



STEM FOR ALL  
MULTIPLEX

October Theme of the Month



## It Takes a Village: Using the Concept of “Learning Ecosystems” to Improve STEM Engagement



Martin Storksdiack (Moderator), Deborah Bailey, Nancy Staus, & Leigh Peake

### Webinar Chat and Resources Mentioned During Webinar

#### Resources

- [Presentation Slides](#)
- References to our two Oregon STEM Hubs evaluations:
  - **O’Connell, K., Keys, B., & Storksdiack, M. (2017).** Taking Stock of Oregon STEM Hubs: Accomplishments and Challenges: An Evaluation Report Prepared for the Oregon Chief Education Office. Oregon State University. <https://doi.org/10.5399/osu/1121>
  - **Staus, N., Preston, K., Keys, B., & Storksdiack, M. (2019).** Taking Stock of Oregon STEM Hubs: Accomplishments and Challenges: An Evaluation Report Prepared for the Oregon Department of Education. Oregon State University. <https://doi.org/10.5399/osu/1123>
- Articles that come from the SYNERGIES’ project:
  - **Shaby, N., Staus, N., Dierking, L. D., & Falk, J. H. (2021).** Pathways of interest and participation: How STEM-interested youth navigate a learning ecosystem. *Science Education*. <https://doi.org/10.1002/sce.21621>
  - **Staus, N. L., Falk, J. H., Penuel, W., Dierking, L., Wyld, J., & Bailey, D. (2020).** Interested, Disinterested, or Neutral: Exploring STEM Interest Profiles and Pathways in A Low-Income Urban Community. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(6), em1853. <https://doi.org/10.29333/ejmste/7927>
  - **Staus, N. L., Lesseig, K., Lamb, R., Falk, J., & Dierking, L. (2020).** Validation of a Measure of STEM Interest for Adolescents. *International Journal of Science and Mathematics Education*, 18(2), 279–293. <https://doi.org/10.1007/s10763-019-09970-7>
- **Rupanwita Gupta, John Voiklis, Shelley J. Rank, Joseph de la Torre Dwyer, John Fraser, Kate Flinner & Kathryn Nock (2020).** Public perceptions of the STEM learning ecology – perspectives from a national sample in the US, *International Journal of Science Education, Part B*, 10:2, 112-126, DOI: [10.1080/21548455.2020.1719291](https://doi.org/10.1080/21548455.2020.1719291)
- [STEM Education Plan from the Oregon STEM Investment Council](#)
- [Building Data and Climate Literacy through Connected Learning Across Informal and Formal Learning Environments Poster](#) from annual NASA meeting, from Leigh Peake

## **Webinar Chat**

Joni Falk : Please introduce yourselves and tell us if you are a researcher, teacher, informal educator, or any other role.

Pam S : Pam Sydelko. Worked on Project Systemic.

Marisa G : Hello. Marisa Garcia, Senior Program Developer with the National Girls Collaborative Project.

Chris S : Chris Singer, Program Coordinator, Mid-Valley STEM-CTE Hub (Albany, OR)

Brooke T : District STEM Coordinator, Portland ME

Joyce C : Joyce Coleman, Virtual Assistant to Dr. John Coleman, Dept of Chemistry & Physical Sciences, Langston University

Marsha S : Marsha Semmel, consultant, writer on museum/library partnerships, networks and ecosystems

Ben S : I'm a professor of physical science and math from Black Hills State University. I'm also director of South Dakota's Center for the Advancement of Math and Science Education.

Nancy K : Nancy Kellogg, Colorado Science Education Steering Committee

Joan H : Hi Leigh!

Leigh P : Hey Joan! Thanks for being here!

Bradley M : Brad Morris, researcher from the department of Educational Psychology at Kent State University.

Patricia S : Patricia Sasson, Prime Time Palm Beach County; STEAM Professional Development Specialist

Lynn D : Lynn Dierking, OSU and Institute for Learning Innovation. I'm eating and will turn on my camera after.

Leigh Peake : One thing I love about sessions on ecosystems is it brings so many interesting, different folks into the room!

Ayo I : Ayo Ibukun, PhD student Educational Technology from Oklahoma State University, Stillwater OK

Verleen M : Verleen McSween, Virgin Islands Institute for STEM Education Research and Practice, University of the Virgin Islands

Lynn D : Yes, Leigh, representing the ecosystem!

Leigh Peake : Great to see you here, Lynn!

Joan H : Joan Harper-Neely, STEM Education Specialist , NASA eClips™ Team, National Institute of Aerospace

Linda K : Linda Kekelis, family engagement advisor with STEM Next, joining from Oakland, CA

Dale M : Hi- Dale McCreedy - Discovery Center, Murfreesboro TN

Kim Descoteaux : [https://multiplex.videohall.com/month\\_themes/+15](https://multiplex.videohall.com/month_themes/+15)

Kim Descoteaux : You can visit the Theme of the Month here:  
[https://multiplex.videohall.com/month\\_themes/+15](https://multiplex.videohall.com/month_themes/+15)

Mirta F : Hello! Mirta Fuentes, TRIO STEM3S Academic Coach, Santa Fe College in Gainesville, FL

John V : Hello all: My name is John Voiklis and I lead research on behaviors, norms, and processes at Knology. STEM learning is often the content area in which I try to make sense of behaviors, etc. Martin and I worked on a project (WZAM3) where one thread of inquiry was about STEM learning ecosystems

Ron S : Hi everyone! This is Ron Skinner from MOXI in Santa Barbara, CA

Jenny B : Hi all I am the evaluation manager at Questacon, The National Science and Technology Centre in Canberra, Australia

Martin Storksdieck : Jenny, amazing that you can join us - what time is it in Canberra?

Pam S : Just to add to my introduction. I am a systems scientist.

Jenny B : Its 6am here right now - could be worse...

Martin Storksdieck : True, Jenny: 6 am is not too bad ;o)

Lynn D : There is still hope that it will continue. We had a break before...but will return in some form.

Martin Storksdieck : That would be marvelous, Lynn!

Pam S : Sounds like a place for systemic organizational design!

Joni F : So curious what it looks and feels like from the perspective of a student. How is their experience enriched? Is there evidence on impact?

Lynn D : So great to hear this, Leigh! We are toying with elements for healthy system-wide learning ecosystems, similar to constructs used in natural systems such as productivity, resilience and durability.

Abdelfattah J : we need as parents to feeds kids curiosity a littel before going to school

Marsha S : Would love to delve further into what has been learned about brokering and the way organizations are training/including brokering in their organization/program specific work.

Leigh P : +1 Lynn — hope to get to hear what insights that's brought to you given how much prior thinking you've done on it!

Amanda R : That's a great question Joni! Talking to STEM professionals, our Chief Science Officer students tend to ask what was an experience that led you to your STEM career and most of the time the professional talks about a STEM related activity such as an engineering project or learning though paper airplanes as a child in school or an organization. That is definitely data that is not quite available right away to us as we provide these programs.

Abdelfattah J : ecosystem is a big book to learn from, rich and accessible

Janellw J : So glad to see the STEM

Marsha S : Chicago tried to map/connect pathways for youth through a complicated digital mapping system. Not sure where it is now.

Janellw J : So glad to see the STEM learning ecosystems featured here...I have been concerned that these efforts may have been running parallel to NSF efforts without intersecting

Marisa G : related, check out The Connectory.: <https://theconnectory.org/>

Joni F : Abdelfattah, I think you have a point that parents can play an important role in helping to knit together an ecosystem for their child. Maybe also community centers etc?

Marsha S : Chicago project Nicole Pinkard. Also Rafi Santo and Dixie Ching research on Mozilla Hives.

Kaci F : In Arizona, through a Rural Activation and Innovation Network grant, we have four RICs - Rural Innovation Councils.

Martin Storksdieck : All, please continue sharing your resources here so we can share them on the website.

Abdelfattah J : absolutely, Joni. learners with community centers provide to them a huge knowledge to bring to school

Leigh Peake : +1 Kaci. We implemented a "Lead Educator" structuring following the model of the RAIN Councils

Natasha W : Just a note, the Chicago mapping project has evolved and continues to provide direction around programming

Kaci F : How do you decide which interests/pathways to focus on? It seems like the path of least resistance tends to be guided by funding, but that doesn't necessarily align with local interests or values.

Natasha W : We looked at student interest, led community conversations and leveraged partners to begin to meet interest

John V : I asked the following as part of registration:

Pam S : Project SYSTEMIC is a Chicago project and is one of the highlighted videos.

Colin E : I love the point what is our goal? what is STEM for community instead of simply STEM for careers?

Kaci F : Wow, that really is a fundamental question in this space! \*WHY\* STEM? Is it for workforce/economic development? Mental and physical well-being? Supporting informed citizens? Social justice?

Janellw J : Colorado is sitting on an unpublished STEM education plan. Any tips on sparking initiative for getting the plan out and starting to build these structures at the state level?

Engin B : Re: interest-driven pathways: How to support the interest discovery process for children? Supporting and expanding on existing interests (that might be limited) versus supporting exploring possible interests ("unknown unknown"), and deepening new found ones?

Marsha S : If this is so, where does multi-disciplinarity (beyond STEM, as challenging as that is) figure in an ecosystem approach?

Joni Falk : Love Leighs examples of creating products that draw parents and teacher in. I think that is so important.

Marisa G : how have families and youth themselves been involved in the creation of STEM ecosystems?

Leigh Peake : We're now starting up a new piece of work with Catherine Haden and David Uttal to push the limits of the digital field notebook as a tool to sustain family conversations about STEM

Joni Falk : Wonder if a rich ecosystem helps to compensate for weak links in a child's environment. Such as a poor teacher that year, or a parent that is not interested in STEM. So multiple supports seem supportive of the child.

Marsha S : Building science capital?

Jenny B : to what extent is an ecosystem strategy focused on strengthening connections between informal learning providers and formal education?

Lynn D : +1 Marisa This is so important--putting the agency of ecosystem in the hands of the users themselves. This is one of the next steps I'm hoping to take.

Marisa G : is this (the idea of an ecosystem) something the children and youth are made actively aware of? Martin, you just said how if you are aware of it you could potentially be more resilient when they are aware of it?

Janellw J : I think it's co-created in partnership with families

Lawanda C : During this season of COVID, how can this coordinated ecosystem protected some of the student learning amidst all the pivots

Debbie S : We are doing just that. Looking at how community partners, families and their youth, and museum educators continually co-create and contribute to an evolving ecosystem

Marisa G : as a former school teacher, this is even hard when families are expected to support kids with things like homework/projects etc. and that is a much more familiar and expected task

Leigh Peake : +1 Janelle (and Hi!) — I hope that's TRUE but ...

Joan H : How can we get parents to feel like they are a part of the ecosystem and that we want to hear their voices?

Marsha S : Do any of your projects create, say, teen or preteen mentors as path connectors? Lynn, doesn't Synergies use preteens?

Engin B : What's the interrelation between the nature of the ecosystem, the approach of interest-driven pathways and the age of the children? What changes when thinking about an ecosystem for our youngest vs elementary school age vs middle school age?

Marisa G : +1 Joan, and the kids themselves!

Janellw J : We have to address deficit views of families and recognize and tap into their funds of knowledge

Jill S : I wonder the extent to which members of the ecosystem are prepared to create open, inclusive spaces for families and youth (particularly those from communities who have been marginalized) to feel a sense of belonging when they go to engage

eric s : I am part of a State-Wide (Pennsylvania) group of faculty (11 State universities) working on developing an NSF funded Geoscience Learning Ecosystem focused on an undergraduate field camp experience with a strong focus on increasing Diversity in our field. We will have a high school level peer mentoring, and service learning experience embedded within our field course. Any suggestions/advice concerning field based ecosystems is appreciated! Thanks!

Lawanda C : In the Virgin Islands we are trying to change our learning units to families for that reason

Chris S : @Lawanda - I love that. Great work!

Leigh Peake : I hope people join the discussion — there's so much great stuff in the chat!!

Natasha W : SO happy to see you Pam!

Marisa G : I need to log off, but thank you all for the interesting and important conversations!

Janellw J : Funds of Knowledge

Kim Descoteaux : Don't forget to visit <https://multiplex.videohall.com/> to participate in the online discussion and view the related playlist videos and resources

John V : How many people have had contact with the Reggio Emilia approach, where the whole town/region is participates actively in the learning ecosystem

Deborah Bailey : <https://www.oregon.gov/highered/institutions-programs/workforce/Documents/STEM/202++1-2025%20Oregon%20STEM%20Education%20Plan.pdf>

Deborah Bailey : Oregon's STEM Education Plan

Abdelfattah J : thanks to this great conversation, the debate continue