

Reigniting Science: Finding and Collaborating with STEM experts



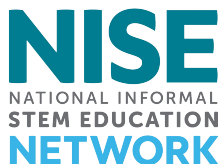
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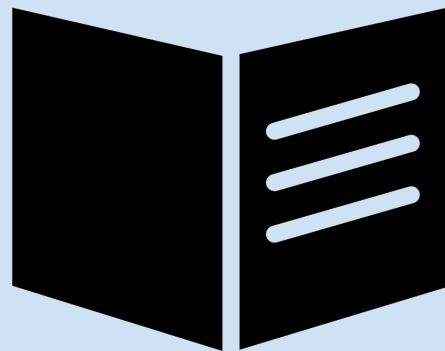
ASTC Conference - October 6, 2021

New Working with STEM Experts Guide

**Available for free download
in late October 2021**

<https://www.nisenet.org/working-with-experts>

**Working with STEM Experts:
A Guide for Educators in
Museums and other Informal
Learning Settings**



Why Bring STEM Experts and the Public Together?

Why Bring STEM Experts and the Public Together?

Many reasons for having STEM experts directly engage the public.

- **Content knowledge** about a specific topic
- Experts can offer **much more beyond facts and information.**



Why Bring STEM Experts and the Public Together?

TOP 10

10 Potential Impacts of Experts Engaging the Public

- 1 Sharing a Passion for Science
- 2 Providing for Mutual Learning
- 3 Understanding that Science is a Human Endeavor
- 4 Increasing the STEM Workforce and Creating Career Pathways
- 5 Greater Representation of Women and Minorities in STEM Careers
- 6 Changing the Face of STEM – Picture a Scientist, Who Do You See?
- 7 STEM Identity and Providing Role Models and Mentors
- 8 STEM Literacy and Creating Lifelong Learners
- 9 More Trust in Science
- 10 Creating Opportunities for Participatory Democracy

Why Bring STEM Experts and the Public Together?

1

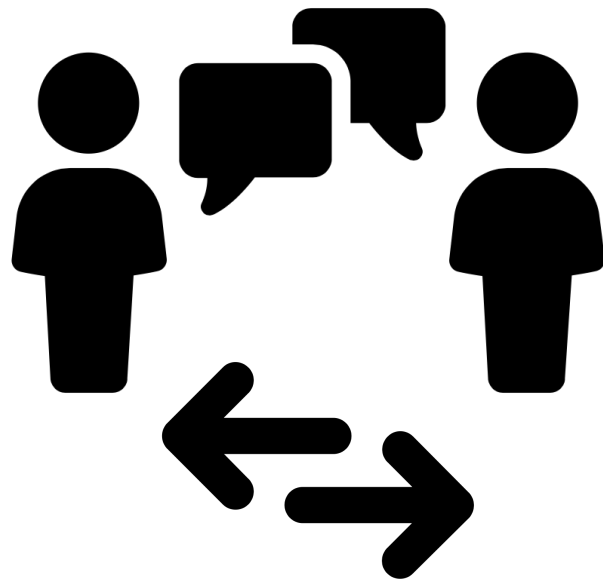
**Sharing a Passion for
Science**



Why Bring STEM Experts and the Public Together?

2

**Providing for
Mutual Learning**



Why Bring STEM Experts and the Public Together?

3

**Understanding that Science
is a Human Endeavor**



Why Bring STEM Experts and the Public Together?

4

**Increasing the
STEM Workforce and
Career Pathways**



Why Bring STEM Experts and the Public Together?

5

**Greater Representation of
Women and Minorities in
STEM Careers**



Why Bring STEM Experts and the Public Together?

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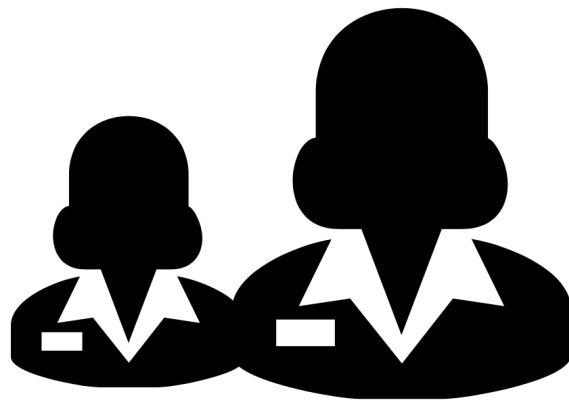
**Changing the Face of STEM –
When You Picture a Scientist,
Who Do You See?**



Why Bring STEM Experts and the Public Together?

7

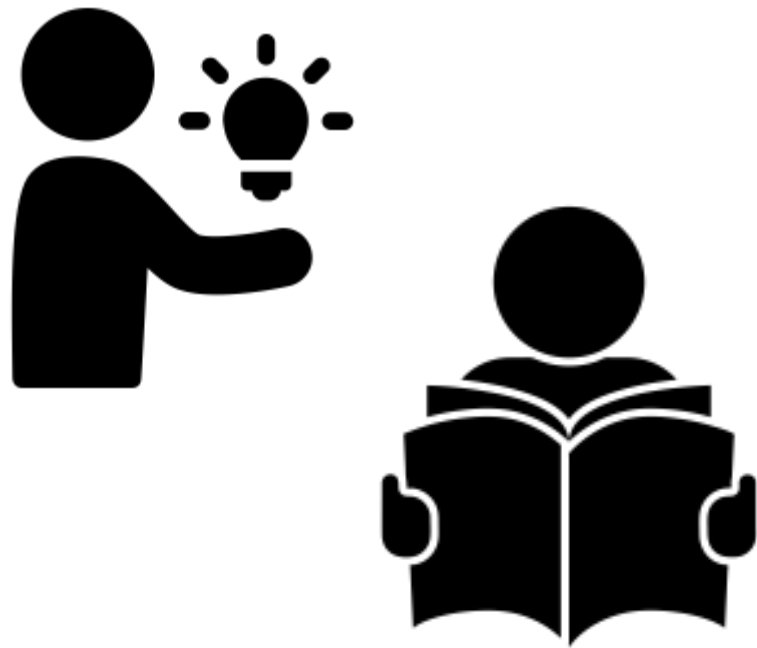
**STEM Identity
and Providing
Role Models and Mentors**



Why Bring STEM Experts and the Public Together?

8

**STEM Literacy
and
Lifelong Learning**



Why Bring STEM Experts and the Public Together?

9

More Trust in Science



Why Bring STEM Experts and the Public Together?

10

**Creating Opportunities
for Participatory
Democracy**



Understanding Experts' Motivations

Altruistic

- Give back
- Inspire
- Create a more inclusive welcoming space



Personal & Intrinsic

- Joy from interactions
- Passion to share
- Connect, feel part of community

Workplace & Professional

- Requirements
- Encouragement from professional society
- Broader impacts incentives

Professional Learning

- Be more relevant
- Get feedback from public
- Attract public participants



Understanding your Institution's Motivations

Organizational

Fulfill mission and goals

Authenticity

Expert knowledge and perspectives

Staff & volunteer professional development



Community

Offer relevant STEM content

Be seen as a valuable part of the community

Be seen as a place for science and/or a convener for science policy topics

Strengthen relationships with local experts and institutions



Ways to work with STEM Experts

Formats for Public Engagement

Hands-On Activities



Guest Lectures, Talks, and Presentations



Formats for Public Engagement

Science Cafés



Forums



Formats for Public Engagement

Special Events



Science Festivals



Formats for Public Engagement

Virtual Formats



More Ways to work with STEM Experts

- Mentoring
- Joint Collaborative Projects
- Professional Development for Staff and Volunteers
- Ongoing Advisory Roles
- Liaison Roles



More Ways to work with STEM Experts

Including Experts in the Development Process

- Brainstorming
- Helping to create content
- Participating in iterative prototyping
- Technical content review



More Resources

Annotated list of resources:

- Science communication
- Broader Impacts
- Broadening Participation

Annotated List of Resources

Science Communication

Science communication (SciComm) is the practice of information, educating, and raising awareness about science with the public.

AAAS Communicating Science

AAAS Center for Public Engagement with Science & Technology offers workshops and seminars for scientists and engineers who wish to develop their public engagement and science communication skills, enabling them to establish meaningful dialogue with diverse audiences. <https://www.aaas.org/programs/communicating-science>

Alan Alda Center for Communicating Science

Alda Center programs empower researchers to build an authentic rapport that can help others appreciate the wonder and value of science. Resources include workshops and training. <https://aldacenter.org>

American Society for Biochemistry and Molecular Biology (ASBMB)

ASBMB offers an eight-week online "Art of Science Communication" course open to all scientists. <https://www.asbmb.org/career-resources/communication-course>

Portal to the Public

Portal to the Public Network (PoPNet) helps informal learning organizations utilize and train scientists and engineers to have meaningful conversations with publics around local STEM

issues. The Portal to the Public Implementation Manual and Catalog of Professional Development Elements is a comprehensive, practical resource for organizations planning to connect scientists and public audiences through conversations and activities. <https://popnet.institutelearninginnovation.org>

Science Public Engagement Partnership (SciPEP)

Sponsored by the U.S. Department of Energy's Office of Science and The Kavli Foundation, Science Public Engagement Partnership (SciPEP) seeks to ensure scientists are supported to be effective communicators and, if appropriate, active in engaging the public. SciPEP recognizes the role communication and engagement professionals play in supporting science and scientists' engagement efforts. <https://scipep.org>

Science Festival Alliance

Science Festival Alliance offers resources and tools to the professional community to support and enhance science and technology festivals. <https://sciencefestivals.org>

SENCER Science Education for New Civic Engagements and Responsibilities

SENCER courses and programs strengthen student learning and interest in science, technology, engineering, and mathematics by connecting course topics to issues of critical local, national, and global importance. Students and faculty report that the SENCER approach makes science more real, accessible, and civically important. <http://sencer.net>

How to Prepare Experts

How to Prepare Experts to Engage Public Audiences

Strategies for Program Design and Implementation

Relevant, effective, and inclusive

- Include societal and ethical implications of science and technology
- Encourage Community Collaboration
- Employ Diversity, Equity, Accessibility, and Inclusion (DEAI) practices
- Foster conversations conversations



How to Prepare Experts to Engage Public Audiences

★ Start with
existing hands-on
activities and
training materials

*Be prepared!
Many experts will want to create
experience from scratch.*



How to Prepare Experts for a Public Event

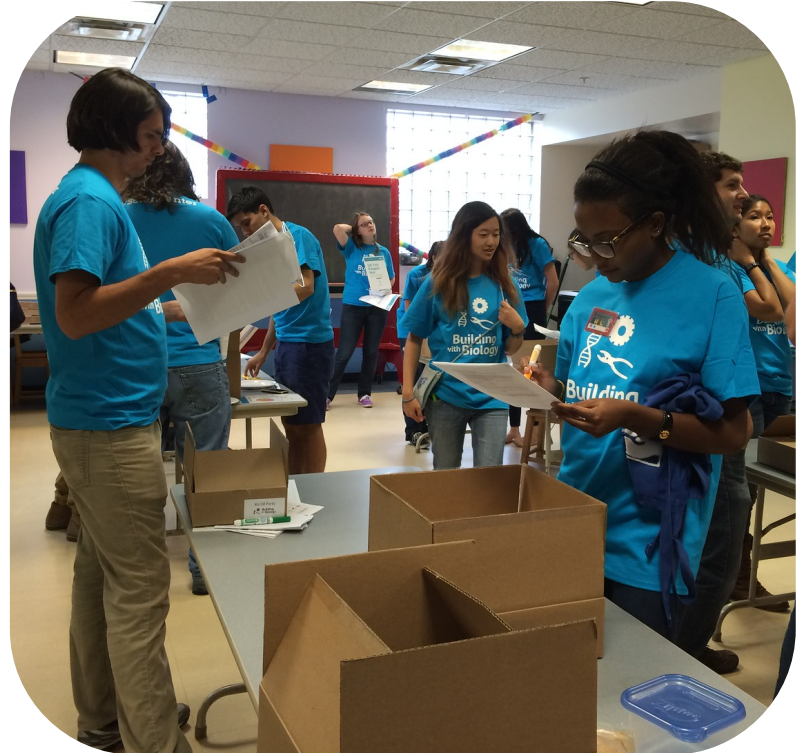
- **Before the event**
 - Logistics, expectations,
 - Training and background materials
- **Day of the Event**
 - Orientation: goals, audience, expectations, facility, logistics
 - Beverages & snacks
 - Practice activities
- **After the event**
 - Follow up, thank, ask for their feedback



How to Prepare Experts for a Public Event

At a Practice Training Session

- Model an existing activity (in-person or with a training video)
- Practice the hands-on activity
- Give constructive feedback and ask questions



How to Prepare Experts to Engage Public Audiences

Tips Sheets

- Planning Guest Presentations
- Guest Speakers
- Leading Hands-On Activities
- And more!

<https://www.nisenet.org/catalog/tips-sheets-engaging-public-audiences>

Tips for Guest Speakers

Public audiences find emerging science and technology interesting. Keep in mind, however, that only a small percentage of the population knows much about this topic. Here are a few pointers for communicating with the public about science, engineering, and technology.

Know your audience

The more you know about your audience, the better you can adapt your presentation to their interests. Keep in mind the diversity of your audience's experience and backgrounds. Many visitors attend in family groups, which can include a wide range of ages and abilities. Also keep in mind that there are many "publics" rather than one monolithic general public.

Keep the message simple

Come up with one "big idea" you want the audience to take away from the experience, and make sure your presentation reiterates and reinforces this idea in different ways. Define your terms, avoiding jargon and acronyms as much as possible. Check in with your audience periodically to see if they're following you.

Use familiar analogies

Use comparisons to everyday experiences. Explain how the topic relates to something that's been in the news or in popular culture.

Use relative size and scale

Focus on relative size and scale rather than exact measurements. Consider using parts of the human body to explain relative scale.

Use visuals

Simple images and models will reinforce and clarify your message.

Use several modes of presentation

In addition to talking, you can include demonstrations, videos, and pictures. You can involve the audience by providing objects to pass around, asking questions, doing brief experiments, providing hands-on activities, and playing games.

Involve the audience in the processes of science

Encourage your audience to observe, predict, and explore by asking them questions: "What do you think will happen when . . . ?" "Were you surprised?" "Why do you think that happened?" "What if you tried . . . ?" "Can you think of any practical uses for this?" "What about unintended consequences?"

Be friendly and approachable

Remember to make eye contact, smile, and let the audience know who you are. If you're a scientist, consider including personal stories about your work life and your career decisions.

Be prepared to answer common questions

But don't be afraid to let your audience know if you don't know the answer to their question.

Share ways to learn more

Remember that your presentation is only one exposure that people will have to this topic—it's not the end of their learning. Help the audience connect to other opportunities for more exploration.

How to Find Experts

Where to Find STEM Experts

STEM Professional Societies

Examples with local databases:

- American Chemical Society
- Society for Neuroscience

Diversity-Serving Professional Societies

Examples with local chapters:

- Society of Women Engineers (SWE)
- National Society of Black Engineers



Where to Find STEM Experts

Colleges and Universities

★ The number #1 source for finding experts in your community.

Consider both 4 and 2-year institutions. Many students will have requirements to fulfill from classes or larger outreach program.



Where to Find STEM Experts

Student Groups

★ Many students are closer in age to children and youth who may be participating in your programs.

These experts may be more approachable for your family and general audiences.



Strategies for Finding STEM Experts

Local, State, and Federal Agencies

- NASA
- NOAA National Weather Service meteorologists
- USDA Natural Resources Conservation Service

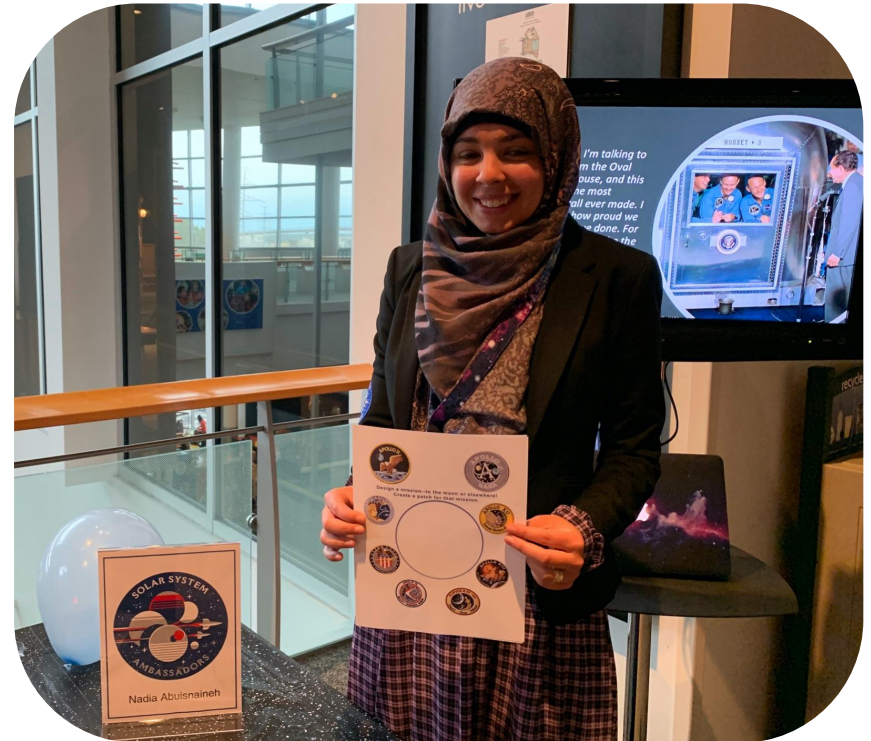
Local Industry Professionals



Strategies for Finding STEM Experts

Affinity Groups

- The Solar System Ambassadors Program
- The Night Sky Network
- National Audubon Society chapters



Strategies for Finding STEM Experts

Indigenous Ways of Knowing

- Connect with Indigenous people in your area.
- Connect with the local Indian Health Service office, especially for health-related STEM topics.



Strategies for Finding STEM Experts

Arts and Cultural Connections



Additional Volunteers for Events



Contacting Experts

Steps for Inviting Experts to Participate

- Start early!
- Cast a wide net
- Craft a clear written email message with your request
- Create a simple recruiting flyer
- Make personal phone calls
- Stay in contact
- Send preparation materials in advance



★ **Be upfront and clear about their commitment.**

Finding STEM Experts by Subject Area

- Chemistry and Physics
- Space and Earth Science
- Environmental Sciences
- Agriculture
- Biology and Biomedical Sciences
- Neuroscience
- Engineering, Technology
- Computer Science, Math, Statistics
- Incorporating STEM into Arts and Cultural Celebrations

Chemistry and Physics

Colleges and Universities

You may find experts at a local college in chemistry, chemical engineering, and physics programs. Many chemistry and physics departments have traveling demo shows and public outreach programs. Many chemistry departments are already active in annual events such as National Chemistry Week and Chemists Celebrate Earth Week.

Student Groups

High school chemistry and physics teachers may be willing to serve as experts; they also may be able to suggest high school students who could volunteer at your event to facilitate hands-on activities.

- **High School ChemClubs**

There are over 600 high school ChemClubs; many of these clubs do outreach with younger students. Find out whether a high school near you has an active ACS ChemClub at:

<https://www.acs.org/content/acs/en/education/students/highschool/chemistryclubs/directory.html>

- **American Chemical Society (ACS) Student Chapters**

ACS has student chapters located on many college campuses around the world. Once you find the name of a student chapter, please contact undergrad@acs.org to reach out to their faculty advisor. To find the closest chapter to you, please visit: <https://www.acs.org/content/acs/en/education/students/college/studentaffiliates/find-a-chapter.html>

- **Society of Physics Students (SPS)**

The SPS has more than 843 chapters at colleges and universities across the country: <https://www.spsnational.org/about/governance/chapters>

- **SPIE Student Chapters**

SPIE, the international society for optics and photonics, has student chapters and clubs at universities around the world. SPIE has educational outreach resources on light, lasers, and optics as well as the International Day of Light:

<https://spie.org/membership/student-services/student-chapters>
<https://spie.org/education/education-outreach-resources>



Professional Societies

American Chemical Society (ACS)

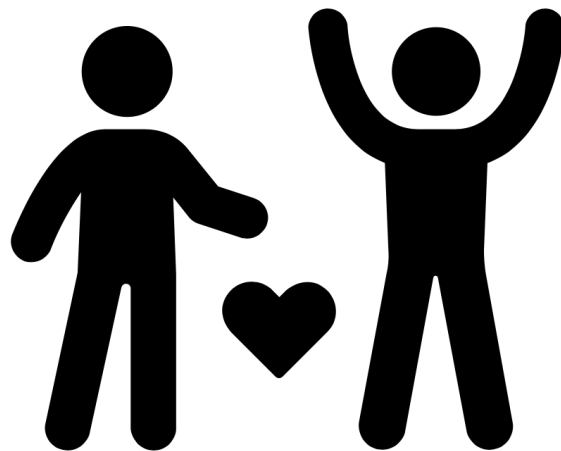
- **ACS has 185 local sections** organized geographically throughout the U.S. To find contact information for your state please visit: https://lslookup.acs.org/lslookup/local_search
- **National Chemistry Week coordinators** (annual event mid-October): ACS maintains a list of National Chemistry Week coordinators that is searchable by state and zip code: <https://www.ncwlookup.acs.org/ncwlookup>
- **Chemists Celebrate Earth Week coordinators** (annual event mid-April): ACS also maintains a list of Chemists Celebrate Earth Week coordinators that is searchable by state and zip code: <https://www.ccedlookup.acs.org>
- **American Chemical Society (ACS) Experts:** The ACS Experts are chemists and chemical engineers who provide reliable, in-depth analysis and respond to inquiries on a wide range of topics in the news and of interest to the public and policymakers. <https://www.acs.org/content/acs/en/pressroom/experts.html>

Final Thoughts

Maintaining and Deepening Relationships

Maintain contact and show your appreciation

- Send a follow-up thank-you note
- Share attendance statistics and photos
- Get to know them
- Offer them a free pass
- Subscribe them to your newsletter
- Periodically reach out and touch base
- Maintain their contact information
- Invite them to a volunteer appreciation event
- Publicly thank volunteer experts



Reflecting on your experiences

Work with experts with a lens
toward improving your relationship

- What went well and what could be improved
- Follow-up with experts
- Make time to talk with experts

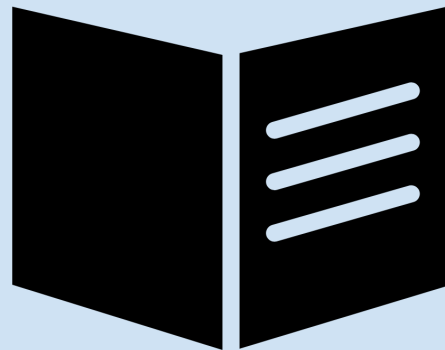


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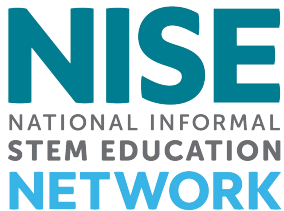
Stay in Touch



OCTOBER 5-7, 2021
[astc.org/2021](https://www.astc.org/2021)

NISE Network at the ASTC Conference

<https://www.nisenet.org/astc2021>



Getting Started with the Network

<https://www.nisenet.org/gettingstarted>

Thank You



Thank You



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Questions and Discussion



Questions and Discussion

- What aspects of **working with experts** do you need help with?
- What **kind of experts** are you looking for?
- **Share advice** for maintaining and deepening connections.
- Share a strategy or technique **you have found successful**.