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WISCIENCE Mission, Vision, and Goals

Vision: Advancing the practice and impact of STEM.

Mission: The mission of WISCIENCE is to 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.
WISCIENCE Personnel

WISCIENCE Leadership
Janet Branchaw, PhD  Director
Amber Smith, PhD  Associate Director
Jessica Belcher  Administrative Director

WISCIENCE Staff
Robert Bohanan, PhD  Outreach Program Manager
Jeri Bryant, PhD  Director of BioCommons
Keegan Buscaino  Office Manager
Amanda Butz, PhD  Director of Evaluation & Research
Liza Chang, PhD  Research Mentor and Mentee Training Coordinator
Anna Courtier, PhD  Director of Community-Based Learning
Alan Hiebert  Communications Coordinator
Kevin Niemi, PhD  Director of Outreach Programs
Jessica TeSlaa, PhD  Community-Engaged Curriculum Developer and Instructor
Cara Theisen, PhD  Director of Professional Development in Teaching & Learning
Jahmese Williams, PhD  Director of First-Year and Retention Programs in Science

Front row, from top: Jessica TeSlaa, Amber Smith, Cara Theisen, Liza Chang, Jahmese Williams, Jeri Branch; Back row, from top: Alan Hiebert, Keegan Buscaino, Janet Branchaw, Jessica Belcher, Anna Courtier, Robert Bohanan, Amanda Butz. Not pictured: Kevin Niemi.
## WISCIENCE Overview

**Goals:** WISCIENCE will:

- **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.
- **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.

### Course and Program Alignment to WISCIENCE Goals

<table>
<thead>
<tr>
<th>Course/Program Name</th>
<th>Goal I</th>
<th>Goal II</th>
<th>Goal III</th>
<th>Goal IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STEM Student Explorations</strong></td>
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<tr>
<td>BioHouse Seminar (INTEGSCI 110)</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
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<td>Exploring Biology (INTEGRSCl 100)</td>
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<td>Exploring Research (INTEGSCI 150)</td>
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<td>Exploring Service (INTEGSCI 140)</td>
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<td>STEM Immersion</td>
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<td>Transfer STEM Immersion</td>
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<td><strong>STEM Student Engagement</strong></td>
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<td>Biological SIGNALS Summer Research Program</td>
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<tr>
<td>Entering Research Scholarship Summer Research Program</td>
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<tr>
<td>Entering Research Part 1 (INTEGSCI 260)</td>
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<tr>
<td>Entering Research Part 2 (INTEGSCI 261)</td>
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<tr>
<td>Service with Youths in STEM (INTEGSCI 240)</td>
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<tr>
<td>Service with Youth in STEM Practicum (INTEGSCI 341)</td>
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<td><strong>STEM Student Leadership</strong></td>
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<td>Exploring Discipline-Based Leadership (INTEGSCI 230)</td>
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<td>IMPACT Leadership Program</td>
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<td>Peer Leader Interns</td>
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<td><strong>STEM Professional Development</strong></td>
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<tr>
<td>Mentoring Fellows</td>
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<tr>
<td>Culturally Aware Mentoring</td>
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<td>Research Mentor Training (INTEGSCI 660)</td>
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<td>Service Fellows</td>
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<td>Public Service in STEM (INTEGSCI 675)</td>
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<td>Relationships and Materials Development in STEM (INTEGSCI 675)</td>
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<td>Mentored Practicum in Public Service in STEM (INTEGSCI 675)</td>
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<td>Teaching Fellows</td>
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<td>Instructional Materials Design (INTEGSCI 750)</td>
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<td>Practicum in Science Teaching (INTEGSCI 850)</td>
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<td>Scientific Teaching for TAs (INTEGSCI 605)</td>
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<td><strong>WISCIENCE Integrated Initiatives</strong></td>
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<tr>
<td>BioCommons</td>
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<td>After school science programs</td>
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<td>HHMI Inclusive Excellence</td>
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<tr>
<td><strong>Connections and Collaborations</strong></td>
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<td>ARIS/ CASIR</td>
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<td>AISL – Broader Impacts Project</td>
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<td>APSI - Biology</td>
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<td>Inclusive Teaching</td>
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<tr>
<td>LTER/Citizen Science</td>
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<tr>
<td>PEOPLE</td>
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<tr>
<td>Wisconsin Scientific Teaching Design Institute</td>
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</tbody>
</table>
WISCIENCE at a Glance

**Total Number of Participants: 3,675**

WISCIENCE programs reach individuals at all stages of training and levels of exposure to STEM, from K-12 students to undergraduate students to community professionals and citizen scientists.

**Total Number of Courses/Programs/Workshops: 425**

- 5 Summer Programs
- 24 Courses Offered
- 26 After School Science Programs
- 29 Workshops
- 341 Programming offered at the BioCommons

Note: Details on all courses/programs/workshops are available in the “WISCIENCE Areas of Focus” section of this report; pages 11 – 22.

WISCIENCE Funding Sources

**WISCIENCE Funding Sources from FY 2017 – FY 2019**

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>101 Funding</th>
<th>Grant Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2017</td>
<td>49.99%</td>
<td>50.01%</td>
</tr>
<tr>
<td>FY 2018</td>
<td>49.99%</td>
<td>50.01%</td>
</tr>
<tr>
<td>FY 2019</td>
<td>34.19%</td>
<td>65.81%</td>
</tr>
</tbody>
</table>

Note: Grant funding reflects the award amount received for a given fiscal year. A list of funding sources can be viewed in the “WISCIENCE Highlights and Accomplishments” section of this report; page 9.
Participant Demographic Information

Race/Ethnicity

- American Indian/Alaska Native
- Asian
- Black/African American
- Hispanic/Latino
- Native Hawaiian/Pacific Islander
- Other
- White

Gender

- Female
- Male
- Other

First-Generation & Transfer Students

- Transfer Students
- First-Generation Students

Note: UW Data comes from Fall Semester in 2018-19 Data Digest (https://apir.wisc.edu/data-digest/). Systematic data collection for WISCIENCE events began midway through the year for this first annual report. Therefore, the WISCIENCE data represent only 34% of all participants.

Note: UW Data comes from Fall Semester Undergraduate Enrollment, First Generation and New Transfer Students and Fall Semester FTE Enrollment in 2018-19 Data Digest (https://apir.wisc.edu/data-digest/). WISCIENCE Data come from participants in courses and programs where this information was collected (N = 1131). Data were not available for 89 of those participants.
Overall Program Satisfaction

The majority of WISCIENCE course participants and IMPACT Peer Leaders were satisfied with their experience.

92% of WISCIENCE participants agreed or strongly agreed that their course or program met the stated goals or objectives.

WISCIENCE courses & programs provide opportunities for participants to explore the intersection of culture, identity, & science.

Participating in this course/program broadened my understanding of...

- how culture and/or identity can impact participation in science.
- MY OWN culture and/or identity.
- OTHERS' cultures and/or identities.
2018-19 WISCIENCE Highlights and Accomplishments

Grants:
7 grants submitted to the following funding sources
- Citizen Based Monitoring Partnership Program (1 proposal submitted)
- Genentech (1 proposal submitted)
- National Science Foundation (2 proposals submitted)
- Howard Hughes Medical Institute (1 proposal submitted)
- Mt. Horeb Community Foundation (1 proposal submitted)
- University of Wisconsin System (1 proposal submitted)

5 grants awarded

<table>
<thead>
<tr>
<th>Funding Agency</th>
<th>Project Title</th>
<th>Principal Investigator</th>
<th>Funding Amount</th>
<th>Funding Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation for Dane County Parks Endowment</td>
<td>Creating Intergenerational Experiential Learning Activities at Dane Co Parks</td>
<td>Robert Bohanan, PhD</td>
<td>$2,000</td>
<td>09/01/2019 – 08/31/2020</td>
</tr>
<tr>
<td>Genentech Foundation for Biomedical Science</td>
<td>Genentech Foundation Summer Scholarship</td>
<td>Amber Smith, PhD</td>
<td>$18,000</td>
<td>02/01/2019 – 01/31/2020</td>
</tr>
<tr>
<td>Howard Hughes Medical Institute</td>
<td>Beyond Access to Success: Creating Flexible Pathways to STEM Degrees for Transfer Students in the UW-System</td>
<td>Janet Branchaw, PhD</td>
<td>$1,010,000</td>
<td>09/01/2018 – 08/31/2023</td>
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<tr>
<td>National Science Foundation</td>
<td>NSF IGE: A Public Service Fellows Program - Preparing Graduate Students for Community Engagement</td>
<td>Anna Courtier, PhD</td>
<td>$490,101</td>
<td>09/01/2018 – 08/31/2021</td>
</tr>
<tr>
<td>National Science Foundation</td>
<td>Center for Advancing the Societal Impacts of Research (Subaward from the University of Missouri-Columbia)</td>
<td>Kevin Niemi, PhD</td>
<td>$48,036</td>
<td>09/15/2018 – 08/31/2023</td>
</tr>
</tbody>
</table>

Awards:
1 award received
Dr. Jeri Bryant, recipient of the Dr. Brenda Pfaehler Award of Excellence from the Center for Educational Opportunities (CeO)

*The Dr. Brenda Pfaehler Award of Excellence was established by the staff of CeO to honor Dr. Pfaehler, CeO’s first director, who passed away on November 30, 1996. Throughout her life, Dr. Pfaehler was committed to providing equal opportunity and equity in education to disadvantaged students. Her love, dedication, and contributions have touched many lives. It was her belief that everyone could excel, which created a CeO community striving for excellence, after which the award has been named.*
Manuscripts:

11 published or in press


3 currently in revision or review


Presentations & Workshops Offered at Conferences:


3. **Bohanan, R. E.** (2019, June). What Can Dragonflies Tell Us About the Ecology of our Neighborhoods. Workshop for UW Arboretum, Madison, WI.


5. **Bohanan, R. E.** (2019, May). What Can Dragonflies Tell Us About the Ecology of our Neighborhoods. Workshop for UW Arboretum, Madison, WI.


15. **Niemi, K.J.** (2019, June). Expanding the Connections of K-12 with Informal Institutions and Higher Education. Presentation at National Science Education Leadership Association Summer Leadership Institute, Orlando, FL.


Undergraduate Student Programs & Courses: Exploring, Engaging and Leading

**STEM Immersion** students participated in outreach activities at several community sites in 2018, including Allen Centennial Garden, Capital Lakes Assisted Living, Goodman Community Center, Lakeshore Nature Preserve, Madison Parks Division, Second Harvest Food Bank Schulte Gardens, UW-Madison Arboretum, UW-Madison Biotech, and the Wisconsin Institutes for Discovery.

**The IMPaCT Peer Leadership** program engaged 84 students in peer leadership experiences. 11 graduating seniors were recognized as part of the Senior Sendoff in Spring 2019.

**228 Exploring Biology** students presented research posters as part of their final project for the course.

During AY 18-19, the Service with Youth in STEM program demonstrated successful engagement strategies and science content for approximately **15 after school staff at two separate events.**
STEM Student Explorations

WISCIENCE STEM Student Explorations are courses and programs designed to benefit diverse populations of first-year or novice STEM students.

Target audiences for STEM Student Exploration Programs

<table>
<thead>
<tr>
<th>Course/Program Name</th>
<th>Semesters offered</th>
<th>Director</th>
<th>Target Audience</th>
<th>Total Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
<td>Summer</td>
<td></td>
</tr>
<tr>
<td>BioHouse Seminar (INTEGSCI 110; INTEGSCI 375)</td>
<td></td>
<td></td>
<td></td>
<td>William Karasov &amp; M. Kotelnicki</td>
</tr>
<tr>
<td>Exploring Biology (INTEGSCI 100)</td>
<td></td>
<td></td>
<td></td>
<td>Cara Theisen with Teaching Fellows</td>
</tr>
<tr>
<td>Exploring Research in Science (INTEGSCI 150)</td>
<td></td>
<td></td>
<td></td>
<td>Amber Smith &amp; Liza Chang</td>
</tr>
<tr>
<td>Exploring Service in Science (INTEGSCI 140)</td>
<td></td>
<td></td>
<td></td>
<td>Jessica TeSlaa</td>
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<tr>
<td>Secrets of Science</td>
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<tr>
<td>STEM Immersion</td>
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<td>Jerry Whitmore/ Jahmese Williams</td>
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<tr>
<td>Transfer STEM Immersion</td>
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<td></td>
<td>Jahmese Williams</td>
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</tbody>
</table>

**BioHouse Seminar (INTEGSCI 110)** is for BioHouse residential learning community students. Careers in biology are explored as well as how biology can help solve current problems. Students develop skills in cooperative learning, integrating information across disciplines, and science communication.

**Exploring Biology (INTEGSCI 100)** is a first-year seminar for students interested in majoring in the biosciences. Students explore biology core concepts and research, and learn about careers, on-campus opportunities, and how to connect with a bioscience community on campus.

**Exploring Research in Science (INTEGSCI 150)** is a seminar course that introduces students to STEM research at UW–Madison. Students explore how scientists from different disciplines approach research, are provided guidance in finding a research mentor, and help in building their scientific thinking skills.

**Exploring Service in Science (INTEGSCI 140)** supports first-year students interested in becoming STEM majors as they explore the public purpose of STEM. Students learn about successful university-community partnerships and experience public service opportunities firsthand.

**STEM Immersion** prepares low-income, underrepresented, and first-generation college students for success at UW–Madison through an immersive, STEM-focused orientation program the week before they begin classes.

**Transfer STEM Immersion** prepares transfer undergraduate students for success at UW–Madison through an immersive, STEM-focused orientation program.
STEM Student Exploration Programs Funding Sources

<table>
<thead>
<tr>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
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<th>90%</th>
<th>100%</th>
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</thead>
<tbody>
<tr>
<td><em>101 Funding</em></td>
<td><em>Grant Funding</em></td>
<td><em>Partner Cost-Share</em></td>
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</table>

STEM Student Explorations: Participant Feedback

“It was a great class to learn some basics about biology and get tips on the transition into college.” – Exploring Biology participant

“Seeing such a diverse representation of people succeeding in the field I want to go into show[s] that although it may be hard, there is so much support that I can make it through.” – STEM Immersion participant

“Thank you so much for allowing me to participate in this program! I consider this to be such a vital part of my first semester, and I can’t express my gratitude for all the opportunities and support WISCIENCE has provided me. Thank you for building my confidence and helping me feel like I belong on this campus!” – STEM Immersion Participant
WISCIENCE STEM Student Engagement Programs provide learning experiences that build science literacy. These programs develop participants’ skills, knowledge and confidence as a STEM learner and future professional.

### Target audiences for STEM Student Engagement Programs

<table>
<thead>
<tr>
<th>Course/Program Name</th>
<th>Semesters offered</th>
<th>Director</th>
<th>Target Audience</th>
<th>Total Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological SIGNALS Summer Research Program</td>
<td>Summer</td>
<td>Amber Smith &amp; Liza Chang</td>
<td>Ugrad</td>
<td>19</td>
</tr>
<tr>
<td>Entering Research Summer Program</td>
<td></td>
<td>Amber Smith &amp; Liza Chang</td>
<td>Ugrad</td>
<td>16</td>
</tr>
<tr>
<td>Entering Research Part 2 (INTEGSCI 261)</td>
<td></td>
<td>Amber Smith</td>
<td>Ugrad</td>
<td>Not offered</td>
</tr>
<tr>
<td>Service with Youth in STEM (INTEGSCI 240)</td>
<td></td>
<td>Anna Courtier; Kevin Niemi</td>
<td>Grad</td>
<td>41</td>
</tr>
<tr>
<td>Service with Youth in STEM Practicum (INTEGSCI 341)</td>
<td>Summer</td>
<td>Anna Courtier; Kevin Niemi</td>
<td>K-12 Ugrad Grad</td>
<td>8</td>
</tr>
</tbody>
</table>

**Biological SIGNALS Summer Research Program** provides intensive, full-time bioscience research and professional development for undergraduate students as they prepare for graduate school and research careers in biology.

**Entering Research Summer Program** provides opportunities for UW–Madison undergraduate students to engage in high impact learning through coursework and authentic research experiences.

**Entering Research Part 1 (INTEGSCI 260)** is for first-time research students taking 1–3 independent research credits in science, technology, engineering, or math (STEM). Students develop skills and knowledge to foster a successful mentor/mentee relationship and tailor research experiences to meet their interests and goals.

**Entering Research Part 2 (INTEGSCI 261)** is for students with 1 or more semesters of research experience who are taking 1–3 independent research credits in STEM. Students improve scientific communication skills, build independence and confidence as researchers, and develop plans to guide their STEM professional development and careers.

**Service with Youth in STEM (INTEGSCI 240)** teaches community building, communication, the needs and learning styles of children, and how to assess informal (non-classroom) STEM learning experiences. Students practice what they learn by serving as leaders of after-school science clubs in the Madison area while reflecting on their learning in individual and group settings.

**Service with Youth in STEM Practicum (INTEGSCI 341)** matches students who have completed Service with Youth in STEM with after-school science clubs. The practicum gives UW–Madison students experience with new community partners with a variety of missions and leadership styles, and experience with different student populations and different science curricula.
## STEM Student Engagement Programs: Participant Feedback

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I truly enjoyed my time here and I would highly recommend this program to anyone. This experience has solidified my passion for science and research, and now I want to pursue my PhD in Biochemistry/Cell Biology. I love the lab/bench work that I have been doing and was glad that I was able to do so many experimental protocols this summer.”</td>
<td>Biological SIGNALS Summer Program Participant</td>
</tr>
<tr>
<td>“I loved working with the kids they are smart and very fun”</td>
<td>Service with Youth in STEM Practicum participant.</td>
</tr>
<tr>
<td>“I gained a more solid understanding of the research process and set of expectations in going into research as an undergrad”</td>
<td>Entering Research participant</td>
</tr>
<tr>
<td>“…it was really empowering to experience how my confidence had grown over time. I think it is good, especially for club leaders who get nervous about club, to experience being at least partially liberated from that fear, and then be able to actually just focus on implementing good teaching methods.”</td>
<td>Service with Youth in STEM practicum participant.</td>
</tr>
<tr>
<td>“I really liked lecture and lab. It was a low-key environment where you were there to learn or experiment not to stress.”</td>
<td>Service with Youth In STEM participant</td>
</tr>
<tr>
<td>“I learned a lot about how to overcome challenges facing people of color entering the STEM field and how to successfully communicate and perform procedures in a laboratory setting.”</td>
<td>Entering Research participant</td>
</tr>
<tr>
<td>“When I first registered for this course, I had not really considered the impact it would have on me. ... I have developed a better understanding of leadership and my own leadership style.”</td>
<td>Service with Youth in STEM participant</td>
</tr>
</tbody>
</table>

### Funding Sources

- 101 Funding
- Grant Funding
- Partner Cost-Share
STEM Student Leadership

WISCIENCE STEM Student Leadership programs and courses help students develop leadership knowledge and skills through the personal and professional development of themselves and others.

Target audiences for STEM Student Leadership Programs

<table>
<thead>
<tr>
<th>Course/Program Name</th>
<th>Semesters offered</th>
<th>Director</th>
<th>Target Audience</th>
<th>Total Participants</th>
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<tbody>
<tr>
<td>Exploring Discipline Based Leadership (INTEGSCI 230)</td>
<td>Fall, Spring</td>
<td>Jahmese Williams</td>
<td>K-12 Ugrad</td>
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<tr>
<td>IMPACT Program</td>
<td></td>
<td>Jahmese Williams</td>
<td>Grad, Postdoc</td>
<td>84</td>
</tr>
<tr>
<td>BioCommons Ambassadors</td>
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<td>Jeri Bryant</td>
<td>Ugrad</td>
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</tr>
<tr>
<td>Exploring Biology Peer Leaders</td>
<td></td>
<td>Cara Theisen</td>
<td>Grad</td>
<td>10</td>
</tr>
<tr>
<td>Research Peer Leaders</td>
<td></td>
<td>Amber Smith &amp; Liza Chang</td>
<td>Grad</td>
<td>2</td>
</tr>
<tr>
<td>Service Peer Leaders</td>
<td></td>
<td>Anna Courtier</td>
<td>Grad, Postdoc</td>
<td>6</td>
</tr>
<tr>
<td>STEM Immersion Leaders and Coordinators</td>
<td></td>
<td>Jerry Whitmore/</td>
<td>Ugrad, Grad,</td>
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</tr>
</tbody>
</table>

Exploring Discipline Based Leadership (INTEGSCI 230) A course in which students learn leadership theories and practical peer leadership skills. The course provides a community of peers who support and offer insight as students learn and reflect on their personal experiences. In particular, students learn to think critically about issues of privilege and identity.

IMPACT Peer Leadership A program that prepares students for leadership within and beyond the STEM classroom. Participants take INTEGSCI 230, serve as peer leaders, and take in-service training sessions where they continue to develop leadership competencies.

Peer Leader Internships

- **BioCommons Ambassadors** guides their undergraduate peers who participate in BioCommons programs by helping them to navigate the STEM landscape at UW–Madison and beyond. Ambassadors lead through one-on-one engagement and event planning and coordination.
- **Exploring Biology Peer Leaders** are mentors, role models, and points of connection to the larger university community for first-year students taking Exploring Biology. They develop leadership and mentoring skills, deliver informative presentations on campus resources and college experiences, and support student success in and out of the classroom.
- **Research Peer Leaders** facilitate WISCIENCE research-related workshops, and serve as peer mentors, role models, and points of connection to the larger university community for students interested in or participating in research on campus.
Service Peer Leaders provide mentoring and guidance to students in the Exploring Service and Service with Youth in STEM courses. Their perspective bridges the experiences of instructors and students. As leaders, they also reflect on how their own perspectives and identities have changed during their involvement in science education in the Madison community.

STEM Immersion Leaders and Coordinators help facilitate STEM Immersion, an orientation program for first-year and transfer students. They guide participants during the program and maintain connections with participants throughout their first year at UW-Madison.

STEM Student Leadership Programs Funding Sources

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<thead>
<tr>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
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<tr>
<td>101 Funding</td>
<td>Grant Funding</td>
<td>Partner Cost-Share</td>
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</tr>
</tbody>
</table>

STEM Student Leadership Highlights: Participant Feedback

“Peer Leaders are very useful because they have recent or ongoing experience as students, so they are able to provide useful guidance (such as tips). It's just nice having someone who is supportive in academics and always willing and happy to help.” – Student commenting on Exploring Biology Peer Leader

“I think having a peer leader in this course is interesting and amazing because he or she helped me decide whether I should take more Biology courses in the future. He or she has helped me become aware of who I am and strive for excellence.” – Student commenting on Exploring Biology Peer Leader

“One lesson I have learned is that no matter how long you have considered yourself a leader, you can always improve. I realize now that it is important to stop every now and then to reflect on new skills I have developed and remember my initial goals when I decided I wanted to be a leader.” – IMPACT Peer Leader

“Thank you for the opportunity to be a peer leader in the course. Working within the community through this course has been life changing and so rewarding. Your guidance and instruction was very supportive and helpful throughout the year!” – Service with Youth in STEM Peer Leader
STEM Professional Development: Teaching, Mentoring and Service

5 of the 8 Scientific Teaching Fellows who completed the program in Fall 2018 are in the process of writing up their units to submit for publication in Course Source, an online publication of evidence-based teaching resources for undergraduate biology education.

The STEM Public Service Fellows program recruited 6 graduate students into its first cohort. Participants will participate in community-engaged teaching, direct service, and policy pathways.
WISCIENCE STEM Professional Development programs are courses and multi-semester programs to train graduate students, postdoctoral scholars, and faculty in teaching and mentoring.

### Target audiences for STEM Professional Development Programs

<table>
<thead>
<tr>
<th>Course/Program Name</th>
<th>Semesters offered</th>
<th>Director</th>
<th>Target Audience</th>
<th>Total Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring Fellows Program</td>
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<td>Amber Smith</td>
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<td>Not offered</td>
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<tr>
<td>Research Mentor Training (INTEGSCI 660)</td>
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<td>Amber Smith</td>
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<tr>
<td>Culturally Aware Mentoring</td>
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<td>Amber Smith</td>
<td>Not offered</td>
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</tr>
<tr>
<td>STEM Public Service Fellows Program</td>
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<td>Anna Courtier</td>
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</tr>
<tr>
<td>Public Service in STEM (INTEGSCI 675)</td>
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<td>Anna Courtier; Jessica TeSlaa</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Relationships and Materials Development in STEM (INTEGSCI 675)</td>
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<td>Anna Courtier; Jessica TeSlaa</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Mentored Practicum in Public Service in STEM (INTEGSCI 675)</td>
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<td>Anna Courtier; Jessica TeSlaa</td>
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<td></td>
</tr>
<tr>
<td>Scientific Teaching Fellows Program</td>
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<td>Cara Theisen</td>
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<td>Practicum in Science Teaching (INTEGSCI 850)</td>
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<td>Cara Theisen</td>
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</tr>
<tr>
<td>College Science Teaching (INTEGSCI 650)</td>
<td></td>
<td>Cara Theisen</td>
<td>8</td>
<td></td>
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<tr>
<td>Instructional Materials Design (INTEGSCI 750)</td>
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<td>Cara Theisen</td>
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<tr>
<td>Scientific Teaching for TAs (INTEGSCI 605)</td>
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<td>Cara Theisen</td>
<td>Not offered</td>
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</tr>
</tbody>
</table>

Note: INTEGSCI 660 instructors: M. Brown, Surgery; E. Callahan, Graduate School; L. Chang, WISCIENCE; G. Cooper, College of Engineering-WISEI; A. Ewer, Graduate School; A-L. Gillan-Daniel, Materials Science; A. Greenberg, Chemical Engineering; J. Maher, Delta; E. Meyerand, Engineering; K. McMahon, Engineering; G. Moore, Agronomy; S. Silverman, Delta; J. Watters, Veterinary Medicine; P. Wilson, Engineering.

**Mentoring Fellows** aims to improve undergraduate mentoring through professional development for graduate students and postdoctoral fellows. Mentoring Fellows develop knowledge and skills to better mentor undergraduates by engaging in two seminars, Research Mentor Training and Culturally Aware Mentor Training. Fellows apply their knowledge in a mentoring practicum.

**Research Mentor Training (INTEGSCI 660)**

**Culturally Aware Mentoring**
**STEM Public Service Fellows** was established in 2019 with funding from the National Science Foundation. It connects graduate students with the Madison-area community in one of four pathways (community-engaged teaching, direct service, policy, and social entrepreneurship). Fellows complete a practicum with a community partner to address issues of public concern in their chosen pathway.

- **Public Service in STEM (INTEGSCI 675)**
- **Relationships and Materials Development in STEM (INTEGSCI 675)**
- **Mentored Practicum in Public Service in STEM (INTEGSCI 675)**

**Scientific Teaching Fellows** is a year-long intensive professional development experience for graduate students and postdocs. The program integrates training in college teaching with practical teaching experience. Teaching Fellows learn about research-based and inclusive teaching, develop instructional materials that engage students in active learning, and then teach an undergraduate STEM course (INTEGSCI 100).

- **College Science Teaching (INTEGSCI 650)**
- **Instructional Materials Design (INTEGSCI 750)**
- **Practicum in Science Teaching (INTEGSCI 850)**

**Scientific Teaching for TAs (INTEGSCI 605)** gives new TAs survival skills in scientific teaching through theory, practice, and learning community. TAs learn the core themes of scientific teaching (active learning, assessment, and diversity) and apply them in real time to the courses they are teaching.

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**STEM Professional Development Programs Funding Sources**

- 101 Funding
- Grant Funding
- Partner Cost-Share

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**STEM Professional Development Programs: Participant Feedback**

“The program changed my entire approach to teaching, for the better I believe. I now have a principled approach (and vision!) that I can bring to course development, implementation and revision which is grounded in scientific principles/research.” – Scientific Teaching Fellows participant

“I now have a support network for pursuing a career that is off the beaten path of grad students in STEM. I get resistance from my peers and PIs... and sometimes even my parents for making the choice to focus less on my research to appreciate how my research can interact with our community. Having people to talk to while I am going through this process is honestly a huge relief.” – STEM Public Service Fellows participant
Integrated Initiatives

The collaborations supported by the HHMI Inclusive Excellence Project yielded 3 professional development events, 4 workshops for transfer students, and 7 STEM transfer pathway course packages have been developed, all designed to help transfer students receive the best preparation possible to successfully transfer from a two to a four-year institution.

During 2018-19, WISCIENCE students and staff served 473 K-12 students at 26 different sites through its After-School Science Clubs. Of the 17 partners who responded to a feedback survey, 82% rated their experience collaborating with WISCIENCE as very good or excellent. 100% were likely, very likely, or extremely likely to partner or collaborate with WISCIENCE in the future.

- Allis Elementary
- Emerson Elementary
- Falk Elementary
- Glendale Elementary
- Hawthorne Elementary
- Kennedy Elementary
- Lake View Elementary
- Leopold Elementary
- Lowell Elementary
- Mendota Elementary
- Orchard Ridge Elementary
- Sandburg Elementary
- Schenk Elementary
- Shorewood Hills Elementary
- Allied Learning Center
- Bayview Community Center
- Bridge Lake Point Neighborhood Center
- Elver Park Neighborhood Center
- Goodman Community Center
- Juvenile Detention Center
- Marquette Resource Center
- Meadowood Neighborhood Center
- Mt. Zion
- Neighborhood House
- Salvation Army
- Theresa Terrace Neighborhood Center

341 events and programs were hosted by the BioCommons compared to 275 last year.
WISCIENCE Integrated Initiatives involve multiple WISCIENCE programs and staff.

Target Audiences for STEM Integrated Initiatives

<table>
<thead>
<tr>
<th>Course/Program Name</th>
<th>Semesters offered</th>
<th>Instructor(s) /Director</th>
<th>Target Audience</th>
<th>Total Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>BioCommons</td>
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<td>Jeri Bryant</td>
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<td>363</td>
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<td>After School Science Clubs</td>
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<td>HHMI Inclusive Excellence: Institutional Change</td>
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<td>Janet Branchaw</td>
<td></td>
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<tr>
<td>HHMI Inclusive Excellence: Transfer Student Development Programs</td>
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<td>Amber Smith</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>HHMI Inclusive Excellence: Faculty, Advisor and Peer Leader Development Programs</td>
<td></td>
<td>Cara Theisen</td>
<td></td>
<td>94</td>
</tr>
</tbody>
</table>

After School Science Clubs: WISCIENCE trains UW–Madison students to lead science clubs with elementary school children through the Service with Youth in STEM service learning course (INTEGSCI 240) to provide Madison-area after-school programs with science club leaders and programming.

BioCommons is a collaboration with Steenbock Library to build community for STEM students. Physical and virtual spaces serve to connect students, faculty and staff; provide venues for departments, schools and colleges to host events; offer professional development, networking and wellness events for students; and provide peer support through BioCommons Ambassador peer leaders.

HHMI Inclusive Excellence: Beyond Access to Success is an initiative to create flexible pathways to STEM degrees for transfer students in Wisconsin. A comprehensive 2-year to 4-year transfer model program and policy changes are in development to transform the way UW System universities and Wisconsin Technical Colleges prepare and support STEM transfer students for success.

STEM Integrated Initiatives Funding Sources

“[The after school program] was a huge success for this year. Our facilitator had a tough group of kids and really kept them engaged. I was very impressed!” – community partner
Beyond WISCIENCE

WISCIENCE impacts the Collaborative for the Advancement of Learning & Teaching (CALT), the UW, the State, and the Nation through its partnerships, service, and outreach.

WISCIENCE and the Collaborative (CALT) Collaborations/Partnerships
- Delta
- Inclusive Teaching
- Service
- Gateway Committee
- Teaching Academy

WISCIENCE and the UW Collaborations/Partnerships
- Badgers Encouraging Youth in Science (BEYS)
- Center for Patient Partnerships
- College of Agricultural & Life Sciences
- College of Letters & Science
- Crow Institute for the Study of Evolution Outreach Design Lab
- Division of Diversity, Equity & Educational Achievement
- First-Year Interest Group Program
- MANRRS
- Morgridge Center for Public Service
- Nelson Institute for Environmental Education
- Office of State Relationships
- Precollege Enrichment Opportunity Program for Learning Excellence (PEOPLE)
- SACNAS
- School of Pharmacy
- SciMedGRS
- Steenbock Library
- Summer Collegiate Experience
- UW Arboretum
- UW Libraries
- Wisconsin Alumni Research Foundation
- Wisconsin Institutes for Discovery

WISCIENCE and the UW (continued) Service
- Fellows Interviews
- Illuminating Discovery Advisory Board
- University Research Council
- WISCIENCE & University Search Committees
- Women in Scientific Education and Research (WISER)

WISCIENCE and the State Collaborations/Partnerships
- Association of Science and Technology Centers
- City of Madison
- Feeding Wisconsin
- Kiwanis Club of Downtown Madison
- Madison College
- Madison Metropolitan School District
- Madison School and Community Recreation
- North Temperate Lakes Long-Term Ecological Research
- Science and Environmental Education in Madison
- Upper Sugar River Watershed
- Wisconsin Department of Health Services
- Wisconsin Youth Company

WISCIENCE and the State (continued) Presentations
- After School Partners Training Workshop
- Citizen Based Monitoring Networking Conference
- Friends of Pheasant Branch Conservancy
- Wisconsin Lakes Convention
- Wisconsin Master Naturalist
- Madison Out of School Time Summer Conference

WISCIENCE and the Nation Service
- American Association for the Advancement of Science
- National Science Education Leadership Association
- Professional and Organizational Development Network
- Reviewer: Journal of College Science Teaching

WISCIENCE and the Nation Presentations & Workshops
- Advancing Informal STEM Learning PIs Conference
- Biology Research Experience for Undergraduates Conference
- NABI/ARIS Summit
- National Science Education Leadership Association
- Summer Leadership Institute
- Professional and Organizational Development Network
- Understanding Interventions
Connections & Collaborations

WISCIENCE Connections & Collaborations increase the reach and impact of STEM programs and courses through partnerships between WISCIENCE and other programs on and beyond campus.

Target Audiences of Connections & Collaborations

<table>
<thead>
<tr>
<th>Course/Program Name</th>
<th>Semesters offered</th>
<th>Instructor(s) /Director</th>
<th>Target Audience</th>
<th>Total Participants</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
<td>Summer</td>
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<tr>
<td>Advancing Research Impact in Society</td>
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<tr>
<td>Advancing Informal STEM Learning/Broader Impacts Design</td>
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<td>The Advanced Placement Summer Institute–Biology</td>
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<td>Kevin Niemi</td>
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<td>LTER/Citizen Science</td>
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<td>PEOPLE</td>
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<td>Wisconsin Scientific Teaching Design Institute</td>
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<td>Cara Theisen</td>
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<tr>
<td>WISCIENCE Workshops</td>
<td></td>
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<td></td>
<td>Amber Smith</td>
</tr>
</tbody>
</table>

Advancing Research Impact in Society (ARIS): WISCIENCE partners with The Center for Advancing Research Impact in Society (ARIS) to fulfill ARIS's mission. The ARIS Center, located at the University of Missouri-Columbia and funded by the National Science Foundation, works with scientists and engagement practitioners to build capacity, advance scholarship, grow partnerships and provide resources to help them engage with, and demonstrate the impact of research in their communities and society.

Advancing Informal STEM Learning (AISL)/Broader Impacts Design Project: WISCIENCE partners with the Discovery Outreach group at the Wisconsin Institutes for Discovery to advance informal science education through Broader Impacts Design, an NSF Advancing Informal STEM Learning grant.

The Advanced Placement Summer Institute–Biology is a partnership with the School of Education that offers professional development for AP biology teachers.

LTER/Citizen Science: WISCIENCE and the North Temperate Lakes Long-term Ecological Research (LTER) Education and Outreach group partner with schools and communities throughout Wisconsin to develop, disseminate and evaluate programs and to develop curriculum and training that incorporate long-term ecological research. Faculty, staff and students collaborate with educational and environmental organizations to provide resources and expertise related to environmental issues.
**PEOPLE:** WISCIENCE collaborates with the Precollege Enrichment Opportunity Program for Learning Excellence (PEOPLE) program to develop, implement and evaluate learning experiences for their program that integrate UW–Madison STEM research.

**Science Alliance** is an informal science outreach group at UW–Madison and in the Madison community. WISCIENCE staff organize meetings and coordinate communication among the members.

**Wisconsin Scientific Teaching Design Institute** is a pilot program to train graduate students and postdoctoral fellows the core principles of scientific teaching. It a partnership between WISCIENCE and Tiny Earth (WID), where participants will apply their learning to develop a new Tiny Earth course.

**WISCIENCE Workshops:** WISCIENCE fulfills requests by the UW-Madison Community to implement workshops around the areas of research mentor and mentee training, closing the achievement gap in undergraduate courses, and other topics related to STEM undergraduate and graduate experiences for departments and programs across campus.

**Connections & Collaborations Funding Sources**

![Bar chart showing funding sources.](image-url)