

Council on Undergraduate Research Partnerships in the Geosciences

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¹Council on Undergraduate Research

November 22, 2022

Abstract

The Council on Undergraduate Research (CUR) is engaged in several formal and informal partnerships within the Geosciences community, and is vital for all faculty, staff, and students involved with undergraduate research. CUR is structured into thirteen (13) separate divisions, of which one of the most active is the Geosciences Division, affectionately known as GeoCUR. CUR has a formal Memorandum of Understanding (MOU) with the American Geophysical Union (AGU) to foster collaboration and mutual benefit. CUR is also an Associated Society of the Geological Society of America (GSA), and a Member Society of the American Geosciences Institute (AGI). Within CUR, the GeoCUR regularly sponsors technical sessions, awards, poster sessions, and/or workshops at the AGU and GSA annual meetings, and an exhibit booth at the GSA Annual Meeting to raise awareness of CUR and the benefits of undergraduate research (UR). For the first time ever, GeoCUR will have an exhibit booth at the AGU meeting in 2018, and will be actively recruiting and engaging AGU meeting attendees. CUR advocacy is expanded when CUR staff and members participate in GSA Associated Societies and AGI Member Societies meetings. CUR is the voice for the UR community, and has worked with both AGU and other scientific societies to advise and educate legislators and federal agency representatives of the importance of UR, and also the continued support of geoscience research priorities, such as climate change research. One of the CUR's most effective advocacy avenues is its annual Posters on the Hill event, now entering its 23rd year. EvaluateUR is an important outgrowth of CUR partnerships, and illustrates CUR's important role in UR assessment. EvaluateUR is an evidence-based model for improving UR student outcomes, funded by NSF WIDER, and partnering SUNY Buffalo State, NAGT/SERC and CUR. EvaluateUR started at SUNY Buffalo State, has expanded to a diverse array of institutions, and is actively seeking new potential partners.

Council on Undergraduate Research Partnerships in the Geosciences

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CUR Overview

The Council on Undergraduate Research, founded in 1978, is an increasingly international organization dedicated to providing high-quality and collaborative undergraduate research, scholarly, and creative activity programs, services, and *advocacy* for faculty, students, and institutions. CUR has over 13,000 members at close to 1,000 institutions, and is organized in 13 divisions; one of which is the active and vibrant Geosciences (GeoCUR) division.

CUR's programs and services span peer-reviewed publications, such as its quarterly journal, *Scholarship and Practice of Undergraduate Research*, many book-length publications, a number of conferences and events, including the yearly National Conference on Undergraduate Research (NCUR) which attracts more than 4,000 attendees, and a variety of award programs, consulting, mentoring, and networking opportunities.

Partnerships with other associations are highly-valued and actively sought. For example, CUR holds a memorandum of understanding (MOU) with the American Geophysical Union. General areas of collaboration include reciprocal advertisement of programs, and joint advocacy. Specific GeoCUR examples are presented below.

GeoCUR Activities



August of 2015, CUR and AGU entered into an agreement designed to foster collaboration, help promote undergraduate research opportunities, enhance diversity in the geosciences, and support the geoscience talent pool objectives of both organizations. To that effect, they will work together to promote the following activities:

- Promotion and support for strengthening research opportunities in Earth and Space sciences at the undergraduate level;
- Collaboration and support for expanding opportunities for quality undergraduate geoscience research experiences at 2-year colleges;
- Promotion of programs to enhance diversity in the undergraduate Geoscience talent pool;
- Collaboration on program opportunities designed to expand opportunities for undergraduate geoscience researchers to present to broader audiences;
- Collaboration and support on dissemination of CUR Geoscience Division Awards (Mentor Award and Undergraduate Award), and expanded award and recognition opportunities for outstanding undergraduate geoscience research and undergraduate research advisors;
- Collaboration in ongoing new programs/initiatives supporting undergraduate geoscience talent pool, with special attention to collaboration and partnership opportunities for the GeoLEAD (Geoscience Learning, Engagement and Development) program; and
- Cross-advertising activities of potential member interest sponsored by the other society.

At this meeting:

- GeoCUR has Booth 600 in the exhibit hall
- GeoCUR ran a workshop on Tuesday afternoon, Dec 11 – *Establishing and sustaining an undergraduate research program*
- The session: **ED13E: Undergraduate Earth, Atmospheric, Ocean, and Space Science Research and Outreach Posters** (Monday afternoon) is co-sponsored by GeoCUR with UNAVCO and the UCAR – SOARS Program)

GeoCUR has sponsored a variety of workshops at both GSA and AGU meetings since 1993. The most popular of these is: **How to get started in undergraduate research**

GeoCUR Awards

Undergraduate Research Mentor Award

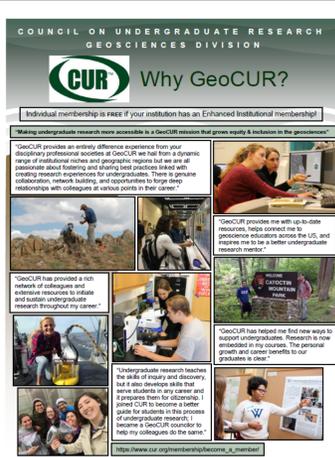
This award annually recognizes an individual who serves as a role model for productive and transformative student-faculty mentoring relationships and for maintaining a sustained and innovative approach to the enterprise of undergraduate research.

GeoCUR Early Career Distinguished Mentor Award

This NEW annual award recognizes faculty, scientists, and educators in the earlier stages of integrating undergraduate student research into their career research program who are engaging in original and successful mentoring of undergraduate research activities who demonstrate dedication to the scholar success of their students.

GeoCUR Award for Excellence in Student Research

This award recognizes identified by their program who are full time undergraduate students currently enrolled in a two-year four-year educational institution engaging in research emphasizing the geosciences



**COUNCIL ON UNDERGRADUATE RESEARCH
GEOLOGICAL SOCIETY OF AMERICA**

Why GeoCUR?

Individual membership is FREE if your institution has an Enhanced Institutional membership!

Working undergraduate research more accessible to a GeoCUR member that provides you a link to the geoscience?

GeoCUR provides an entirely different experience from your discipline professional societies. GeoCUR has over 13,000 members from a diverse range of traditional colleges and geographic regions but we are also creating research experiences for undergraduates. There is genuine opportunity, network building, and opportunities to forge deep relationships with colleagues at various points in their career.

GeoCUR has provided a rich network of colleagues and academic resources to advise and sustain undergraduate research throughout my career.

GeoCUR provides me with up-to-date resources, help connected to geoscience educators across the US, and inspire me to be a better undergraduate research member!

GeoCUR has helped me find new ways to support undergraduate research in my department. The personal growth and career benefits to our projects is deep!

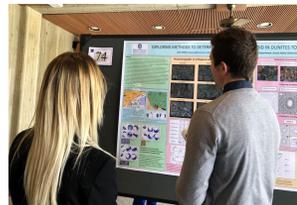
Undergraduate research teaches me all of my skills and abilities but it also develops skills that were students in my career and a process that for helping I want CUR to become a better guide for students in the process of undergraduate research to help my colleagues do the same!

https://www.cur.org/membership/become_a_member



CUR is an Associated Society of the Geological Society of America

- GeoCUR sponsors a variety of topical sessions at the GSA meetings
- CUR regularly staffs a booth in the Exhibit Hall at each GSA annual meeting.
- GeoCUR has sponsored **undergraduate poster sessions** at GSA Regional Meetings since 1992.
- GeoCUR participates in the Joint AGI/GSA Societies Meeting at the Annual GSA meeting
- CUR will contribute to the GSA JTPC committee to evaluate abstracts related to undergraduate research.
- CUR co-sponsors the **National Association of Geoscience Teachers (NAGT), GSA Geoscience Education Division, and the Council for Undergraduate Research (CUR) Joint Awards Luncheon and the Geoscience Educators Reception**



Jory VanEss (Grand Valley State University) won best undergraduate student poster at the GeoCUR-sponsored Undergraduate Research Poster session at the 2018 North Central GSA meeting



NAGT and GeoCUR share overlapping interests, particularly in the realms of undergraduate research as pedagogy, in the curriculum, and CURE's. NAGT and GeoCUR often co-sponsor sessions and events. NAGT has a liaison to GeoCUR (a former CUR councilor) who attends GeoCUR meetings at the GSA meeting - GeoCUR is exploring a more formal relationship with NAGT

GeoCUR sponsor or co-sponsored the following sessions at the 2018 Geological Society of America Meeting in Indianapolis:

- T81. Promoting Scientific CURE-iosity: Course-Based Undergraduate Research Experiences (CUREs) in Introductory Courses at 2YCs and 4YCs**
- T71. Recruiting and Retaining K9–16 Students through Field- and Laboratory-Based Geoscience Experiences (Posters)**
- T105. A Showcase of Undergraduate Research in Hydrogeology (Posters)**

American Geosciences Institute

Member Society

- Opportunities to engage in AGI leadership
- AGI's Geoscience Policy Program Advisory Committee
- Participation in Joint AGI/GSA Societies Meeting at the Annual GSA meeting
- Contributed to development of AGI's Guidelines for Ethical Professional Conduct (approved 2015)



CRITICAL ISSUES WEBINAR
Media Partners: AGU | APGC | ASROC | ARWG | CUR | NAGT | SSA

Geoscience for Community Priorities

**November 14, 2018
2:00 PM EST**

Register today:
<http://bit.ly/community-geoscience>
(CEUs available from APGC)

Sarah Fortner, one of the webinar speakers, is a GeoCUR Councilor - CUR served as a Media Partner for the Webinar

CUR Advocacy

CUR, along with other organizations in the DC area, helps to educate U.S. Congress and other stakeholders as to the value of investments in research, with a focus on undergraduate research. Specific issues such as protection of the peer review system, and research in geosciences, social and behavioral research, and arts and humanities support have also received focused attention in recent years.

In addition to hosting periodic briefings and congressional visits to educate various stakeholders with respect to the value of research investments, CUR organizes a yearly Posters on the Hill event in Washington, DC. The American Chemical Society is a prominent supporter and sponsor of the event.

Held in one of the U.S. House of Representatives' buildings each spring when Congress is in session, Posters on the Hill showcases high-quality undergraduate research in a variety of disciplines. Several hundred applicants vie yearly for one of 60 presentation slots. Those selected to present at Posters on the Hill come to Washington for a two-day event that includes visits to congressional representatives, and a gala poster session the evening of the second day. The impact of Posters on the Hill is stunning: for some congressional representatives and their staff, the connection to research investments is made most strongly when the research is conducted by people from their own congressional districts, and focuses on issues of interest to the people living in the region. Undergraduate researchers are often our best research ambassadors.

EvaluateUR

EvaluateUR is a unique approach to teaching and learning that seeks to improve student outcomes by making evaluation an integral part of the undergraduate research experience. The project obtains reliable independent assessments of program impact without creating a measurement burden and uses these assessments to help participating students gain new insights into their academic strengths and weaknesses and a new appreciation of the broad range of academic and personal skills for which they should assume responsibility. The project is a partnership among Buffalo State, the Council on Undergraduate Research, SERC, and Finger Lakes Community College. With funding from the NSF WIDER program, EvaluateUR is currently being refined and piloted at 14 institutions with plans to recruit another group of project participants in 2019.

Outcomes	Examples
Communication	
Creativity	Brings new insights to the problem at hand
Autonomy	She was able to agree with problems from different perspectives
Ability to deal with obstacles	Combines information to new ways and/or demonstrates intellectual resourcefulness
Practice and process of inquiry	Effectively connects multiple ideas/approaches
Nature of disciplinary knowledge	Learns from and is not discouraged by set-backs and unforeseen events
Critical thinking and problem solving	She was flexible and a willingness to take risks and try again
Understanding ethical conduct	Critical thinking and problem solving
Intellectual development	Trouble-shoots problems, searches for ways to do things more effectively, and generates, evaluates and selects better alternatives
Culture of scholarship	Recognizes discipline-specific problems and challenges established thinking when
Content/knowledge/skills/methodology	Recognizes flaws, assumptions and missing elements in arguments

This table includes the 11 categories of outcomes, and examples of discrete components for Creativity, Ability to deal with obstacles, and Critical thinking and problem solving. Students score themselves and mentors score their student(s) using a 5-point scale reflecting frequency of component (1=never to 5=always). This information is gathered at the beginning, middle and end of the research experience.

EvaluateUR creates multiple assessments of student knowledge and skills in 11 outcome categories. Each outcome category is defined by several discrete components designed to provide explanatory detail about outcome meanings. Student accomplishments on each component are assessed using a five-point scale linked to an explanatory rubric. Faculty mentors and students each complete these assessments three times – at the outset of the research, in the middle of the research, and at the end of the research experience. Faculty mentors rate students on each component and students evaluate their own progress using an identical instrument. Following the completion of each assessment, the student and mentor meet to discuss the reasons for any significant differences in their respective assessment scores. To facilitate these structured interactions, a score report is generated that highlights components with a score difference of two or more points. A web-based tool helps site administrators track the progress of student/mentor pairs and automated messages remind the student and mentor when to complete each step in the evaluation. A data analysis and reporting function prepares summary statistics that can be used to provide institutional assessment data.



Allows students and mentors to easily track their progress

Hide Completed Forms

View the Summary of Student and Mentor Assessments

Student Forms Already Submitted

- Student Pre-Research Reflection (n=26)
- Student Confirm Pre-Research Reflection Meeting (n=26)
- Initial Research Assessment Student (n=21)
- Student Confirm Initial Research Assessment Meeting (n=20)
- Mid-Research Assessment - Student (n=26)
- Student Confirm Mid-Research Assessment Meeting (n=26)
- Student Global Report (n=26)
- Final Assessment - Student (n=26)
- Student Confirm Final Research Assessment Meeting (n=26)
- Student Final Research Report (n=26)

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EZ-Stats for 2016

Allows UR director to quickly generate report statistics

Users and understands professional and discipline-specific language	Pre Mean	Post Mean	Gain	Significance
Student	3.833	4.500	0.667	0.102 (n.s.)
Mentor	4.000	4.143	0.143	0.604 (n.s.)

Expresses ideas in an organized, clear, concise and accurate manner	Pre Mean	Post Mean	Gain	Significance
Student	4.200	4.400	0.200	0.374 (n.s.)
Mentor	3.857	3.857	0.000	1.000 (n.s.)

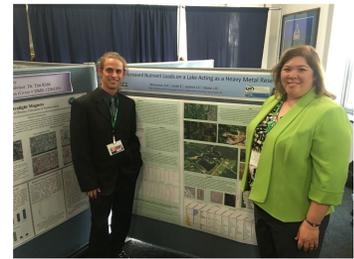
Writes clearly and effectively in discipline-specific formats	Pre Mean	Post Mean	Gain	Significance
Student	3.600	4.200	0.600	0.208 (n.s.)
Mentor	3.714	4.000	0.286	0.457 (n.s.)

Applications Now Open to Implement EvaluateUR on Your Campus:

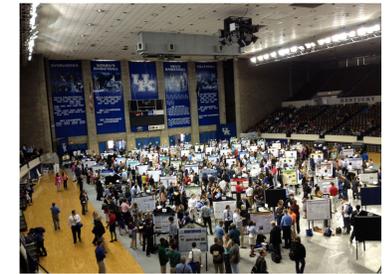
We currently are accepting applications to participate in the 3rd round of implementing EvaluateUR through Buffalo State's and CUR's award from the NSF WIDER program. Information about the project and EvaluateUR can be found at:

<https://serc.carleton.edu/evaluateur/programs/buffstate/index.html>
<https://www.cur.org/what/projects/current/wider/>

Applications to use EvaluateUR at:
https://serc.carleton.edu/evaluateur/application_2018.html



GeoCUR Councilor, Jennifer Latimer (right) with undergraduate student, D.A. McLennan presenting research poster at the Posters-on-the-Hill event. McLennan also received the Excellence in Undergraduate Research award from the Indiana State University Department of Earth and Environmental Systems.



NCUR 2014 poster session at University of Kentucky.

Benefits of EvaluateUR to Students, Mentors, and UR Directors

Students:

- They are introduced to comprehensive list of competencies and skills that include but go beyond subject area knowledge that they will need in order to go on to graduate work and/or succeed in workplace
- They obtain realistic picture of strengths and weaknesses across all of the competencies and skills they should strive to achieve
- Gain confidence and greater self-awareness as they track their academic growth
- Enriches relationship with mentor and helps them to carry on productive conversations about the research and the student's intellectual development
- Helps them gain access to the 'professional community' and their own professional identity
- Provides framework and specific instruments for students and mentors to exchange views about how well students are doing across wide range of variables with direct bearing on research progress
- Framework for student-mentor discussions provides an opportunity for mid-course research corrections, rather than students having to wait until it's too late to make adjustments to their research efforts

Mentors:

- Able to make more dependable assessments
- Provides rich new insights into the strengths and weaknesses of the student(s) they mentor
- Enables mentors to focus their mentoring efforts more productively and contribute to helping students become more independent researchers
- Provides examples of ways in which students in their classes may not be aware of all the competencies and skills they should strive to achieve and may be less than clear about their academic strengths and weaknesses
- EvaluateUR provides framework for effective mentoring and complements/extends mentoring training

UR/REU Directors:

- Acquire reliable data to support campus assessments and funding requests
- Can be useful in recruitment and retention of students
- Opportunities to publish/present on their program at professional meetings and in journals
- EvaluateUR supports high-quality mentoring relationship between students and mentors
- In REU programs this could contribute to students' ratings of their relationship with their mentor, students' overall program ratings, students' scholarly output resulting from the REU, and decisions to pursue graduate school