



UNDERGRADUATE RESEARCH SCHOLARS PROGRAM

Summary & Justification: The *Undergraduate Research Scholars Program* of the South Central Climate Adaptation Science Center (CASC) will provide *undergraduate research scholars* with the information and skills needed to foster the development and use of research products in climate-informed decision-making. The proposed program aims to document impacts of climate change and current management strategies on priority species, habitats/ecosystems, ecosystem goods and services, and other natural and cultural resources within the region by engaging undergraduate students in conversations with natural and cultural resource managers from tribes, federal and state agencies, and non-governmental organizations across the region. Participants will gather data about the adaptation research needs of our management partners and will build their research capacity through a series of field-based experiences.

Management Partner Relevance & Collaborations: Actionable research requires that researchers, including student researchers, and managers come together to exchange ideas and share experiences related to climate adaptation. Participating Scholars will engage with our management partners and research faculty and staff through a workshop that aims to share relevant CASC research, identify additional research needs of our partners, spark new collaborative and actionable science projects, and foster climate-informed decision-making of current and future management partners.

Deliverables: At the conclusion of each summer program (Years 2 and 4), we will have at least four mini-research products (e.g., case-studies) produced that highlight CASC research and support climate adaptation efforts. These products will be presented at the workshop and posted on the South Central CASC website. We also will document emerging research needs of our management partners and report our evaluation results. We will produce a final report that highlights the program and its outcomes.



2018 Undergraduate Research Scholars

Procedures/Methods: The proposed 3-week, in-person summer program builds upon lessons learned from developing and operating a successful undergraduate summer program from 2014 to 2018, funded through the first South Central CASC host agreement. During the previous program, we actively demonstrated to undergraduate students the direct impacts of climate variability and change across the south-central U.S. through hands-on and research-based experiences (Kuster et al., 2019). Students who participated gained valuable research skills and were motivated to further their careers in climate adaptation science. Many of the students subsequently went to graduate school, sought other undergraduate research programs, or joined the science workforce after graduation.



UNDERGRADUATE RESEARCH SCHOLARS PROGRAM (CONTINUED)

The latest climate change reports from the National Climate Assessment (Marvel et al., 2023) and Intergovernmental Panel on Climate Change (IPCC, 2023) clearly note that climate change is already impacting our region. Research indicates that successful climate adaptation requires place-based, local knowledge and the participation of those who may benefit from or be harmed by adaptation actions (Jennings et al., 2024; Kettle et al., 2014; Miller Hesed et al., 2022). Through the proposed *Undergraduate Research Scholars Program*, we will gather data about the research needs of our partners to advance climate adaptation and build the research capacity of future researchers to engage in actionable science that weaves together different ways of knowing.

By engaging the Scholars with our management partners, we aim to document impacts of climate change and current management strategies on local and regional priority species, habitats/ecosystems, ecosystem goods and services, and other natural and cultural resources within the region and begin conversations with Scholars from these communities that may be impacted by adaptation actions of agencies.

Our program will be implemented in Years 2 and 4 of the proposed host agreement, with program planning expected in Year 1 and adjustments to the design expected in Year 3 based on participant feedback. Each program year, eight Scholars will be competitively selected from South Central CASC Consortium institutions through an application and review process involving both USGS and Consortium faculty and staff.

Previous research shows that climate education has generally remained inadequate at the collegiate level (Cross & Congreve, 2021; Hess & Collins, 2018; Kuster & Fox, 2017). To ensure similar knowledge among the participants, the Scholars will be introduced to the foundations of climate science, participatory research, and climate adaptation during an orientation week hosted by the University of Oklahoma. Following orientation, the Scholars will continue in their 3-week summer program and visit at least one additional state, engaging Consortium members and management partners along the way.

Active learning approaches help learners build connections between the material presented and their everyday lives (Jonassen, 1991). Recent work by Creutzig and Kapmeier (2020) shows that active learning is helpful for spurring climate thought and action. During the program, the Scholars will engage in hands-on field experiences and conduct mini-research projects (e.g., case-study development) to practice newly gained skills and further disseminate CASC research to our management partners.



2017 Undergraduate Research Scholars and Participants in Louisiana



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At the conclusion of the program, the Scholars will be invited to join a managers-focused workshop where Scholars will share their mini-research projects and engage in facilitated discussions with researchers and resource managers to identify emerging research needs.

Several principles will be used in the design and development of our activities, including:

- **Actionable Science** – Program activities will emphasize the importance of conducting science that is useful and usable for on-the-ground decision-makers (Bamzai-Dodson et al., 2021).
- **Native and Western Ways of Knowing** – Program content will interweave Native ways of knowing and Western science (Mack et al., 2012), including exposure to tools and networks for assessing change and comprehensive science concepts (i.e., systems-thinking).
- **Career Connections** – We will highlight a wide range of career opportunities through federal or state agencies, tribes, academia, the private sector, and non-governmental organizations. We also will coach the Scholars to recruit future academic or professional mentors (Schwartz et al., 2016).

The Scholars will participate in a pre- and post-test assessment to capture the impact of this program on the knowledge and skills gained through the 3-week program related to climate adaptation and actionable science. We will also conduct a follow-up assessment about six months after the conclusion of the summer program. In addition, at the conclusion of the 3-week program and about six months later, our management partners will be asked to participate in an online assessment to capture how the program fostered climate-informed decision-making or new collaborative research with our research team. Information gained through these evaluative efforts will be used to refine the program and to document for other CASCs to learn from our efforts.

Project Personnel: The CASC's Education Researcher requires annual funding in Years 1-4 for program planning, evaluation, implementation, and reporting. 3-4 Consortium PIs or Co-PIs are needed in Years 2 and 4 for local planning and implementation at universities that host the Scholars.

Schedule/Timeline:

- **Year 1** – Program planning, curriculum development, and evaluation criteria establishment.
- **Year 2** – Program implementation, curriculum delivered, and evaluation delivered.
- **Year 3** – Evaluation results analyzed and program revisions made.
- **Year 4** – Program implementation, curriculum delivered, evaluation delivered. Evaluation results analyzed, and program outcomes documented for reporting.



**Undergraduate Research Scholar
assisting in field collection**



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2018 Undergraduate Research Scholars in Louisiana along the Mississippi River