WISCIENCE
UNIVERSITY OF WISCONSIN–MADISON

DATA DIGEST

September 2020 – August 2021

OVERVIEW

WISCIENCE provides cross-campus programs, services, and courses to undergraduate students, graduate students, postdoctoral scholars, staff members, and faculty members to support the University's strategic goal of excellence in STEM education. All WISCIENCE programs, services, and courses promote diversity, educational innovation, engaged scholarship, outreach and collaboration.

Mission:

Enhance engagement and strengthen success in STEM through equitable and inclusive initiatives, collaborations, service, and scholarship.

Goals:

WISCIENCE will…

I. Build and support communities of STEM learners, leaders, and practitioners.
II. Deliver courses and programs that:
    a. Develop knowledge and skills for success in STEM.
    b. Build STEM identities and confidence.
    c. Provide professional development in teaching, public service, leadership, and research in STEM.
    d. Provide opportunities to engage in teaching, public service, leadership, and research in STEM.
III. Foster equity and inclusion in STEM through initiatives and programs that support diverse populations.
IV. Lead and collaborate on local and national efforts to improve STEM education by developing and disseminating evidence-based programs, curricula, resources, and other scholarly products.

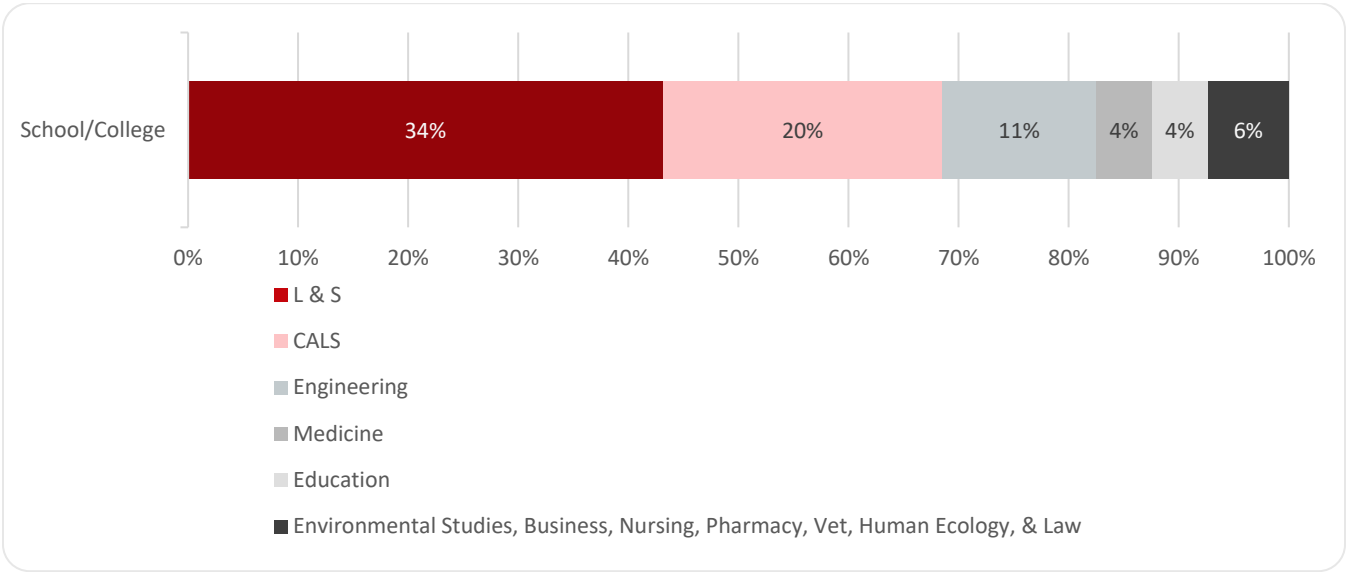
Who WISCIENCE Impacts

WISCIENCE engages learners at all stages of training and levels of exposure to STEM, from K-12 students to graduate students to STEM faculty and citizen scientists. In 2020/21, we reached 1,709 participants. *Note: Data includes registered participants and does not include participants who attended but did not formally register.*

Total Number of Participants: 1,709

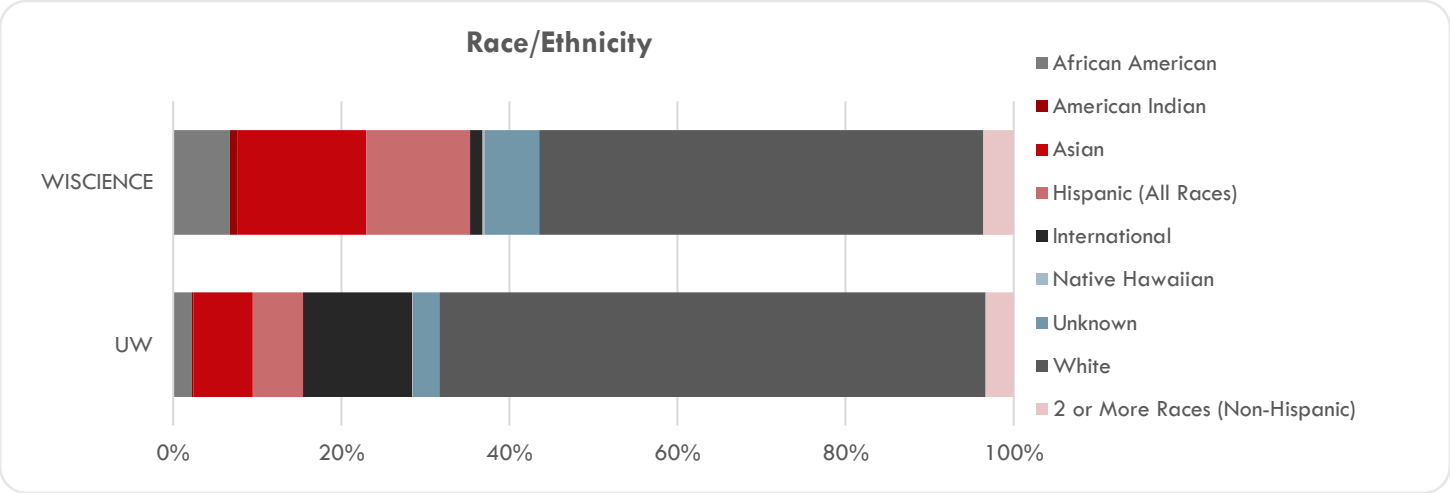
15 sites | 41 events | 27 events | 9 events | 6 events | 0 events

Participant School/College Affiliation

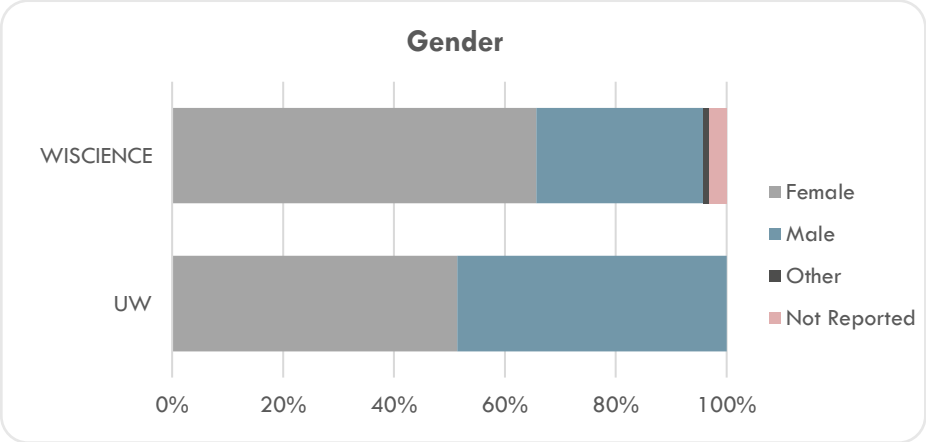


N= 791. Schools and Colleges with %1 or less of participants reporting them are shown as dark grey at the end of the bar. 164 participants did not report their college.

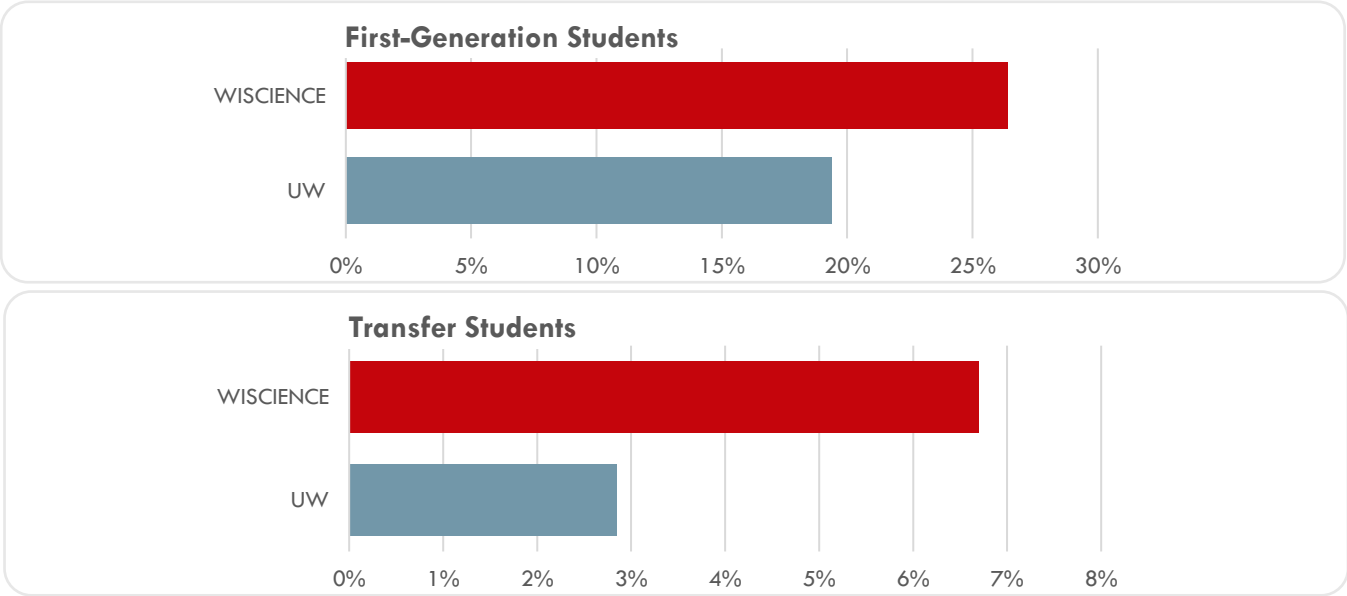
Participant Demographics



Note: UW–Madison data comes from Fall 2020 Semester in 2020-21 Data Digest (https://apir.wisc.edu/data-digest/). Race and Ethnicity categories represent all domestic (non-international) students. Non-domestic students are categorized as "International" for reporting purposes at UW-Madison. WISCIENCE data represent only 63% of all participants (1,081).



Note: UW–Madison data comes from Fall 2020 Semester in 2020-21 Data Digest (https://apir.wisc.edu/data-digest/). WISCIENCE data represent only 63% of all participants (1,081). UW Data reports gender with Male and Female categories only.



Note: UW–Madison data comes from Fall Semester Undergraduate Enrollment, First Generation and New Transfer Students and Fall Semester FTE Enrollment in 2020-21 Data Digest (https://apir.wisc.edu/data-digest/). WISCIENCE Data come from participants in courses and programs for undergraduates where this information was collected (N = 791).

WISCIENCE Courses and Programs

STEM Student Explorations are courses and programs for novice STEM learners.					
Course/Program Name	**WISCIENCE Goals**	**Semesters offered**	**Director**	**Target Audience**	**Total Participants**
BioHouse Seminar (INTEGSCI 110; INTEGSCI 375)	I, IIa, IIb, III	Fa, Sp	William Karasov & MaryRuth Kotelnicki		43
Exploring Biology (INTEGSCI 100)	I, IIa, IIb, III	Fa, Su	Cara Theisen with Teaching Fellows		139
Exploring Research in STEM (INTEGSCI 150)	I, IIa, IIb, IIc, III	Fa, Sp, Su	Amber Smith & Liza Chang		56
Exploring Service in STEM (INTEGSCI 140)	I, IIa, IIb, IId, III	Sp	Anna Courtier		9
STEM Immersion Orientation Program	I, IIa, III	Fa	Jahmese Williams		138
Transfer STEM Immersion Orientation Program	I, IIa, III	Fa	Jahmese Williams		19
STEM Student Engagement courses and programs build science literacy and develop participants' skills, knowledge, and confidence as STEM learners and future professionals.					
Course/Program Name	**WISCIENCE Goals**	**Semesters offered**	**Director**	**Target Audience**	**Total Participants**
Biological Interactions Summer Research Program	I, IIa, IIb, IIc, IId, III, IV	Su	Amber Smith & Liza Chang		18
Entering Research Part 1 (INTEGSCI 260)	I, IIa, IIb, IIc, IId, III, IV	Fa, Sp	Amber Smith & Liza Chang		19
Entering Research Part 2 (INTEGSCI 261)	I, IIa, IIb, IIc, IId, III, IV	N/A	Amber Smith		Not offered
Research Mentee Training Workshops	I, IIa, IIb, IIc, IId, III, IV	Fa, Sp	Amber Smith & Liza Chang		290
Service with Youth in STEM (INTEGSCI 240)	I, IIa, IIb, IId, III, IV	Fa	Anna Courtier; Kevin Niemi		13
Service with Youth in STEM Practicum (INTEGSCI 341)	I, IIa, IIb, IId, III, IV	Fa	Anna Courtier; Kevin Niemi		7

STEM Student Leadership courses and programs develop participants' leadership knowledge and skills through the personal and professional development.

Course/Program Name	WISCIENCE Goals	Semesters offered	Director	Target Audience	Total Participants
Exploring Discipline Based Leadership (INTEGSCI 230)	I, IIc, III	Sp	Jahmese Williams		40
IMPaCT Peer Leader Program	I, IIb, IIc, IId, III	Fa, Sp, Su	Jahmese Williams		60

Undergraduate Peer Leaders:

- BioCommons Ambassadors (2)
- Exploring Biology Peer Leaders (14)
- Exploring Discipline-Based Leadership and Mentoring Peer Leader (1)
- Research Peer Leaders (5)
- Exploring Service in Science Peer Leader (2)
- Service with Youth in STEM Peer Leaders (4)
- STEM Immersion Peer Leaders and Coordinators (37)
- Transfer STEM Immersion Peer Leaders (1)

STEM Professional Development courses and programs train graduate students, postdoctoral scholars, and faculty in inclusive, evidence-based STEM teaching and research mentoring practices.

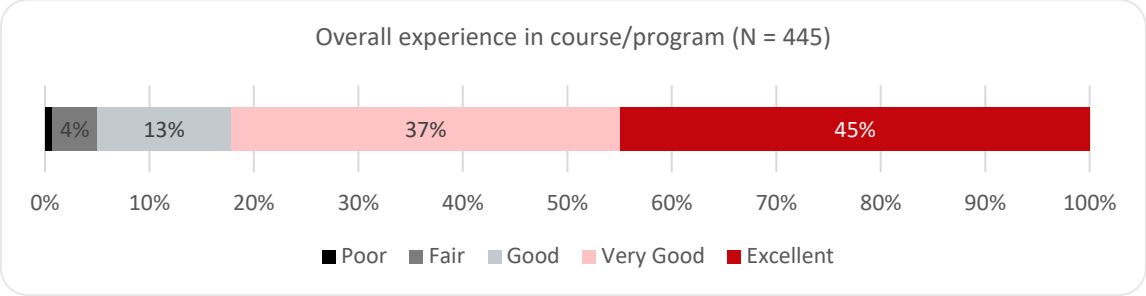
Course/Program Name	WISCIENCE Goals	Semesters offered	Director	Target Audience	Total Participants
STEM Public Service Fellows Program			**Anna Courtier**		
Mentored Practicum in Public Service in STEM (INTEGSCI 840)	I, IIa, IIb, IIc, IId, III	Fa	Anna Courtier; Jessica TeSlaa		10
Public Service in STEM (INTEGSCI 640)	I, IIa, IIb, IIc, IId, III	Sp	Anna Courtier; Jessica TeSlaa		15
Relationships and Materials Development in STEM (INTEGSCI 740)	I, IIa, IIb, IIc, IId, III	Su	Anna Courtier		15
Scientific Teaching Fellows Program			**Cara Theisen**		
Practicum in Science Teaching (INTEGSCI 850)	I, IIa, IIb, IIc, IId, III	Fa	Cara Theisen		8
College Science Teaching (INTEGSCI 650)	I, IIa, IIb, IIc, III	Sp	Cara Theisen		15
Instructional Materials Design (INTEGSCI 750)	I, IIa, IIb, IIc, IId, III	Su	Cara Theisen		8
Scientific Teaching for TAs (INTEGSCI 605)	I, IIa, IIb, IIc, III	N/A	**Cara Theisen**		Not offered
Research Mentor Training (INTEGSCI 660)	I, IIa, IIb, IIc, IId, III	Fa, Sp, Su	**Amber Smith; Liza Chang**		155
Entering Mentoring Facilitator Training	I, IIa, IIb, IIc, IId, III, IV	Sp	**Amber Smith**		12
Research Mentor Training Workshops	I, IIa, IIb, IIc, IId, III, IV	Fa	**Amber Smith; Liza Chang**		18

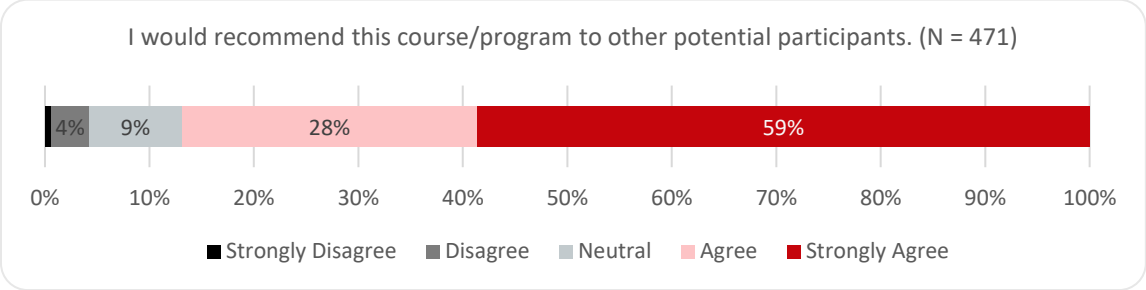
STEM Integrated Initiatives bring together multiple WISCIENCE partners, programs, and staff members to serve STEM learners within and beyond the university community.					
Course/Program Name	**WISCIENCE Goals addressed**	Semesters offered	**Instructor(s) /Director**	**Target Audience**	**Total Participants**
BioCommons	I, IIa, IIb, IIc, IId, III, IV	Fa, Sp, Su	Jerí Bryant		175
After School Science Clubs	I, IIa, IIb, IIc, IId, III, IV	Fa, Sp	Anna Courtier; Kevin Niemi		510
Connections & Collaborations allow WISCIENCE to support and amplify the impact of STEM programs and courses led by others at UW-Madison.					
Course/Program Name	**WISCIENCE Goals addressed**	**Semesters offered**	**Instructor(s) /Director**	**Target Audience**	**Total Participants**
Advancing Informal STEM Learning/Broader Impacts Design	I, IIa, IIc, IId, IV	Fa	Kevin Niemi		75
PEOPLE	I, IIa, IIb, IIc, III	Su	Robert Bohanan/ Jerí Bryant		227
Science Alliance	I, IIc, IId, IV	Fa, Sp, Su	Kevin Niemi		758*

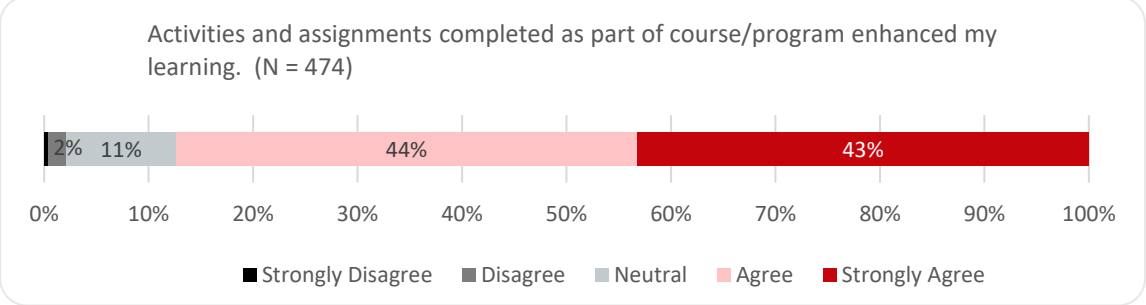
WISCIENCE Evaluation Summary

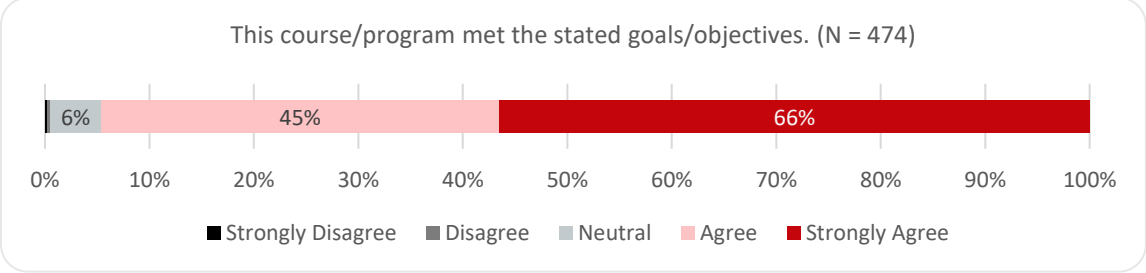
WISCIENCE examines the extent to which participants are satisfied with their experiences in courses and programs and the extent to which courses and programs meet the mission and goals of the institute. Multiple sources of data are used in these evaluations.

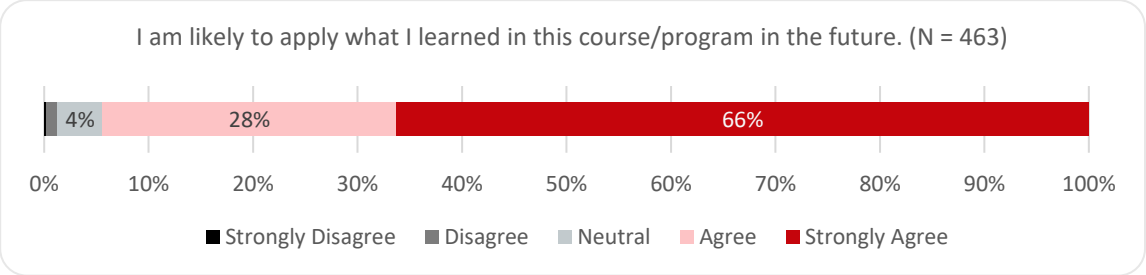
Course & Program Satisfaction, Learning, and Application





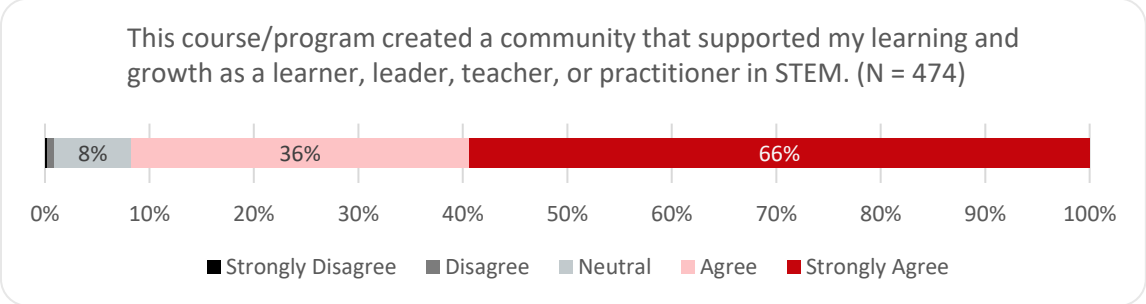






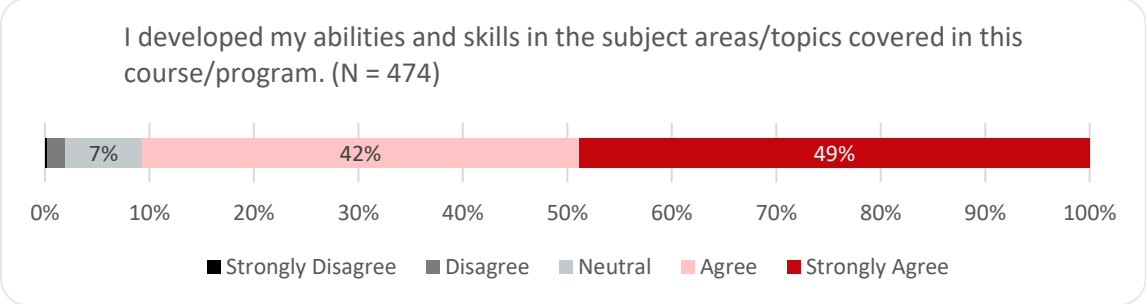
Course & Program WISCIENCE Goal Achievement

Goal I: Build and support communities of STEM learners, leaders, and practitioners.

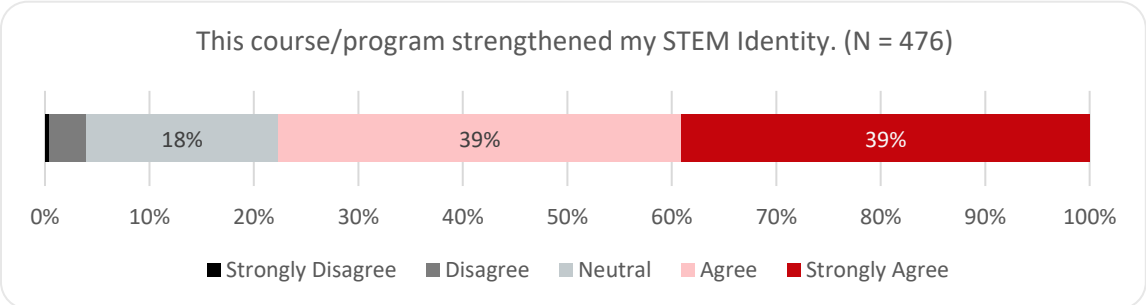


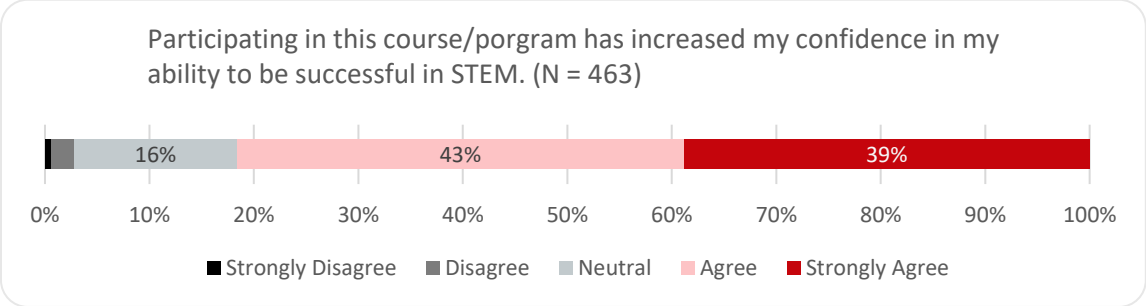
Goal II: Deliver courses and programs that:

A. Develop knowledge and skills for success in STEM.

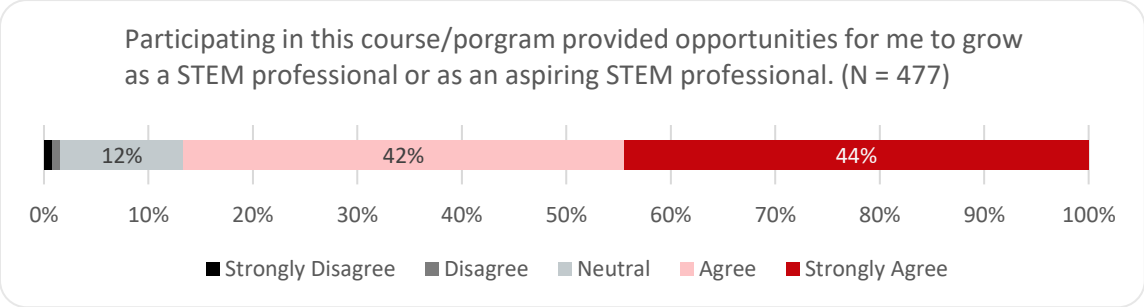


B. Build STEM identities and confidence.





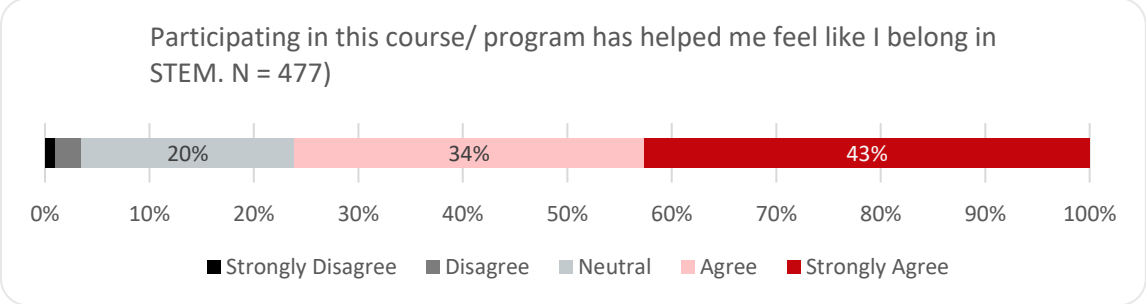
C. Provide professional development in teaching, public service, leadership, and research in STEM.



D. Provide opportunities to engage in teaching, public service, leadership, and research in STEM.

- **60** Undergraduate students served as Peer Leaders
- **8** Graduate students completed Teaching Fellows Program in Fall 2020
- **10** Graduate students completed Service Fellows Program in Fall 2020

Goal III: Foster equity and inclusion in STEM through initiatives and programs that support diverse populations.



Goal IV: Lead and collaborate on local and national efforts to improve STEM education by developing and disseminating evidence-based programs, curricula, resources, and other scholarly products.

Publications:

5 scholarly products currently in revision or review

1. Machiavelli-Giron, S., Caudill, E., **Theisen, C. H.** (in revision). Defining Life: Exploring Creativity, Scientific Discover, and Biology Core Concepts in a Disciplinary First-Year Seminar. Submitted to CourseSource.
2. Holzhausen, E. A., Fitz-Henley, J., & **Theisen, C. H.** (in review). Online Resource Comparison: Applying the CRAAP Test to Vaccine Misinformation. Submitted to CourseSource.
3. Sancheznieto, F., Lucas, L., & **Theisen, C. H**. (in review). Discover and Innovation: A Reflection on Representation in Science. Submitted to CourseSource.
4. Wang, X., Wang, Y., **Wagner, B.** (chapter proposal accepted). Meeting the Promise and Challenges of "Free College": Research and Practical Insights From a Community College STEM Scholarship Program. *New Directions for Community Colleges (NDCC) volume, "Free College: Budgets, Mission, & the Future."*
5. Erickson, O., Cole, R., Isaacs, J., Alvarez-Clare, S., Arnold, J., Augustus-Wallace, A., Ayoob, J., Berkowitz, A., **Branchaw, J. L.**, Burgio, K., Cannon, C., Ceballos, R., Cohen, C. S., Coller, H., Disney, J., Doze, V., Eggers, M., Farina, S., Ferguson, E., Gray, J., Greenberg, J., Hoffman, A., Jensen-Ryan, D., Kao, R., Keene, A., Kowalko, J., Lopez, S., Mathis, C., Minkara, M., Murren, C., Ondrechen, M. J., Ordonez, P., Osano, A., Padilla-Crespo, E., Palchoudhury, S., Qin, H., Ramirez Lugo, J., Reithel, J., Shaw, C., **Smith, A.**, Smith, R., Summers, A., Tsien, F., and Dolan, E. (in review). "How do we do this at a distance?!" A descriptive study of remote undergraduate research programs during COVID-19. *Life Sciences Education.*

12 scholarly products published or in press

1. **Branchaw, J., Theisen, C. H.**, and Trimby, C. (2020). Leveraging a Graduate Student Teaching Fellows Program to Enhance Undergraduate Education. In *Approaches to Graduate Student Instructor Development and Preparation,* New Directions for Teaching and Learning. San Francisco: Jossey-Bass. 2020(163), 73-82. https://doi.org/10.1002/tl.20411
2. **Theisen, C. H.**, Modell, A., Munoz, Y., & Saichaie, K. (2020). Peer Teaching Consultants: Design Principles for Instructional Development and Program Alignment. In *Approaches to Graduate Student Instructor Development and Preparation,* New Directions for Teaching and Learning. San Francisco: Jossey-Bass. 2020(163), 55-63. https://doi.org/10.1002/tl.20417
3. **Theisen, C. H.**, Paul, C. A., Roseler, K. (in press). Fostering Reflective Teaching: Using the Student Participation Observation Tool (SPOT) to Promote Active Instructional Approaches in STEM. Journal of College Science Teaching.
4. Saichaie, K., & **Theisen, C. H.**, (2020). Editors' Notes. In *Approaches to Graduate Student Instructor Development and Preparation,* New Directions for Teaching and Learning. San Francisco: Jossey-Bass. 2020(163), 7-12. https://doi.org/10.1002/tl.20405
5. Saichaie, K., & **Theisen, C. H.**, eds. (2020). *Approaches to Graduate Student Instructor Development and Preparation.* New Directions for Teaching and Learning. San Francisco: Jossey-Bass. https://doi.org/10.1002/tl.20354
6. Byars-Winston, A., & **Butz, A. R.** (2021). Measuring research mentors' cultural diversity awareness for race/ethnicity in STEM: Validity evidence for a new scale. *CBE – Life Sciences Education, 20, (2).* https://doi.org/10.1187/cbe.19-06-0127
7. **Wagner, B.**, Zhu, X., & Wang, X., (2021), Tools in Their Toolbox: How Community College Faculty Transfer Industry Experience Into Their Teaching. *Community College Review, 49*(4), *483-505.* https://doi.org/10.1177/00915521211026677
8. O'Connell, K.O., Hoke, K., Giamellaro, M., Berkowitz, A., and **Branchaw, J.L.** (accepted) A Framework of Factors That Influence Undergraduate Student Outcomes in Field Learning Experiences. *BioScience.*

9. Morello, S.L., Rogus-Pulia, N., **Branchaw, J.L.**, Brauer, M., Schwakopf, J.M., and Carnes, M. (2021) The Influence of Messaging on Perceptions of Careers in Veterinary Medicine: Do Gender Stereotypes Matter? *Journal of Veterinary Medical Education*. https://doi.org/10.3138/jvme-2020-0143
10. Lee, S. and **Branchaw, J.L.** (2021) Pause, Breathe, Reflect and Reset: The Importance of reflecting on one's graduate school career over the past year. *Inside Higher Education*. https://www.insidehighered.com/advice/2021/05/03/importance-reflecting-ones-graduate-school-career-over-past-year-opinion
11. Pfund, C., **Branchaw, J.L.**, McDaniels, M., Byars-Winston, A., Lee, S., and Birren, B. (2021) Reassess – Realign – Reimagine: A Guide for Mentors Pivoting to Remote Research Mentoring. *Life Sciences Education*. 20(1) https://doi.org/10.1187/cbe.20-07-0147
12. O'Connell, K.O., Hoke, K., Berkowitz, A., **Branchaw, J.L.**, and Storksdieck, M. (2020) Undergraduate Learning in the Field: Designing Experiences, Assessing Outcomes, and Exploring Future Opportunities. *Journal of Geosciences Education*. https://doi.org/10.1080/10899995.2020.1779567

5 WISCIENCE staff led workshops or presentations

1. Wang, Y., Wang, X., & **Wagner, B.** (2021, April). Barely Scrapes the Surface: Understanding the Unmet Needs of STEM Students at Community College. Paper presentation for the American Educational Research Association, Virtual Conference.

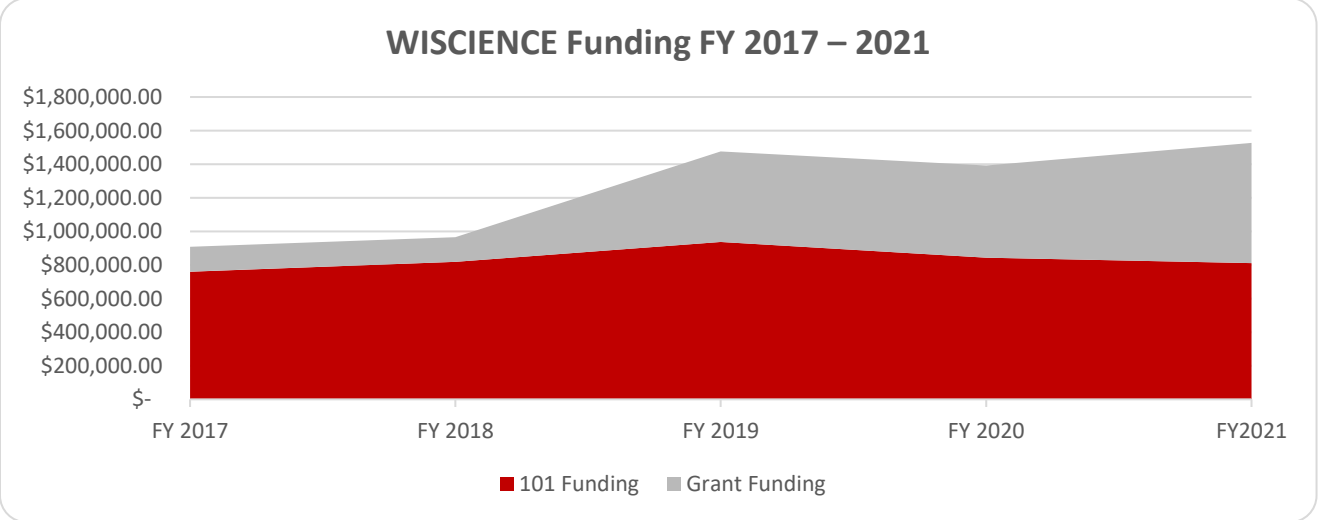
2. **Branchaw, J.L.** Entering Research Curriculum Development Online Workshop. Trinity Washington University, June 2021.

3. **Branchaw, J.L.** Research Mentoring Online Workshop. Trinity Washington University, April 2021.

4. **Branchaw, J.L.** National Science Foundation Physics Research Experiences for Undergraduates (REU) Principal Investigators Workshop: Common REU Assessment and Evaluation, 2020

5. **Branchaw J. L.** Webinar (in place of invited talk) National Directors of Graduate Training Programs in Physiology and Pharmacology Meeting: Reassess – Realign – Reimagine: Pivoting to Remote Research Mentoring, 2020.

WISCIENCE Funding



4 grants submitted

- Genentech (1 proposal submitted)
- National Institutes of Health (1 proposal submitted)
- National Science Foundation (2 proposals submitted)

3 grants awarded

Funding Agency	Project Title	Principal Investigator	Funding Amount	Funding Period
National Institutes of Health	Collaborative Project with iBiology: Online Courses for Navigating Research Mentoring Relationships	Janet Branchaw, PhD Amanda Butz, PhD (Co-I)	$932,720	08/01/2020 – 07/31/2025
Genentech	Genentech Fellows: Biological Interactions from Molecules to Ecosystems- Phenotype, Genotype, and Environment Summer Research Program	Amber Smith, PhD	$49,000	06/01/2021-05/30/2022
National Science Foundation Research Experience for Undergraduates	REU Site: Biological Interactions from Molecules to Ecosystems- Phenotype, Genotype, and Environment	Amber Smith, PhD	$323,946	02/01/2021-01/30/2023

3 continuing grants

Funding Agency	Project Title	Principal Investigator	Funding Amount	Funding Period
Howard Hughes Medical Institute	Beyond Access to Success: Creating Flexible Pathways to STEM Degrees for Transfer Students in the UW-System	Janet Branchaw, PhD	$1,010,000	09/01/2018 – 08/31/2023
National Science Foundation	Center for Advancing the Societal Impacts of Research (Subaward from the University of Missouri-Columbia)	Kevin Niemi, PhD	$48,036	09/15/2018 – 08/31/2023
National Science Foundation	NSF IGE: A Public Service Fellows Program - Preparing Graduate Students for Community Engagement	Anna Courtier, PhD Jessica TeSlaa, PhD (Co-PI)	$490,101	09/01/2018 – 08/31/2022

HHMI Inclusive Excellence Project

WISCIENCE was awarded a 5-year, $1,000,000 Howard Hughes Medical Institute Inclusive Excellence grant in 2019. The project "Beyond Access to ***Success*** in Wisconsin: Creating Flexible Pathways to STEM Degrees for 2- to 4-Year Transfer Students" is building a *comprehensive* 2- to 4-year transfer *model* program and implementing policy changes to transform the way Wisconsin public institutions support STEM transfer students. The project has four specific aims:

- AIM 1: Faculty, Advisor, and Peer Mentor Professional Development Programming
- AIM 2: Student Transfer Transition Programming
- AIM 3: System Policy, Curricular, and Personnel Connections
    - Interinstitutional Relationships
    - STEM Major Course Pathways
    - Transfer Admission
- AIM 4: Iterative Evaluation and Refinement

In 2020-21, we brought together WTCS and UW System institutions to partner on adapting the original model programs developed by UW-Madison and Madison College. The partnering teams (listed below) each developed and submitted a mini proposal outlining the work they plan to do together to advance transfer student success between their institutions.

- Madison Area Technical College, UW - Madison, UW - Platteville, and UW – Whitewater
- Chippewa Valley Technical College, UW - Eau Claire, and UW – Stout
- Milwaukee Area Technical College and UW Milwaukee
- Western Technical College and UW - La Crosse
- Nicolet Technical College and UW - Stevens Point

In addition, six STEM course concentration pathways have been built and are being reviewed and approved by STEM department faculty across UW System institutions. The pathways are in: biology, chemistry, computer science, mathematics, physics, and statistics.

BROADER IMPACT

WISCIENCE courses and programs impact the Collaborative for the Advancement of Learning & Teaching (CALT), UW–Madison, the State, and the Nation through partnerships, service, and outreach.

WISCIENCE and the Collaborative (CALT)
Collaborations/Partnerships
Delta
MTLE
Office of Undergraduate Advising

WISCIENCE and UW–Madison
Collaborations/Partnerships
Center for the Improvement of Mentored Experiences in Research
Precollege Enrichment Opportunity Program for Learning Excellence
UW Arboretum
Science Alliance

Presentations & Workshops
Atmospheric and Oceanic Sciences
BioHouse
Biophysics
Cellular and Molecular Biology
Center for Academic Excellence
Center for Demography and Ecology
College of Agricultural and Life Sciences
First Generation Student Success Organization
Genetics
The Graduate School
Health Occupations Students of America
Life Sciences Communication
Nutritional Sciences
Psychology
SciMed GRS
Waisman Center

WISCIENCE and the State
Collaborations/Partnerships
Altruize
Arrowhead Pharmaceuticals
Brain XCell
Clean Wisconsin
Madison Schools and Community Recreation
UW System collaborations:
- UW System Administration,
- UW-Eau Claire,
- UW-Green Bay,
- UW-LaCrosse,
- UW-Milwaukee,
- UW-Oshkosh,
- UW-Parkside,
- UW-Platteville,
- UW-River Falls,
- UW-Stevens Point,
- UW-Stout,
- UW-Superior,
- UW-Whitewater

WISCIENCE and the State (continued)

Wisconsin Alliance for Women's Health
Wisconsin Department of Natural Resources
Wisconsin Greenfire
Wisconsin Youth Company
WTCS System Collaborations:
- WTCS System Administration,
- Madison College,
- Milwaukee Area Technical College,
- Chippewa Valley Technical College,
- Nicolet College,

Western Technical College

Presentations and Workshops
Madison College STEM Center
UW System Admissions

WISCIENCE and the Nation

Presentations & Workshops
American Educational Research Association
Trinity Washington University
National Science Foundation Physics REU
National Directors of Graduate Training Programs in Physiology and Pharmacology
Undergraduate Field Experience Research Network
Virginia Polytechnic Institute and State University