce global climate warming and, thus, substantially reduce many of the catastrophic impacts of climate change that will occur over the coming decades.

At the same time, proposed SCI strategies involve significant, uncertain risks that must be understood.

Over the past two years, Hurrell and his team have secured funds from DARPA, NOAA, and philanthropic donors totaling nearly \$2.5 million in support of an SCI research program, which speaks to the strong reputation CSU is already developing in SCI research. While much of Hurrell's work to date has focused on SCI impacts on weather and climate, he is working to develop new interdisciplinary research projects across campus by leveraging existing strengths and expertise in not only weather and climate science, but also data science, human and animal health, agriculture, and terrestrial ecology. Hurrell has also recently led an effort to develop a new initiative in SCI research by the World Climate Research Programme, and he also led a U.S. National Academies of Sciences, Engineering, and Medicine workshop on climate intervention research in an Earth System Sciences Framework. The sponsor of the NASEM workshop was the National Science Foundation, and NSF is launching new research programs into SCI that should further support Hurrell's efforts at CSU.



Students attending Tami Bond's second Research Experiences for Undergraduates program at CSU in Summer 2023.