The Successful Implementation of the Institutional Capacity Building National Science Foundation S-STEM Program at UVA Wise

Josephine Rodriguez, Galen Sedo, Trevor Makal, Isabella Maggard, and Bruce Cahoon

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NSF Division of Undergraduate Education: Scholarships in STEM (NSF S-STEM)

Scholarship support for talented students (in Natural Sciences) with financial need

Understand best practices for student retention, graduation, and preparation
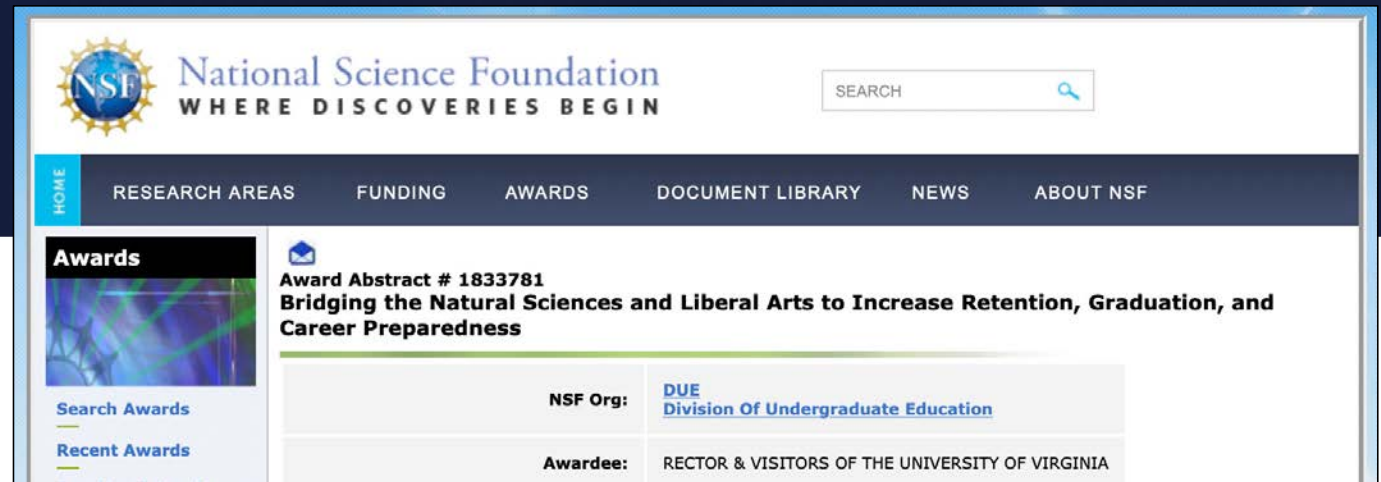
Equity and access (to scholarships, mentoring, professional development, research, etc.)

UVA WISE

News   Events   Directory   Athletics ⧉   VISIT   APPLY

https://www.uvawise.edu/academics/departments/natural-sciences/nsf-s-stem-scholarship-program

Admissions +   Affordability +   Academics +   About +   College Life +

Almost every successful person begins with two beliefs: the future can be better than the present, and I have the power to make it so.

Academics / Departments / Natural Sciences

NSF S-STEM Scholarship Program

$650,000 awarded
to UVA Wise in 2018

National Science Foundation
WHERE DISCOVERIES BEGIN

SEARCH

HOME   RESEARCH AREAS   FUNDING   AWARDS   DOCUMENT LIBRARY   NEWS   ABOUT NSF

Awards

Award Abstract # 1833781
Bridging the Natural Sciences and Liberal Arts to Increase Retention, Graduation, and Career Preparedness

Search Awards

Recent Awards

NSF Org:	**DUE** **Division Of Undergraduate Education**
Awardee:	RECTOR & VISITORS OF THE UNIVERSITY OF VIRGINIA

NSF S-STEM: Promoting Learning, Retention, and Preparation for STEM Graduate Studies/Workforce

- 4th year; $92k scholarships at UVA Wise (for AY 2022-23)
- 5 B.S degrees May 2022
- 7 B.S. degrees May 2023
- 14 more B.S. degrees expected by May 2025

NSF S-STEM: Prioritizing Equity and Access for Talented Students with Financial Need

First-Year Success Seminar

General Chemistry Recitation

Research Groups

Outcomes and Impacts

NSF S-STEM: First-Year Success Seminar

- 17 participants since Fall 2019; 3 have become SEM 1010 mentors
- Goal: provide supportive peer relationships and facilitate transition to UVA Wise
  - "I did not know any of the NSF S-STEM members before starting the Fall semester. Now, I know multiple members and have made some great friends within the program. I know that I have people who are willing to help me if I need assistance and will support me."
  - "I have developed supportive relationships with the members of NSF S- STEM. The members are always willing to give advice and talk about how classes are."

NSF S-STEM: First-Year Success Seminar

NSF S-STEM: First-Year Success Seminar

Time Management Matrix:
Urgent, Not Urgent, Important, and Not Important

	Urgent	**Not Urgent**
Important	**Do** these tasks as soon as possible.	**Defer** (schedule) these tasks until all urgent and important tasks have been completed.
Not Important	**Delegate** these tasks to the appropriate people who can manage them.	**Delete** these tasks – they are often time wasters.

NSF S-STEM: Mentoring

Assessment of the NSF S-STEM Mentoring (May 2022)

Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1 (n=14)

	(average)
I feel that I am part of a cohort	4.65
I feel that the cohort provides supportive peer relationships	4.54
I understand where to seek campus services such as tutoring and counseling	4.85
I am willing to seek campus services such as tutoring and counseling	4.92
I am interested in pursuing undergraduate research	4.83
I understand my STEM career options after UVA Wise	4.92
I understand my STEM graduate training options after UVA Wise	4.69
I have the time-management skills necessary to be successful in my coursework	4.69
I have the note-taking skills necessary to be successful in my coursework	4.69
I have the study skills necessary to prepare for my exams	4.54

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NSF S-STEM: General Chemistry Recitation

- Piloted with Dr. Galen Sedo for NSF S-STEM, since Spring 2020, 14 students have participated
- Students found intervention effective in fostering the critical thinking skills required to be successful in General Chemistry and more advanced courses; 1 previous participant is now the General Chemistry tutor.
- Now institutionalized for at UVA Wise!

CHM 1951 01	ST: RECITATION COLLEGE CHEMISTRY I	Makal, Trevor Arnold	4/12	Open	F 2:00 PM-2:50 PM; UVa-Wise Main Campus, Science Center, Science Center Room 108	1.00	1/17/2023	5/12/2023
CHM 1952 01	ST: RECITATION COLLEGE CHEMISTRY II	Sedo, Galen	7/26	Open	F 3:00 PM-3:50 PM; UVa-Wise Main Campus, Science Center, Science Center Room 108	1.00	1/17/2023	5/12/2023

NSF S-STEM: General Chemistry Recitation

Assessment (Fall 2021)

Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1 (n=3)

	(average)
Instructor explained concepts clearly:	5
Instructor increased my ability to work out problems:	5
Instructor helped improved my knowledge of General Chemistry:	5
Instructor helped me better prepare for exams:	5
Instructor used a variety of explanations and approaches to help me understand the material:	5
The General Chemistry Recitation met my expectations:	5

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NSF S-STEM: Research Groups

Environmental Chemistry

(presented at ACS)

Dr. Trevor Makal

- Biophysical characterization of Metal-organic Frameworks as potential microbial growth inhibitors
- UiO-66 (a zirconium-based MoF) relationship between percentage of ligand defects in the MoF and metal uptake

Environmental Genomics

(presented at ASB)

Dr. Bruce Cahoon

- Testing various collection methods for freshwater microbial environmental metabarcoding
- Assessing the feeding preferences in freshwater mussels using environmental metabarcoding

Gains Measured with Undergraduate Research Student Self-Assessment (URSSA)
(Weston and Laursen, 2015)

Thinking and Working Like a Scientist

- Analyzing data for patterns
- Problem-solving in general
- Identifying limitations of research methods and designs

Personal Gains

- Confidence in my ability to contribute to science
- Comfort in working collaboratively with others
- Confidence in my ability to do well in future science courses

Skills

- Conducting observations in the lab or field
- Explaining my project to people outside my field
- Making oral presentations

Attitudes and Behaviors

- Engage in real-world science research
- Think creatively about the project
- Try out new ideas or procedures on your own

Gains Measured with Undergraduate Research Student Self-Assessment (URSSA) (Weston and Laursen, 2015)

How much did you gain in these areas because of your most recent research experience?
Gains scale: 1 → 5; 1 = no gains, 5 = great gains

Thinking and Working Like a Scientist	Research Groups (n=5)	Summer (n=5)
Analyzing data for patterns:	4.4	4
Figuring out the next step in a research project:	4.8	4.6
Problem-solving in general:	4.6	5
Formulating a research question that could be answered with data:	4.8	4.4
Identifying limitations of research methods and designs:	4.8	4.8
Understanding the theory and concepts guiding my research project:	4.6	4.8
Understanding the connections among scientific disciplines:	4.4	4.8
Understanding the relevance of research to my course work:	4.6	4.6

Personal Gains		
Confidence in my ability to contribute to science:	4.8	4.6
Comfort in working collaboratively with others:	4.8	4.6
Confidence in my ability to do well in future science courses:	4.6	4.8
Ability to work independently:	4	4.4
Developing patience with the slow pace of research:	4.4	4.8
Understanding what everyday research work is like:	4.4	4.6

Skills		
Writing scientific reports or papers:	3.8	3.4
Making oral presentations:	4.4	4.6
Defending an argument when asked questions:	4	4.4
Explaining my project to people outside my field:	4.8	5
Preparing a scientific poster:	4	4
Keeping a detailed lab notebook:	4	4.8
Conducting observations in the lab or field:	4.6	5
Using statistics to analyze data:	4.2	3.6
Calibrating instruments needed for measurement:	4.2	4
Understanding journal articles:	4.6	4.6
Conducting database or Internet searches:	4.6	3.8
Managing my time:	4.4	4

Attitudes and Behaviors		
Engage in real-world science research:	4.8	4.8
Feel like a scientist:	4.8	5
Think creatively about the project:	4.8	5
Try out new ideas or procedures on your own:	4.8	4.2
Feel responsible for the project:	4.6	4.6
Work extra hours because you were excited about the research:	3.8	4.8
Interact with scientists from outside your school:	4	4.8
Feel a part of a scientific community:	4.4	5

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NSF S-STEM: A Transformative Investment in UVA Wise Students

- 13 Scholars are 1st-generation; 9 (current) Scholars with EFC $0
- Careers: Rivanna Water and Sewer Authority; UPM Pharmaceuticals; Natural Tunnel State Park
- Ph.D. program in Molecular and Cellular Biophysics at UNC Chapel Hill
- Post-Graduate Acceptance: Lincoln Memorial (n=2) and Milligan University
- 1st NASA Virginia Space Grant Consortium Scholar from UVA Wise

NSF S-STEM: Outcomes and Impacts

- Scholars recruited from 7 different community colleges
- Internships: VA Cooperative Extension; Carbon Research and Development, Inc., Wetlands Estonoa Learning Center, American Climate Partners, VA Dept. of Environmental Quality
- NSF REUs: UVA Mountain Lake Biological Station, Univ. South Florida, EKU; accepted to Univ. Tennessee, offers from NCSU (n=2), UVA & University of Kansas
- Non-traditional students: 1 US Navy Veteran, 2 young mothers
- 3 NCAA Division II athletes
- Researchers with NSF MRI, UVA Wise Fellowship in the Natural Sciences, USDA
- Presentations: Association of Southeastern Biologists, American Chemical Society, American Society of Microbiology, Kentucky Academy of Sciences
- Leadership: Introductory Chemistry and Physics tutors; Freshman Success Seminar Mentors; Orientation Leaders

Fall 2019 (NSF S-STEM, 1st Cohort, pre-COVID)

Fall 2020 (new 1st year NSF S-STEM Scholars)
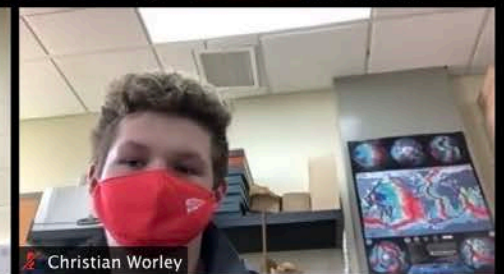
Fall 2022 (current NSF S-STEM Scholars)

FEATURED

UVA Wise Student Isabella Maggard Wins Goldwater Scholarship

April 12, 2023 • Genna Welsh Kasun

BARRY GOLDWATER
SCHOLARSHIP & EXCELLENCE IN EDUCATION FOUNDATION

Dear Isabella Maggard:

Congratulations! On behalf of the Board of Trustees of the Barry Goldwater Scholarship and Excellence in Education Foundation and the Department of Defense National Defense Education Programs, I am pleased to inform you that you have been selected as a 2023 Barry Goldwater Scholar.

Students who are named Scholars as juniors are entitled to one year of funding in their senior year (up to a maximum of $7,500). Students who are named Scholars as sophomores are entitled to funding in both their junior and senior years (up to a maximum of $7,500 each year, or $15,000 total). Funding for all scholars will begin in the fall of 2023. For sophomore awardees, the second year of funding will begin in the fall of 2024.
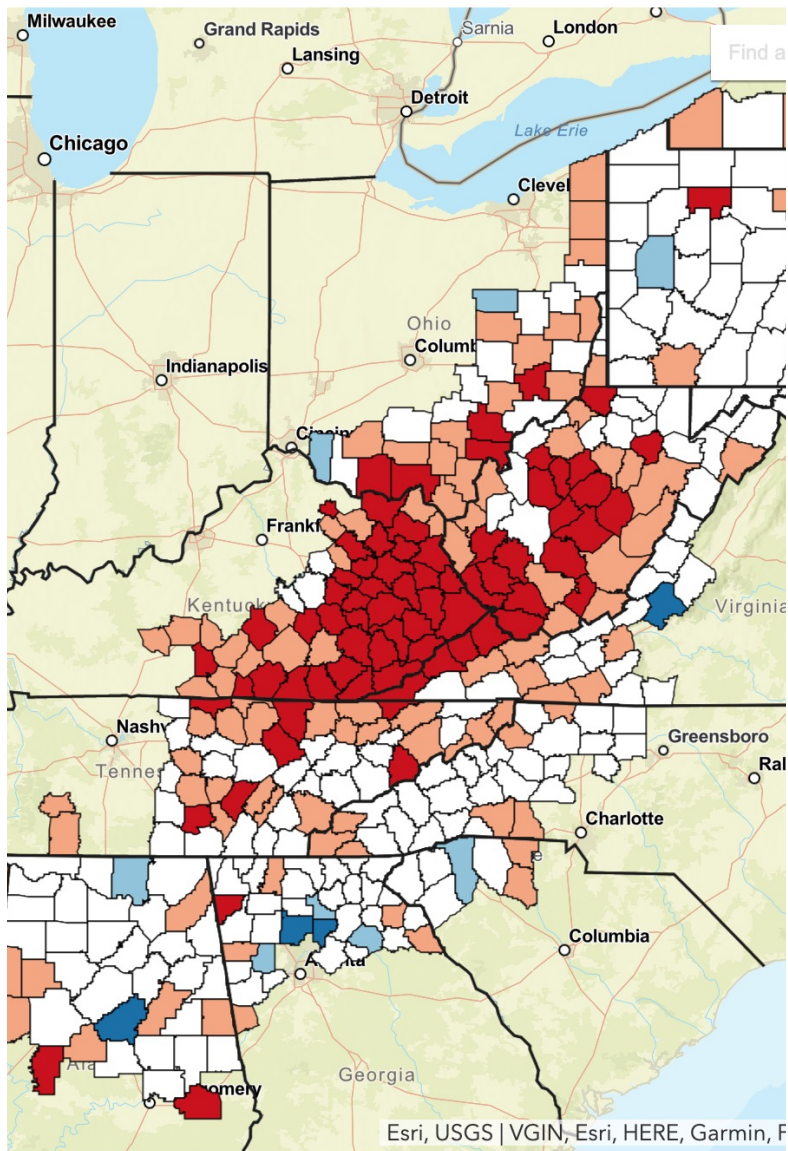
NSF S-STEM Collaborative Proposal: Pathways to Access, Collaboration, and Equity for Central Appalachian Students (PACE) Proposal No: 2322482, submitted March 2023

- Focus on Central Appalachia, build equitable and collaborative partnerships among regional community colleges and industry collaborators

- UVA/UVA Wise to scale and expand the current and successful Track 1 NSF S-STEM program at UVA Wise

- PACE aims to increase STEM educational and economic opportunities for Virginia and Kentucky students in Central Appalachia, which includes some of the poorest counties in the U.S. (e.g., Distressed Areas Classification System, n.d.)

https://www.arc.gov/classifying-economic-distress-in-appalachian-counties/

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- Galen Sedo, Trevor Makal, Bruce Cahoon, Isabella Maggard, Becky Huffman

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- NSF DUE 1833781

- Lorenzo and Piper Rodriguez

- Reach out – jjr5x@uvawise.edu