

STEM READY AMERICA

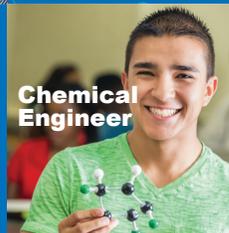
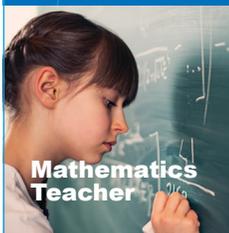
Inspiring and Preparing
Students for Success
With Afterschool and
Summer Learning

This collection of articles is excerpted from a new resource, *STEM Ready America: Inspiring and Preparing Students for Success with Afterschool and Summer Learning*. In this volume, Executive Editor Ron Ottinger and Contributing Editors Cary Sneider and Ian Hickox have collected expert perspectives on the state of the field of STEM learning—especially in afterschool and summer learning opportunities.

Collectively, these writings from more than 40 thought leaders highlight how young people are developing STEM knowledge and skills that will prepare them to be successful in school today and the workforce tomorrow.

The articles provide persuasive evidence and real-world examples to inform effective partnerships, policies, and actions to bring quality STEM learning to children and youth across the nation. This volume is focused in three key sections:

- ▶ **The Evidence for STEM**
- ▶ **Partnerships for STEM Learning**
- ▶ **Ensuring Access to Quality STEM Learning**



Developed by STEM Next with support from the Charles Stewart Mott Foundation, *STEM Ready America* builds on the award-winning 2013 publication *Expanding Minds and Opportunities: Leveraging the Power of Afterschool and Summer Learning for Student Success* edited by Terry K. Peterson, Ph.D., which made the definitive case for the power and effectiveness of afterschool programs and summer learning.

For more information about STEM Ready America and to download articles visit: www.stemreadyamerica.org.



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www.STEMReadyAmerica.org

The Nebraska Way: Building STEM Learning Systems from the Bottom Up

Jeff Cole, Network Lead, Beyond School Bells

Julie Sigmon, Omaha STEM Ecosystem Director

Anna Wishart, Nebraska State Senator, District 27

Ronald Ottinger, Executive Editor

STEM Next | Charles Stewart Mott Foundation



Education in Nebraska is, first and foremost, a community-based endeavor. As befits our largely rural Great Plains state, this emphasis on local control—as opposed to centralized, top-down management—defines our approach to building the systems of support that help to ensure that young people in urban and rural Nebraska alike have access to the learning opportunities they need to thrive in the 21st century. Within this context, education in the STEM fields (science, technology, engineering, and math) has emerged as a key area of focus and investment in communities across the state.

In particular, expanded learning opportunities (ELO)—which, in Nebraska, means high-quality, school-based, and community-powered afterschool and summer programs—have been essential to advancing STEM learning statewide. This article tells the story of how the ELO sector in Nebraska has become a key platform for increasing the number and quality of STEM learning opportunities in our state by cultivating local partnerships, coordinating systems-building efforts across the state, and broadly communicating the importance of STEM learning for improved educational and economic outcomes.

Initial STEM Systems Building in Nebraska

Communities across Nebraska, rural and urban, are faced with an array of challenges related to our state's lagging economy. Systemic budget constraints and the continued outmigration of our young people, especially those from rural communities, have given Nebraskans reason to consider what we need to do to support a diverse array of industries and businesses that will drive economic growth across the state. A constellation of education, industry, and community development advocates have come to realize that, for our economy to grow, it is paramount that we retain youth in our state and provide them with the educational opportunities, in STEM and other 21st-century workforce skills building, that they need for success.

Beyond School Bells (BSB), Nebraska's statewide afterschool network, has played a leading role in establishing ELO as a primary engine for expanding STEM learning in the state. In 2011, thanks to an initial two-year grant (which was later extended for an additional two years) from the Robert Noyce Foundation, BSB began to explore strategies for building statewide ELO STEM systems.

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Importantly, BSB's community-based systems-building work coincided with the Nebraska Department of Education's 21st Century Community Learning Centers program implementation of BLAST! (Building Lasting Afterschool STEM Teams), a NASA Summer of Innovation-supported STEM initiative that focused on building STEM partnerships with key statewide organizations, such as Nebraska Extension and the other University of Nebraska-based resources.

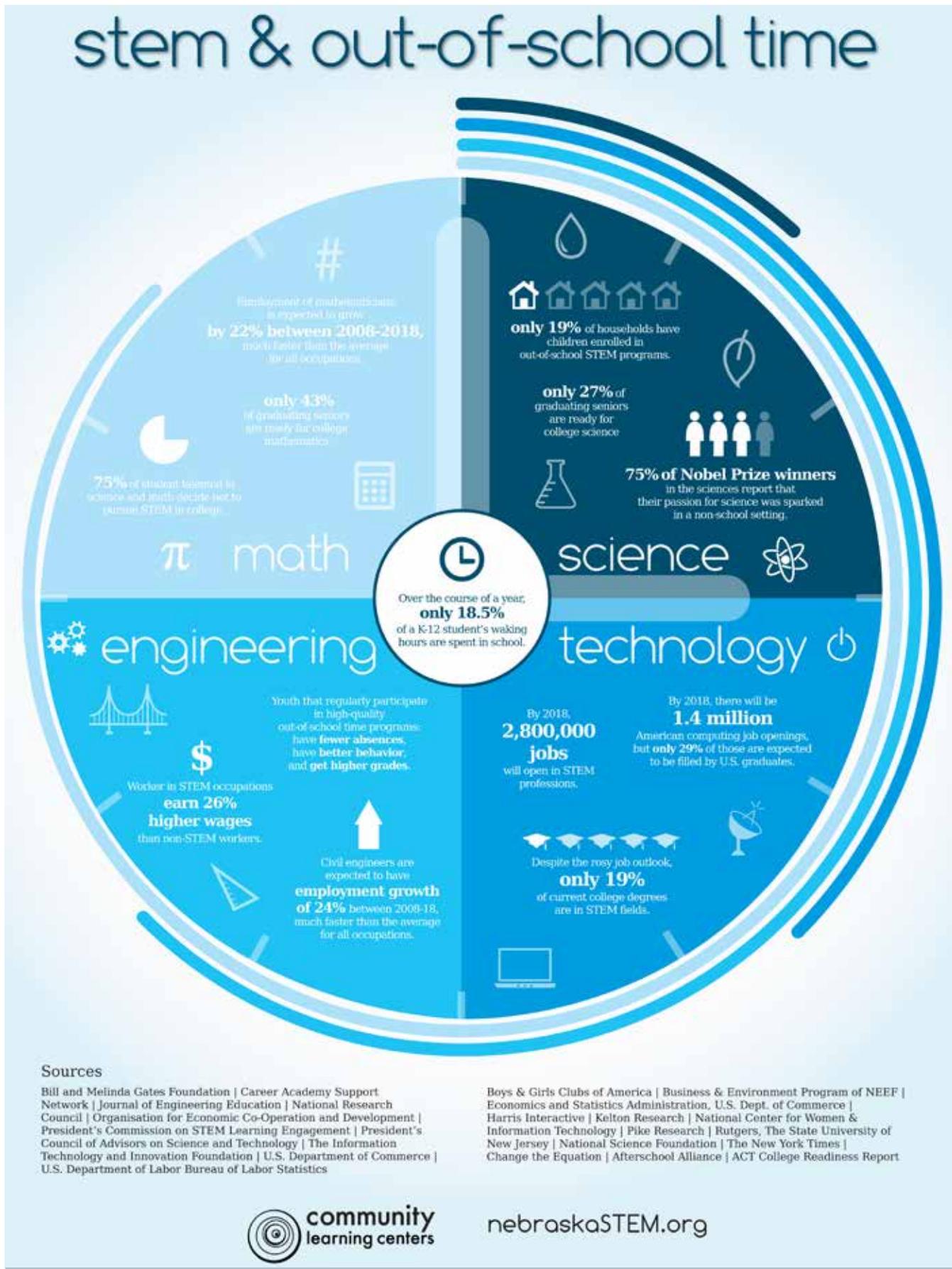
BSB's early systems-building work focused on identifying resources and partnership opportunities for local ELO systems to connect with state-level STEM organizations and resources. BSB also began supporting community-driven ELO STEM efforts intended to encourage collaboration among local ELO programs and STEM professionals and organizations. These efforts represented the first initiative in the state focused on making afterschool and summer learning a central component of [efforts to support STEM education statewide](#).

During this early phase, BSB focused intently on communicating the importance of ELO STEM in order to seed the conversation in communities across the state. BSB organized outreach events, such as ELO STEM Days at the State Capitol, STEM awareness events at the Nebraska State Fair, and an hour-long original program on ELO STEM on Nebraska Educational Television that was part of the State of Education in Nebraska series. BSB has also created numerous resources that make the case for ELO STEM. These outreach and communications activities helped raise the profile of ELO STEM with policymakers, funders, advocates, practitioners, and other key stakeholders. They also helped to build a strong foundation for later systems-building work.

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In addition to a focus on communications and STEM outreach, BSB also emphasized (and continues to emphasize) capacity building for community-based ELO programs. Because ELO staff are not always well prepared to facilitate STEM learning activities, BSB has partnered with NE Extension, a division of the University of Nebraska, to implement a statewide training program to introduce ELO staff to the Click2SciencePD platform, a unique on-line tool that provides ELO staff with the support they need to effectively implement high-quality STEM activities in their programs. BSB also facilitated professional development efforts to train program staff in the use of the Dimensions of Success (DoS) site observation tool—created by the Program in Education, Afterschool & Resiliency at Harvard University (The PEAR Institute)—to measure the quality of ELO STEM learning opportunities and identify areas for improvement.

Figure 1. Source: Beyond School Bells



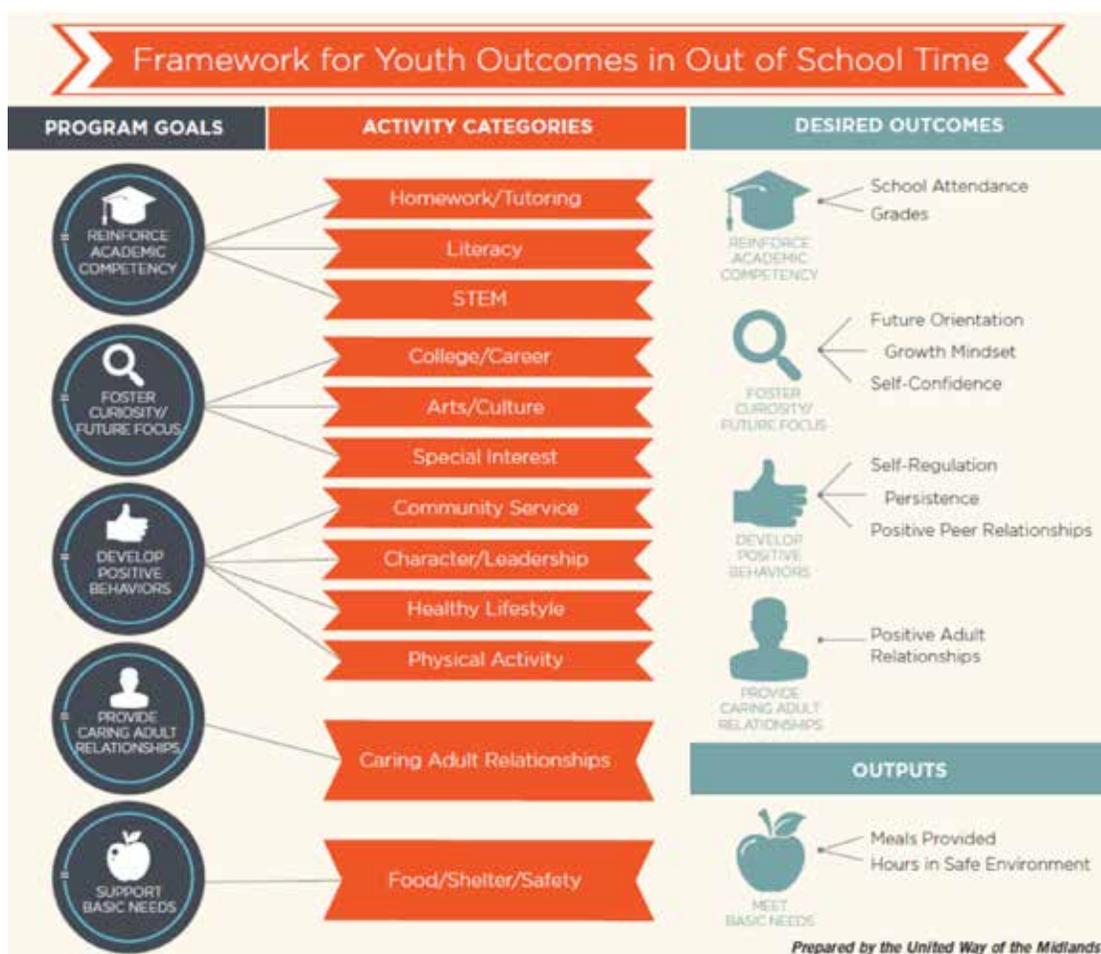
Leveraging Local Partnerships and Intermediaries to Build STEM Systems

Partnerships have played a critical role in the growth of ELO STEM in Nebraska, and this particularly evident in Nebraska’s largest city, Omaha. The city is home to well-established citywide ELO systems that have the capacity to provide leadership for the ELO sector statewide. BSB—in collaboration with Collective for Youth, Omaha’s ELO intermediary organization—took advantage of the infrastructure already in place in Omaha to expand on its initial systems-building work and develop and strengthen

partnerships committed to improving youth outcomes (see Figure 2), a process in which STEM learning has a prominent role.

One such partnership connected Collective for Youth with STEM 4U, an initiative out of the University of Nebraska-Omaha that recruits and trains college students to provide hands-on, engaging STEM learning experiences to youth in ELO programs across Omaha. In addition to facilitating and strengthening local partnerships, the collaboration between BSB and Collective for Youth helped to map available STEM resources in the community and promote ELO STEM program quality through a combination of professional development support and program evaluation. This support was especially important for ELO programs and staff in the process of implementing STEM programming for the first time.

Figure 2. Source: United Way of the Midlands



As the work of this collaboration has progressed, additional community-based partnerships have expanded access to high-quality STEM learning opportunities. In 2015, Omaha became one of the first Imagine Science communities. An ELO initiative that seeks to provide underserved youth with STEM programming at community-based sites, Imagine Science is facilitated through local-national partnerships among the four largest youth serving organizations: Boys & Girls Clubs of America, Girls Inc., the National 4-H Council, and the YMCA of the USA. In Omaha, these include the YMCA of Greater Omaha, Girls Inc. of Omaha, UNL Extension 4-H, and Boys & Girls Club of the Midlands.

The Power of STEM Partnerships

Research supports the collaborative approach BSB has adopted to strengthen STEM learning in Nebraska. Findings from SRI show that afterschool programs that partner with an outside organization are positively associated with more frequent science offerings, more use of inquiry practices that connect to youth's interests, and opportunities for youth choice and leadership.

Learn more at <https://www.sri.com/work/publications/asnrecommendations>

Additionally, cross-sector partnerships in Omaha have led to the creation of the Omaha STEM Ecosystem. This collaborative effort involves stakeholders from throughout the educational continuum, including local school districts, businesses, science advocacy groups, and ELO organizations. In particular, two local institutions—the University of Nebraska at Omaha and the Henry

Doorly Zoo and Aquarium—have led Ecosystem work to strengthen STEM-rich educational and career pathways. A member of the national STEM Learning Ecosystem Initiative, supported by the STEM Funders Network, the Omaha STEM Ecosystem initiative's objectives are to:

- ▶ **Build citywide collaborative capacity through consistent and diverse stakeholder engagement,**
- ▶ **Implement a shared framework that evaluates measureable effects of high-quality STEM programs,**
- ▶ **Provide professional development for STEM educators, and**
- ▶ **Implement a system that ensures students are engaged in high-quality STEM programs that build career-ready skills.**

Encouraged by its successes in Omaha, BSB expanded its systems-building work to strengthen ELO STEM in rural communities across Nebraska. In this effort, BSB has focused on sustainability, using targeted mini-grants for established ELO programs to develop and reinforce local STEM partnerships. This strategy has resulted in a host of innovative partnerships, including regional collaborations with the Nebraska Game and Parks Commission and local nature centers that focus on outdoor education. Additionally, the strategy has established partnerships between local ELO organizations and Nebraska Extension to expand gardening, robotics, and other programs.

As part of this engagement strategy, BSB is focused on cultivating private sector partners to support expanded STEM career exploration for students in rural communities. BSB is also working with several communities to field test a new Career Exploration curriculum that is based on Nebraska Career Education standards and adaptable to local needs and community-based opportunities.

Capacity building also plays a major role in BSB's rural ELO STEM systems-building efforts. In addition to professional development and program evaluation trainings—again through the use of Click2SciencePD and the DoS quality observation instrument—BSB is piloting a mobile makerspace—the TMC (Think Make Create) Lab—that provides rural ELO partners with fully-equipped maker trailers. These trailers not only facilitate STEM learning in a variety of community settings but also provide a platform for initiating partnerships that can sustain local programming.

Building on these efforts, BSB and a coalition of state organizations and local partners have established a goal of developing new ELO STEM learning opportunities as part of a broader collective impact model that links formal and informal learning environments to support student growth. Developing and sustaining the next generation of high-quality ELO STEM programs—and expanding access to ELO STEM in rural communities, which are often STEM and ELO “deserts”—represents the next challenge in Nebraska's systems-building work.

Nebraska policymakers are acutely aware of our changing economy, and they increasingly recognize that the capacity of ELO programs to enhance STEM education.

Developing Policies to Support STEM

Nebraska's strongly held commitment to local control manifests in the skepticism with which education stakeholders in our state often regard policy initiatives and mandates that emanate from Washington. The state was reluctant to accept No Child Left Behind and the accompanying system of standardized testing. The more recent Race to the Top initiative never gained traction as Nebraska communities remained committed to maintaining quality public school systems rather than join the booming charter movement. However, the state's inclination toward education policies that are community-based does not mean it does not embrace the value of state- and national-level resources. In fact, it is quite the opposite; our systems-building approach may start from the ground up, but it is predicated on the idea that locally driven initiatives can and should leverage the resources and advantages that broader systems can provide.

Nebraska policymakers are acutely aware of our changing economy, and they increasingly recognize that the capacity of ELO programs to enhance STEM education. As a result, they are committing greater support to nascent statewide STEM systems-building efforts. Expanding on a 2013 Nebraska Board of Education-approved policy statement supporting high-quality afterschool and summer learning experiences, Nebraska legislators recently passed legislation that, for the first time in our state's history, provides funding to support ELO innovations. Although this legislation is not exclusively focused on STEM, many of the ELO innovations that received support are STEM-oriented. Both the state Board of Education policy statement and this new legislation reflect a growing awareness in Nebraska of the importance of school-based and community-powered ELO activities. Moreover, they set the stage for future policies designed specifically to support out-of-school STEM.

As state policymakers continue to embrace the opportunities that ELO programs have to support the development of a more comprehensive education-to-workforce pipeline, current discussions center on opportunities to utilize ELO programs as platforms to expose youth to the career opportunities that are available in their communities and can be achieved through the following:

- ▶ **Public-private partnerships to leverage resources.** As ELO STEM policies are developed, they should build around strong philanthropic sector support and nonprofit organizations that want to support academic excellence, youth development, and economic vitality.
- ▶ **Dedicated state funding stream for ELO programs.** Dedicated funding is needed that aids in sustaining existing ELO programs; spawns new programs in ELO deserts; supports ELO innovations, including STEM initiatives; and that can be used to leverage private and community partnerships.

- ▶ **Active involvement of business and industry.** Nebraska policymakers recognize that ELO programs can provide an ideal platform to engage business and industry expertise in education, provide youth with opportunities to learn about careers available in their communities, and help students gain the 21st-century skills that are so important to workplace success. Future policies should take advantage of this platform and be structured in a way that provides flexibility to adapt to local conditions.

For ELO STEM to be successful and sustainable in Nebraska, programming should be based on local resources and strengths rather than relying on national models developed in other contexts. This is the Nebraska way—building systems of strong support for public schools, community-based ELO programs, and creating local STEM learning opportunities for a public that wants to contribute to the success of our young people.

Resources

1. Beyond School Bells—<http://beyondschoolbells.org>
2. Click2Science—<http://www.click2sciencepd.org>
3. Collective for Youth—<http://www.collectiveforyouth.org>
4. ELO STEM on Nebraska Educational Television—<http://netnebraska.org/basic-page/learning-services/out-school-time-and-stem>
5. Imagine Science—<http://imaginesci.org/omaha/>
6. STEM Ecosystems—<http://stemecosystems.org>
7. STEM Funders Network—<http://stemecosystems.org/about-the-stem-funders-network/>
8. 21st CCLC BLAST—<https://sites.google.com/a/education.ne.gov/nebraska-blast/home>

About the Authors



Jeff Cole has been the Network Lead for Beyond School Bells, Nebraska's statewide afterschool network and a public-private partnership at Nebraska Children and Families Foundation, for ten years. Jeff got his start in afterschool while teaching at NYC's High School for Environmental Studies. That led to an exclusive focus on developing the school's STEM-rich afterschool and summer programs, work that continued when he relocated to Lincoln. Jeff helped develop Lincoln's city-wide afterschool system, which has grown into a network of 27 schools implementing a full service community school strategy. Jeff returned to working at the intersection of afterschool and STEM through the first round of Noyce Foundation STEM systems building grants in 2012 and has successfully raised local funding to sustain and grow these efforts. Jeff has a Masters in economics and was a Fulbright researcher in Poland.



Julie Sigmon currently serves as the Director for the Omaha STEM Ecosystem, a recently formed organization that encompasses a rich array of STEM learning opportunities that ensure Omaha is meeting the future goals for STEM talent in the workforce. Sigmon has been involved in the education field for over 40 years, including previous experiences involved contract work around quality in STEM programs, especially Out of School Time programs in Omaha, as well as serving as the external evaluator for the NE STEM 4U program at University of NE Omaha.

Sigmon currently serves on the boards of Nebraska's Beyond School Bells and the Nebraska SciFest Board. Sigmon has a bachelor's of science in Special Education from the University of Tulsa and a master's degree in Education Administration and Supervision from Roosevelt University.



State Senator Anna Wishart was born, raised, and has lived in Nebraska for over 30 years. Anna is a proud graduate of Lincoln Public Schools and graduated from Middlebury College in Vermont with a degree in film studies. While film will always be one of her passions, Anna returned to Nebraska to embark on a career in politics. Anna has worked at the Nebraska Legislature for six years as a staff member. Additionally, Anna has run several advocacy and legislative campaigns. In 2011, Anna was elected to the Lincoln Airport Authority, and served as Chair of the Board. In the five years she served on the board, Anna helped lead the Lincoln Airport to increased flights and passenger traffic, economic development and job growth, a strong budget and cash reserve policy, and all without using the airport's taxing authority. Anna was elected to the Nebraska Legislature in 2016. As a freshman Senator, Anna was selected to serve on the Legislature's Appropriations Committee. Currently Anna works at Beyond School Bells, a coalition with the mission to improve access to quality Expanded Learning Opportunities for Nebraska's youth.