

# Libraries as Anchors in Rural STEM Hubs

## Overview

The five-year STEM Guides project addresses two critical needs: 1) the need for a coherent informal STEM infrastructure rather than a set of fragments; and 2) the need for creative models to support STEM learning in underserved rural communities that lack traditional infrastructure such as science centers. The project creates and studies an innovative model of capacity-building: small networks of STEM Guides. Guides are tasked with identifying a range of existing STEM resources available in their regions, and connecting STEM-interested youth with them in creative ways. Resources for STEM Guides also include out-of-school STEM projects funded by NSF such as Teen Science Café, Math in the Garden, and Engineering Is Everywhere.

The project implements and studies STEM Guide networks in a staggered series of five low-income rural regions, providing startup resources and professional development, and will sustain the work through local funding after three years. The project aims to increase the frequency and depth of out-of-school STEM experiences for 3,000 youth aged 10-18 at a relatively low cost, creating a model for STEM capacity-building, especially in rural areas.

## How Libraries Play a Key Role

- Libraries are key nodes in a localized STEM learning ecosystem: places of social meeting, places where free high-speed Internet access is available, STEM resource repositories. They are staffed by community-embedded educators.
- Libraries are trusted locations within physical reach of many community members.
- By partnering with libraries and library-supporting organizations, we leverage existing resources and deepen youth STEM experiences.

## Details of Our Model: What We Do

- Collaborate with Cornerstones of Science, a Maine-based organization that distributes STEM tools (e.g., telescopes, 3-D printers) to libraries for lending.
- Provide complementary links to STEM programs, pedagogies, and activities.
- Work with library staff to identify synergies with their current themes, topics, and plans.
- Host proven programs (e.g., Teen Science Café, Engineering Is Everywhere) and use them to make more connections to community STEM resources.
- Develop and maintain a STEM Resource Bank that is being disseminated through the Maine State Library ([www.STEMinME.org](http://www.STEMinME.org)).

## Impacts

- Library-based STEM programs, including the loans of STEM tools, have reached dozens of youth, of whom approximately 70% have returned for a follow-up STEM experience.
- Library staff have learned to use and manage scientific tools, and some have taken initiative in expanding lending programs to include binoculars.
- Detailed interviews with participants and stakeholders are underway.

## Who's Involved?

### Funder

The STEM Guides project is funded by the National Science Foundation through its Advancing Informal STEM Learning (AISL) program (NSF Grant #1322827).



### Lead Organization



Dr. Jan Mokros, PI, and Dr. Sue Allen, co-PI, lead the MMSA team, which includes Dr. Tom Keller, Jo Gates, Alyson Saunders, Lynn Farrin, Veronica Young, Becky Carino, Alicia Millette, Dan Michael, and Janna Civittolo.

### Evaluation



EDC (Dr. Leslie Goodyear) is the summative evaluator for the project.

### Program Partners



Cornerstones of Science (Cindy Randall) connects the project with libraries.



4-H Cooperative Extension (Dr. Lisa Phelps) provides people and material resources, such as 4-H staff, kits, and templates for clubs.



Maine Maritime Academy (Dr. Paul Wlodkowski) connects the project with the leading public STEM university in Maine.

## The Audiences

We are working with 10-18 year old youth and their families in rural communities in areas where the median household income is below Maine's median income of \$48,000.

**Rural youth make up 25% of the US population and are an underserved and often overlooked group.** Rural youth are only half as likely to participate in STEM programs outside of school as their urban counterparts, even when socio-economic factors are controlled. Only about 14% of rural middle and 11% of rural high school students have participated in even a single STEM program outside of school in the last six months.

Rural audiences have significant assets, including:

- Close-knit communities where adults, including STEM professionals, are known
- Many natural resources and outdoor opportunities
- Increasingly sophisticated technology associated with familiar activities such as fishing, farming, and forestry
- STEM grassroots organizations, including libraries
- Access to laptops (through a statewide program) and to burgeoning virtual STEM resources (e.g., SciStarter, How to Smile)

We are currently working in three rural STEM Hubs: the Dexter-Dover-Guilford region, the Blue Hill Peninsula, and central Lincoln County. We are just starting a fourth rural STEM Hub in the Machias region of Downeast Maine.

Each Hub is served by a team of STEM Guides.

## Scale

The project currently involves six rural libraries and will roughly double in size over the next 3 years.



Libraries participated in Hour of Code and Scratch Day computer programming events.



An amateur astronomer talks with a group of over 70 about the night sky and what they will see as the sun goes down over Sebec Lake. A public library, a state park, and the project-sponsored Teen Science Café all collaborated on this event. The goal was to encourage more library patrons to borrow the new telescope provided through Cornerstones of Science.



Libraries provide the highest-speed Internet publicly available in rural areas. A local youth leadership team is using this library to meet virtually with a presenter who will be speaking at their next event.



Youth discuss aquaculture and fish disease with an expert at a Teen Science Café held in the meeting space of the Thompson Free Library in Dover-Foxcroft.



Dr. Jan Mokros | [jmokros@mmsa.org](mailto:jmokros@mmsa.org)  
[www.mmsa.org](http://www.mmsa.org) | 207-626-3230 x.121