2023 STEM Summit Report
Growing STEM Learning Across the Big Sky
Sponsors and Organizers

The 2023 Montana STEM Summit was brought to you by the Montana Afterschool Alliance and MSU Science Math Resource Center with members of the planning committee from ExplorationWorks!, Helena SACC, MAPS Media Institute, Montana Afterschool Alliance, and UM spectrUM Discovery Area.


A big thank you to summit attendees, Montana STEM programs, and the youth presenters who made this event possible.

A special thank you to:
Afterschool Alliance
First Lady of Montana, Susan Gianforte
Montana University System
National Girls Collaborative Project
Office of Public Instruction
Rep. Laurie Bishop-House District 60
Rep. Mike Yakawich-House District 51
US Senator Steve Daines's Office
US Senator Jon Tester's Office

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The creation of this report was supported in part by the National Science Foundation EPSCoR Cooperative Agreement OIA-1757351. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.
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Welcome

The Montana STEM Summit brings together representatives from education, business, afterschool, government, industry, and nonprofits, along with other engaged citizens, to discuss and showcase STEM (Science, Technology, Engineering, and Math) opportunities from across the state.

The 2023 Montana STEM Summit built upon previous summits, the first of which was held in August of 2017 at Montana State University (MSU) as a collaboration between the Montana Afterschool Alliance (MTAA) and the MSU Science Math Resource Center. The event originated when MTAA was awarded a STEM Next grant from the Charles Stewart Mott Foundation in order to promote collaborations and statewide partnerships for innovative STEM efforts. Summit organizers, attendees and other stakeholders set priorities that were then used to guide programming and partnerships in Montana, including setting the agenda and goals for the statewide STEM Summits in 2019, 2022 and 2023.

The priorities identified at the first STEM Summit included:
• Create a statewide centralized STEM effort for networking and resources
• Build a bridge between K-12 STEM education/out-of-school pipeline and workforce and innovation
• Increase access and affordability for afterschool/out-of-school STEM programming
• Transform STEM into STEAM (with art)
• Focus on K-12 curriculum

These priorities have continued to guide future events, including Summer 2019, when the STEM Summit was again held at MSU. The 2021 biennial Summit was not held due to COVID-19 but was hosted virtually in Spring 2022. This report contains an overview of the 2023 Montana STEM Summit, which was hosted in Helena, Montana on April 13, 2023.

Many incredible organizations and individuals made the 2023 Montana STEM Summit possible. Thank you for your interest in supporting STEM learning opportunities in Montana.
The 2023 Montana STEM Summit included:

- **Workshop**: A workshop for providers focused on STEM role models.
- **Work Session**: An interactive conversation on the current state of STEM in Montana.
- **Open House**: An open house of exhibits and activities, including robotics, VR, bookmobiles and more.
- **Showcase**: A student showcase celebrating STEM learning opportunities from around the state.

**Who Attended?**

- **K-12 Education 13%**
- **Higher Education 14%**
- **Nonprofits 18%**
- **Industry 6%**
- **Libraries 2%**
- **Museums 13%**
- **Afterschool 24%**
- **Government/Military 9%**
- **Parents 1%**

Over 100 participants from 50 different organizations.

Source: based on attendance data for April 13, 2023
The 2023 STEM Summit kicked off with a workshop featuring Karen Peterson, Chief Executive Officer, and Brenda Britsch, Senior Research Scientist, of the National Girls Collaborative Project. Their attendance was in support of the Million Girls Moonshot initiative of the STEM Next Opportunity Fund.

As one of the most geographically spread-out states, the opportunity for providers and educators to connect and share about their experiences and resources was invaluable. Participants were introduced to research-based strategies and resources for planning a role model experience, including how to recruit and connect with diverse role models. The workshop concluded with a conversation with Susan Gianforte, First Lady of Montana, whose background is in mechanical engineering.

“Getting to know the resources and connections within the MT STEM network was incredibly beneficial.”
-Summit Participant

STEM Role Model (Mechanical Engineering)
Susan Gianforte, First Lady of Montana

Karen Peterson, Chief Executive Officer
National Girls Collaborative Project
Why STEM Role Models?

Engagement with diverse STEM role models is a key strategy to encourage youth’s identification with and participation in STEM by:

- breaking down and dispelling stereotypes about who belongs in STEM
- making STEM personally and culturally relevant
- broadening the notion of STEM fields and journeys
- showing how STEM is collaborative and social
- helping youth develop positive STEM identities
- increasing interest and participation in STEM

Learn more

- Visit National Girls Collaborative Project at ngcproject.org
- Monthly NGCP newsletter: ngcproject.org/our-newsletters
- Montana Girls STEM Collaborative: ngcproject.org/about/collaboratives/montana-girls-stem-collaborative

STEM Role models resources

- Million Girls Moonshot: www.milliongirlsmoonshot.org
- IF/THEN Collection: www.ifthenshecan.org/ and https://www.ifthencollection.org
- STEM Journeys Activity: https://ifthen.widen.net/s/ml6cpx7sj
- State of Girls and Women in STEM: https://ngcproject.org/resources/state-girls-and-women-stem
- SpectrUM Discovery: www.umt.edu/spectrum/
- Career Girls: www.careergirls.org
- SciGirls Videos: pbskids.org/scigirls/videos
- IF/THEN Collection MGM Portal: www.ifthencollection.org/MGM
- Engineer Girl: www.engineergirl.org
- FabFems: https://ngcproject.org/about/initiatives/fabfems

Interested in becoming a STEM Role model? Contact the Montana Girls STEM Collaborative at taylor@montana.edu
As in years past, the goals of the summit work session were to bring all participants together to:

- document needs and challenges in the state
- facilitate connections and discussions on STEM priorities in Montana
- brainstorm solutions and explore ways to expand STEM experiences
- create a collaborative framework for more high-quality STEM learning
- connect STEM resources, industry, and mentors to STEM providers
- reflect on how to be more involved in state-level efforts

The work session began with opening remarks provided by Sen. Steve Daines and Sen. Jon Tester followed by the collaboration and networking of summit attendees.

“The value of an education in the sciences, technology, engineering and math is truly limitless.”

-U.S. Senator Daines

“It is critical that we are preparing young Montanans to succeed in a competitive job market. And there is no question that a high quality STEM education can set our kids apart.”

-U.S. Senator Tester
STEM Across America

Chris Neitzey of the National Afterschool Alliance shared an overview of national STEM followed by Montana-specific data.

**Afterschool programs offer an increasing variety of STEM learning activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>2014</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology and engineering</td>
<td>39%</td>
<td>39%</td>
</tr>
<tr>
<td>Science learning</td>
<td>46%</td>
<td>49%</td>
</tr>
<tr>
<td>Math activities</td>
<td>60%</td>
<td>62%</td>
</tr>
<tr>
<td>Computer science</td>
<td>n/a</td>
<td>41%</td>
</tr>
</tbody>
</table>

*Science learning, technology and engineering, and math activities have increased since 2014.

*Computer science not included in 2014 survey

**Big national takeaways**

1. Opportunities for STEM learning are on the rise in afterschool programs
2. Parents increasingly see afterschool as important for STEM learning
3. Programs are serving students underrepresented in STEM careers
4. STEM opportunities are not evenly distributed to all families
5. Fewer students benefit from STEM learning due to increased barriers to afterschool participation

**Montana-specific data**

In Montana, there are 10,538 children with STEM learning opportunities in afterschool programs, and in 2020, 65% of parents reported that their child’s afterschool program offered STEM learning opportunities (up from 62% in 2014).

Most parents (62%) believe that STEM and computer science learning opportunities are important when considering an afterschool program, and 76% of parents overall agree that afterschool programs help children gain interest and skills in STEM.

**However, several roadblocks exist for Montana children. The top three are:**

1. **cost**
2. **transportation**
3. **lack of available programs**

All have increased as barriers from 2014 to 2020.

Source: America After 3PM STEM Special Report, 2020
After reflecting upon issues of national and Montana importance, all attendees were asked to contribute ideas on five discussion topics. The following pages highlight each discussion topic:

**Barriers**
- What are the key challenges or barriers to providing or growing STEM in your community?

**Overlooked**
- Who are we overlooking?
- Who is NOT at the STEM table but should be?

**Workforce**
- What can we do to help students explore careers and workforce opportunists in Montana?

**Support**
- What is the #1 thing that would support YOU with the STEM work you do?

**Advance**
- What is the #1 thing that Montana needs to advance STEM Learning?

I overheard some important thoughts, and I noticed that everyone was engaged in different ways. I think it helped us all relate to one another, which is especially important as we work together to solve the issues we share.

-Summit Participant
Although the STEM Summit aims to focus on the future and not dwell on any negative current situations, organizers have found it helpful to ground the work in the barriers we face to advancing STEM learning in Montana. In both the work session and the exit survey, attendees were asked, “What are the Key Challenges and Barriers to STEM?” Responses are listed below.

<table>
<thead>
<tr>
<th>Challenges and Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other issues included:</strong></td>
</tr>
<tr>
<td>• competition for students’ time from sports, etc.</td>
</tr>
<tr>
<td>• lack of physical space or need for rent money</td>
</tr>
<tr>
<td>• lack of interest, confidence, or resilience in kids</td>
</tr>
<tr>
<td>• home life affects participation</td>
</tr>
<tr>
<td>• training for staff</td>
</tr>
<tr>
<td>• need for resources and curricula</td>
</tr>
</tbody>
</table>

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**Barriers listed in order:**

1. **Money:** funding or lack of resources such as materials or curriculum

2. **People:** lack of staff or volunteers; capacity; need for mentors and role models

3. **Transportation:** for students to attend STEM programming but also lack of transportation to take students to off-site field trips or opportunities

4. **Awareness:** outreach for programs; getting information to parents; misperceptions of STEM

5. **Collaboration:** need for better communication across the state

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“Transportation! We have the skills, the staff but we need to get kids to us.”
- Summit Participant
Work Session: Key Question #2
Who are we overlooking when it comes to STEM?

Who needs to be in the conversation:

- Rural populations
- Gender-expansive people
- People with disabilities
- Youth
- Low-income
- Workforce
- Role models
- Native American Communities
- Parents/ Caregivers
- Industry/ STEM Professionals
- Other fields (Humanities/ CTE)

Source: work session discussion responses from April 13, 2023

“Adults, especially those without advance education, need these STEM opportunities just as much as kids.
- Summit Participant

“Encourage STEM careers that do not need a four year degree.
- Summit Participant"
Work Session: Key Question #3
How can we help with STEM careers & pathways?

Build Pathways:
- Work with K-12 schools Career and Technical Education (CTE) with focus on career pathways.
- Create pathways between programs
- Introduce youth to different career pathways through tours, internships and people in the field

Focus activities and curricula on:
- Real-world, experiential driven activities that connect to problem solving
- Take STEM out of the classroom and into the field
- Curriculum that provides type of careers that use STEM (engineering, chemistry etc.)
- Emphasize how STEM interacts with other areas of interest (fashion, art, film, etc.)

Role models
- Have role models incorporated in other programs other than just formal education
- Have STEM professionals do hands-on meaningful activities with students and teachers
- Informational interviews with STEM professionals in middle school
- Link STEM professionals with school counselors who can pair them with students

Create industry partnerships:
- Partner with local businesses, hospitals, trades etc. for hands on activities
- work experiences and expectations
- Engage local high-tech companies to provide open house days to showcase what they do and how they do it
- Field trips to STEM employers
- Connect schools with non-profit STEM organizations
- Virtual reality demonstrations
- Mentoring networks
- Connect industry with educational leaders

At home
- More support at home
- Engage parents

Internships and job shadowing:
- Site/industry tours
- Industry speaking with students
- A more formal relationship with STEM-based companies in MT for work study etc.
- Companies willing to have internships so young people can explore career options

Youth Voice
- Get them involved in what kinds of STEM learning and resources is of interest to them
- Follow their interests and help them make community connections
- Encourage their curiosity without labeling it as a career
- Phrase things differently. Not all kids know that their curiosity is worth cultivating
Work Session: Key Question # 4

What is the #1 thing that would support YOU?

Montana STEM programs and providers need:

- Collaboration (30%)
  - Funded opportunities to share time and knowledge
  - Partnerships between in-school and out-of-school
  - Collaboration with colleges and educators

- Funding (22%)
  - Livable wages
  - Access to information on what grant funding is available for STEM programming

- Volunteers, role models, mentors (18%)
  - Subject matter experts

- Visibility (18%)
  - Support in the community or school district

- Staffing (12%)
  - Living wages
  - Professional development and continuing education

Source: workshop discussion responses from April 13, 2023

Share additional STEM needs by contacting heather@mtafterschoolalliance.org
Work Session: Key Question #5
What needs to happen to advance STEM in Montana?

Other needs included:

- encourage STEM careers that don’t need a University degree
- stop anti-science legislation
- concerns for four day school weeks
- more media involvement is needed to get ourselves and opportunities for students out there
- a clearinghouse site that lists resources available in the state that can be accessed and brought in to programs

Source: work session discussion responses from April 13, 2023

The energy in this room needs to be shared with underserved schools
-Summit Participant
This year the Montana STEM Summit returned to an in-person format and included an open house that featured over 20 different programs from across the state. As students, parents, providers, and community members mingled with programs and explored the activities they offered, programs also connected with each other and learned of ways they could collaborate to amplify their offerings.

Kids, families, and community members could be seen playing with a variety of robots, holding pieces of the moon in their hands, or learning to change car oil via a VR headset.

“I enjoyed being able to connect with people representing different groups across Montana.”

- Summit Participant
STEM Open House Programs

- Boys & Girls Club of Billings – Virtual reality demonstration
- Boys and Girls Club of Missoula - Teen Club
- Code Girls United
- Confederated Salish & Kootenai Tribes Maker Truck
- ExploraitonWorks!
- Fish, Wildlife, Parks - Montana WILD
- Imagination Destination
- Lewis & Clark Mobile Library
- MAPS Media Institute
- Montana Destination Imagination
- Montana Girls STEM Collaborative
- Montana Learning Center
- Montana Natural History Center
- Montana PBS
- Montana Robotics Alliance
- Montana Science Center
- MSU Science Math Resource Center
- NSF EPScoR CREWS project
- Snapology
- Sphero, Inc.
- Starbase 2.0
- UM spectrUM Discovery Area
- Waterford.org

To find more STEM programs check out the Montana STEAM Resource Database at:
mtafterschoolalliance.org/steam-resource-database
The evening concluded in celebration with a student showcase highlighting the voices of Montana students who shared their stories of STEM learning and how it has impacted their lives. From a high school senior who received a scholarship to continue her passion for STEM in college to an elementary schooler showing a live demonstration of his favorite science experiment, the student showcase made it clear that opportunities to engage with STEM are helping Montana’s youth to find their confidence, their voices, and their passions. After a day of discussing the work still needed to grow and expand STEM learning opportunities, the student showcase left STEM Summit participants reinvigorated and reminded about the important reasons of why this work must be done.

“We are reimagining a future where any young girl can see a place for themselves in STEM.”

-Aika, Flight Crew ‘23 Million Girls Moonshot
STEM Summit Student Showcase

- Millions Girls Moonshot, Montana’s first Flight Crew Member
- Arrow Creek Elementary, 1st & 2nd Grade (video)
- Helena School Age Child Care (SACC), Science Experiment
- Boys & Girls Club of Missoula, Teen Club (video)
- Montana Destination Imagination, St. Andrew School
- iGraduate STEM Career Academy, Corvallis
- Code Girls United, App Development (video)
- MAPS Media Institute, Statewide Media Arts
- Montana Learning Center, Curiosity Through Camp
- Boys & Girls Club of Flathead Reservation and Lake County, NASA in Afterschool
- Boys & Girls Club of Billings, Career Exploration (video)
- Montana Robotics Alliance, FIRST Montana
- Student music: Ukulele Covers
Key Takeaways
Montana STEM Summit
Growing STEM Learning Across the Big Sky

STEM Summits past and present

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Summary</th>
<th>Priorities Highlighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>Bozeman, MT</td>
<td>Featured panels from students, out-of-school time providers, K-12 educators and businesses.</td>
<td>• Creating a centralized effort for networking and resources • Building a bridge between STEM education and workforce • Increasing access affordability of programs • Transform STEM into STEAM (art) • Focus on K-12 curriculum</td>
</tr>
<tr>
<td>2019</td>
<td>Bozeman, MT</td>
<td>Featured discussion groups on education and industry, K-12 science standards, integration of the Arts, and building statewide STEM efforts.</td>
<td>• Communication, collaboration, connections • Connections between industry and education • Repository, clearinghouse, database</td>
</tr>
<tr>
<td>2022</td>
<td>Virtual</td>
<td>Featured a youth panel, interactive breakout sessions, action items and planning.</td>
<td>• Increasing funding to the programs that are available • Making more connections to share resources, materials, and ideas. • Networking to donors and getting grants for more funding</td>
</tr>
<tr>
<td>2023</td>
<td>Helena, MT</td>
<td>Featured a provider workshop, work session, open house, and showcase.</td>
<td>• Increase awareness of STEM and build community/industry engagement • Seek funding opportunities and livable wages • Developing a STEM task force • Work towards statewide legislation and advocacy for STEM</td>
</tr>
</tbody>
</table>

92% of surveyed STEM Summit participants met someone or an organization they might collaborate with.
-post-workshop survey, 2023
Why STEM?

The Montana Department of Labor & Industry highlights the importance of STEM by stating, "The STEM field is one of the most rapidly growing, highest paying, and most innovative areas of the economy. Jobs in STEM will be vital to Montana’s economic growth." – Montana Employment Projections 2021-2031

The number of STEM jobs is projected to grow by **10.8%** between 2022–32.

Source: Employment in STEM occupations, Bureau of Labor Statistics, 2023

The U.S. is at risk of surrendering its global leadership in technological innovation.

Source: STEM Education for the Future - Visioning Report, NSF, 2020

Opportunities for STEM learning are on the rise in afterschool programs but roadblocks still exist:

- All have increased as barriers

Source: America After 3PM STEM Special Report, 2020

In Montana, **65%** of students are below proficient in Math, and **64%** are below proficiency in Science.

Source: 2021-2022 State Report Card, Montana Office of Public Instruction

In Montana, 65% of students are below proficient in Math, and 64% are below proficiency in Science.

Source: 2021-2022 State Report Card, Montana Office of Public Instruction

Rep. Mike Yakawich- House District 51
Bethany Wieferich, Montana Afterschool Alliance
Deanna Mydland, Montana PBS
References:
Afterschool Alliance. (2020). Montana after 3pm: Special Report STEM.


Keep connected:

• Sign-up for the Montana STEM Summit email list at: mtafterschoolalliance.org/stem-projects

• Receive a monthly e-newsletter with grant opportunities, free STEM resources and other resources from the Science Math Resource Center MSU. Subscribe at http://bit.ly/smrc-news


• Receive updates on out-of-school time opportunities for professional development, resources, and more at mtafterschoolalliance.org

Make more events like this possible by donating at:
mtafterschoolalliance.org/donate-index-impact
Thank you for interest in STEM learning in Montana