

Research-informed Recommendations for STEM Mentoring Programs

IMPACT Webinar Series



May 2018

Moderator & Panelists



Daniel Horgan
MENTOR
Moderator



Ragnar von Schiber
Genentech
Panelist



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Panelist



Mike Garringer
MENTOR
Panelist



Katie Cubina
Sea Research Foundation
Panelist

MENTOR Overview – www.mentoring.org



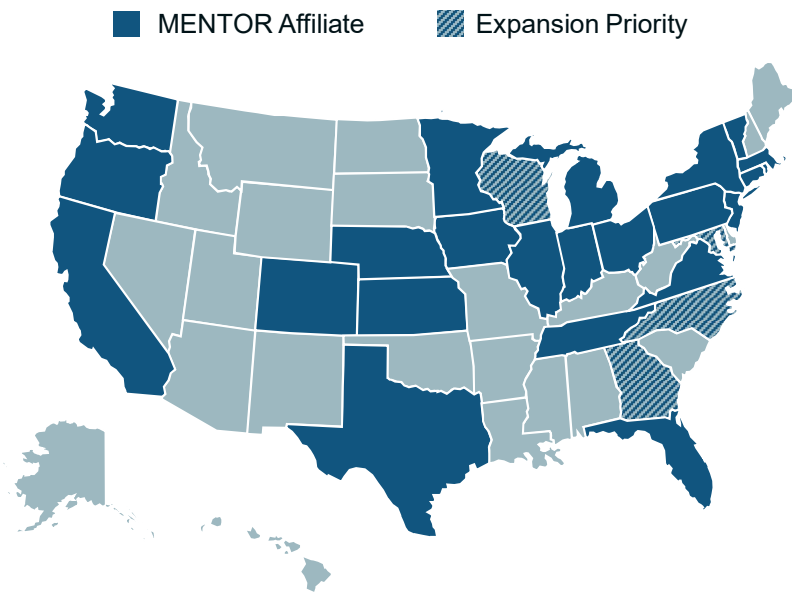
MENTOR's Mission is to fuel the quality and quantity of mentoring relationships for America's young people and to close the mentoring gap for the one in three young people growing up without this critical support.

- Nationally recognized field leader with more than **25 years of experience**
- Demonstrated results and impact grounded in a **community responsive approach**
- Proven ability to help **unlock new public and private dollars** and engagement in mentoring
- Successful **cross-sector and collective impact convener**
- Member of the **Social Impact 100**, America's 100 top-performing nonprofit organizations

MENTOR's National Program Network



MENTOR's National Footprint



26 affiliates serve as catalysts of the state/local mentoring movement



MENTOR's Public/Private Partnerships



Altria



Genentech
A Member of the Roche Group

Deloitte.



JPMORGAN CHASE & Co.

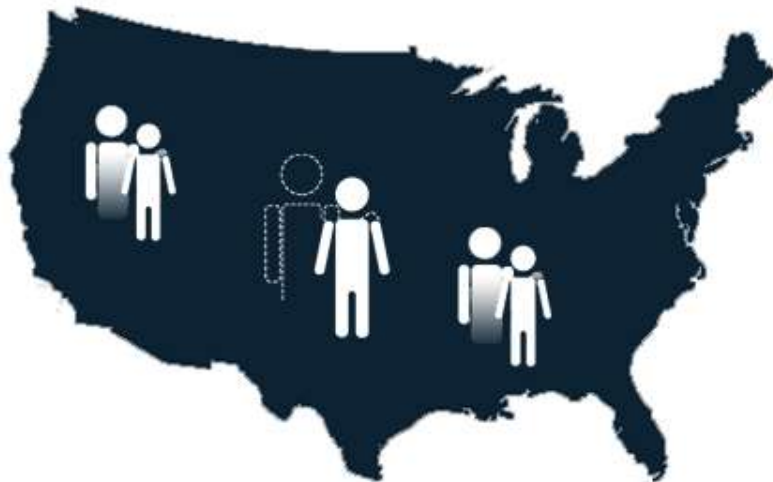


STATE STREET®

The Need for Mentoring

One in three young people are growing up without a mentor.

This is the mentoring gap in America.



46 Million

All young people
ages 8-18

22 Million

Young people with
no risk factors

24 Million

Young people facing
risk factors

15 Million

Had a mentor
2.4M structured
12.6M informal

15 Million

Had a mentor
4.5 M structured
10.5M informal

7 Million

Never had a mentor

9 Million

Never had a mentor

The Mentoring Effect

WITH A MENTOR, AT-RISK YOUTH ARE:



55%

more likely be enrolled in college



78%

more likely to volunteer regularly in their communities



130%

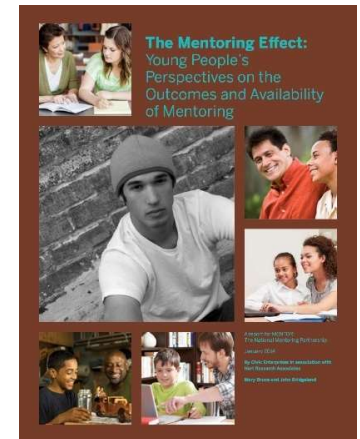
more than twice as likely to say that they held a leadership position in a club or sports team



90%

Respondents who had a mentor said they are now interested in becoming mentors

Research has consistently shown that mentoring has a positive effect in improving outcomes for young people with mentors versus those that do not.



Overview of STEM Supplement to the Elements of Effective Practice for Mentoring



Supplement Sponsor



Project Team

- **Janis Kupersmidt** – innovation Research & Training (iRT)
- **Rebecca Stelter** – innovation Research & Training (iRT)
- **Michael Garringer** – MENTOR
- **Jennifer Bourgoin** – MENTOR

Working Group

Practitioners and Programs

- **Catharine B. Shay** – 3M
- **Eileen Yang** – [Genentech's Futurelab Initiative](#)
- **Jennie Mathur** – Girls Inc.
- **Christine Banks Calderón** – New York City Science Research Mentoring Consortium
- **Laura Moran** – San Francisco Chamber of Commerce
- **Michael Kennedy** – [Science Club](#)
- **Laura Batt** – [Sea Research Foundation](#)

Researchers

- **Wendy Marcinkus Murphy (Researcher)**– Babson College
- **Jean Rhodes (Researcher)** – UMASS-Boston

Why we developed the supplement

- *Elements of Effective Practice for Mentoring* can't fully address every type of program or youth need.
- STEM mentoring has grown in popularity in response to labor market concerns.
- Underrepresentation in STEM fields remains a concern that needs new approaches.
- Genentech's curiosity about effective practices really set this in motion.

How we developed the supplement

- Extensive literature review, emphasizing real research
 - 102 articles to start, 82 from peer-reviewed journals
 - 45 program evaluations
 - 49 on K-12 + 44 on higher education
 - Supplemented with over 100 more articles from related fields
- Thin overall volume of research on STEM mentoring
- Lack of rigorous evaluation of effectiveness
 - Fewer than 10 studies used experimental design

Translating into practice

- Working group...
 - Suggested practices they felt were critical to their work
 - Confirmed, clarified, or, in some cases, rejected suggested practices from the research literature
 - Reviewed and approved the final recommendations
- June release, with accompanying webinars and other learning opportunities throughout the year

General typology of STEM mentoring

- In-person and online are both popular
- Programs often focus on
 - Changing attitudes and beliefs
 - Increased participation and planning
 - Improved STEM skills and performance
- Youth age often drives program focus, but very few programs are connecting the dots across the age spectrum
- Supplement offers a helpful table that breaks down types of programs by mentee age range

Research-informed Recommendations



Recruitment & Screening

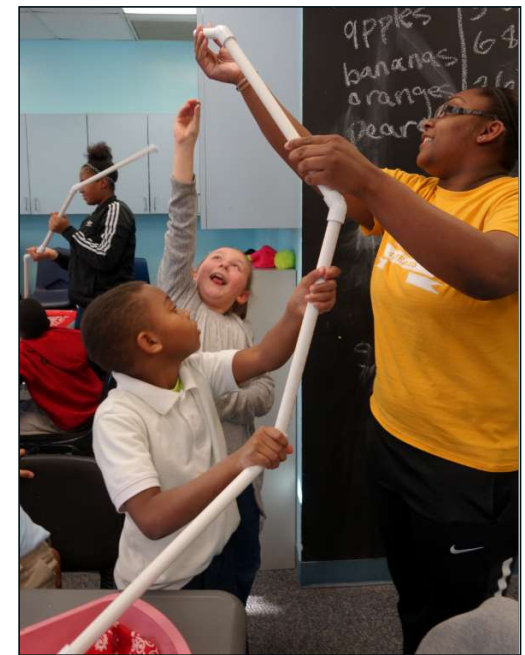
- Recruit mentors who express interest in developing a supportive, caring relationship and friendship with their mentee(s), and not just promoting their mentees' interest in, or commitment to, a STEM career – plus, recruiting those outside of STEM fields to learn alongside mentees in the mentoring program.
- STEM mentoring programs should assess during the screening process whether prospective mentors may have scheduling challenges or conflicts that would hinder their full participation in the program, screening out those who may be unable to meet with mentees consistently (e.g., potentially challenging groups may include college students, employees at local STEM companies, and faculty in higher education)

Research in Practice



About Sea Research Foundation's STEM Mentoring Program

- Group mentoring program for youth ages 6–10
- Provides youth with structured, hands-on activities facilitated in small groups by supportive mentors
- Activities cover a variety of topics in science, technology, engineering, and math (STEM), with a particular focus on conservation
- Goal to positively impact the social development and academic achievement of participating youth



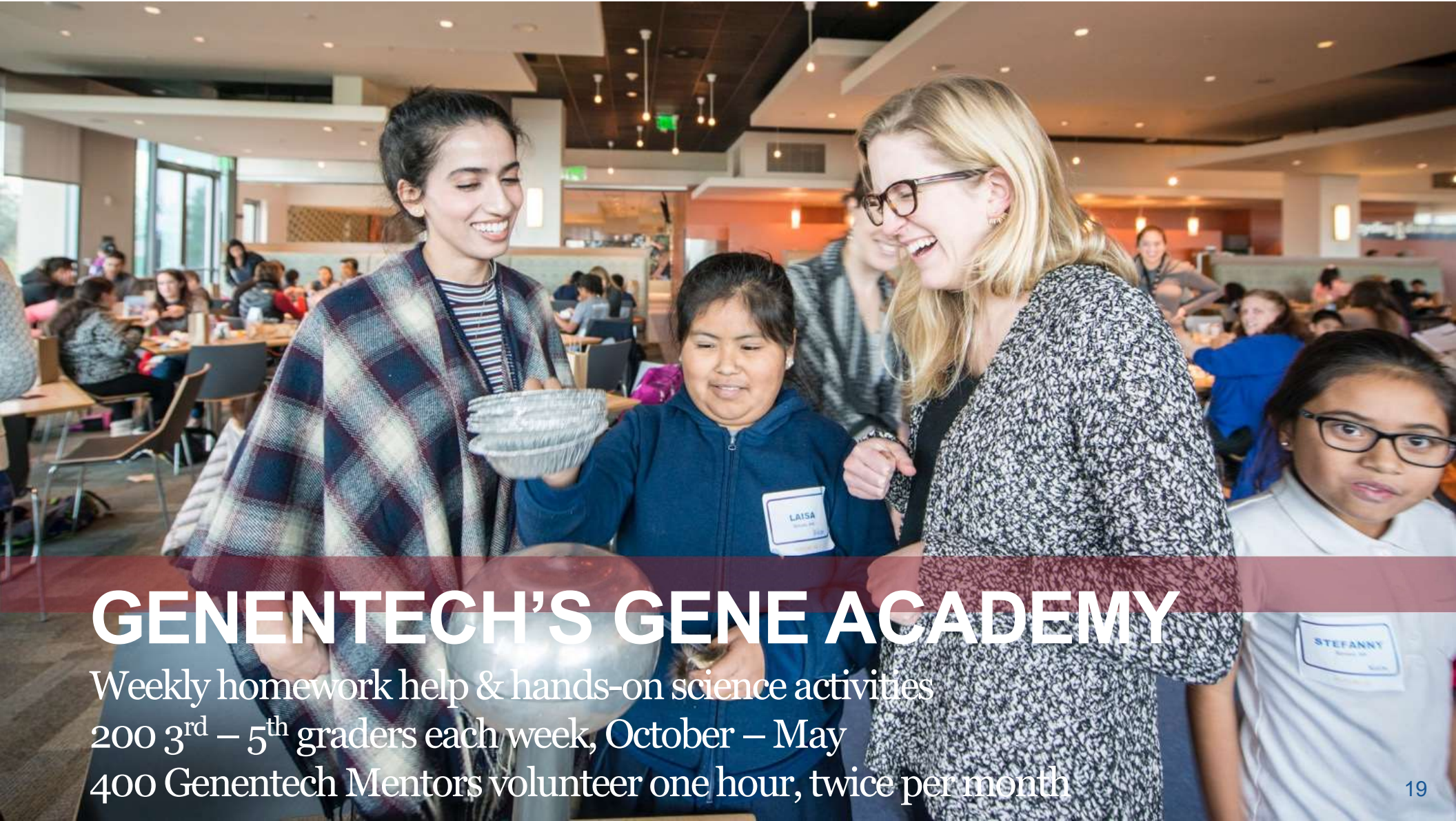
Research in Practice



Mentor Recruitment & Screening in the STEM Mentoring Program

- Mentors need not work in STEM fields to effectively deliver the STEM Mentoring curriculum.
- The best mentors are dedicated, patient, caring, positive role models who are willing to make the commitment of time. They are good listeners who will serve as advocates for youth.
- STEM Mentoring sites successfully utilize adult and peer mentors.





GENENTECH'S GENE ACADEMY

Weekly homework help & hands-on science activities

200 3rd – 5th graders each week, October – May

400 Genentech Mentors volunteer one hour, twice per month

Research in Practice



Science X Club

- Longitudinal mentoring, middle school youth (grades 5-8)
- Mentors: grad students, staff, postdoctoral fellows
- Mentor selection: commitment, experience, willingness to learn

Training

- STEM mentoring programs often focus in their training on the role of being a positive role model to mentees with the goal of building mentees' sense of belonging in a STEM field and establishing their scientific identity. Two additional key roles need to be incorporated into mentor training content.
 - Mentors need to be trained to be a connector or advocate for their mentees to connect them to other people, places, experiences, or opportunities related to STEM.
 - Traditional mentor training should be included in STEM mentor training with a focus on the importance of being a trusted, adult friend to mentees in order to establish a caring, supportive mentoring relationship.

Training

- When STEM mentoring programs have matches conduct STEM activities or experiments together, ongoing mentor training is likely needed in the following topics:
 - Facilitating STEM activities. Training could be conducted in advance of the meeting or just-in-time, and virtually (e.g., online videos, video or web conferences) or at an in-person, instructor-led workshop
 - How to conduct the program's STEM activities in a safe and successful way
 - Being cautious about using an overly technical vocabulary with mentees without providing them with definitions or explanations
 - The importance of simplifying explanations and instructions so that they are developmentally appropriate for the target audience of mentees
 - The scientific method, critical thinking, and continuing problem solving

Training

- Because female and minority students frequently encounter negative stereotypes and lower expectations of their intellect and abilities, additional topics for pre- (or post) match training for mentors in a STEM mentoring program are needed to help mentees overcome barriers to success in STEM coursework or common challenges experienced when exploring or entering STEM careers. These topics include:
 - Cultural awareness training on negative stereotypes and lower expectations, unconscious biases, and diversity and inclusion
 - Strategies for supporting feelings of self-efficacy and belonging
 - Communicating admiration and respect for mentees
 - Talking with their mentees about traditional barriers to STEM education and STEM careers including race, gender, socioeconomic status, and disability
 - Teaching and providing feedback on workplace norms and behaviors in ways that are culturally responsive and empowering for youth
 - Fostering a growth mindset in youth

Research in Practice



Training in the STEM Mentoring program

- All mentors participate in training before the start of the program to learn about best practices in mentoring and the content of the first curriculum module.
- During the course of the program, sites schedule trainings for mentors on new curricula as content is provided by Sea Research Foundation, along with refresher trainings on mentoring best practices.
- Mentors are provided with individual copies of the curricular materials so they can better prepare themselves to conduct the hands-on STEM activities with their small groups each week.

Matching

- Mentoring programs that create mentoring relationships involving one or more mentors and multiple mentees should take into consideration the group dynamics when making matches.
- Mentoring programs that create mentoring relationships involving one or more mentors and multiple mentees should consider having a trial period for all group matches that allows for the opportunity to make changes to the group membership, as needed.

Research in Practice



About the Explorations in STEM Mini-Module

- Four sessions, each with 30 minutes of team-building activities and 30 minutes of hands-on STEM activities
- Goals are to help mentors and mentees develop teamwork skills, build trust with one another, and explore introductory STEM topics
- Designed to help inform the matching process prior to the implementation of the STEM Mentoring program's first full-length curriculum module



Research in Practice



Feedback from Program Coordinators on the Mini-Module

- “The addition of [a] mini-module this year was a great idea! Our group really bonded with their mentors which made the transition to the more sophisticated AQUA ADVENTURE seamless.”
- “The mini-module sessions allowed for us to see who worked best with each other and with what mentor. This also gave us the opportunity to make changes to best serve the program and our youth.”
- “We actually allowed our mentors to float each [mini-module] lesson to a different group each week. Therefore, we were able to make sure we had the perfect match[es] once AQUA ADVENTURE started.”

Monitoring & Support

- When mentoring activities take place in the presence of mentoring program staff, program staff should provide real-time monitoring and support of mentoring activities and group dynamics to help support mentors and mentees in completing STEM activities and help mentors manage the dynamics of their mentoring relationship(s).

Research in Practice



Science X Club

- Real-time mentor support **critical**
- Modeling positive, open ended conversations, pedagogy, and resolving challenging situations
- Recognizing mentor frustrations & initiating dialogue

Research in Practice



Monitoring & Support in the STEM Mentoring Program

- Program Coordinators at STEM Mentoring sites are always present when STEM Mentoring activities are taking place. This allows them to respond quickly to any needs of mentors and/or mentees.
- Meeting with mentors just prior to each STEM Mentoring session allows Program Coordinators to preview the STEM content and go over implementation tips for the day's hands-on activities.
- Checking in with mentors just after each session helps Program Coordinators learn whether mentors need any additional support for their mentees or with the STEM content.



Closure

- Time-limited STEM mentoring programs may consider networking with other mentoring programs, so that when the program ends, mentees will be able to continue to receive additional mentoring services.
- In addition, prior to relationship closure, STEM mentoring programs should consider training mentees in the lifelong skills of being able to locate, identify, initiate, and maintain new mentoring relationships with caring adults in their lives to address the ongoing needs for support as youth enter a STEM education or STEM career.

Futurelab: Genentech's partnership with SSF schools



GENE ACADEMY

"Science is fun!"

Weekly onsite 2:1 mentoring program for elementary students



HELIX CUP

"I can do science!"

Annual science competition for middle school students



SCIENCE GARAGE

"I'll work in science!"

A four-year biotech pathway and state-of-the-art teaching facility

Futurelab brings science to life for all students in the SSFUSD, and is focused on rigorous and relevant hands-on learning at every grade level.



Featured Programs

- **Sea Research Foundation**
 - <http://stemmentoringprogram.org/overview/>
- **Genentech's Futurelab**
 - <https://www.gene.com/futurelab/>
- **Science Club**
 - <https://scienceclub.northwestern.edu/>

Additional Resources from MENTOR

- **Online Philanthropic Community of Practice**
 - Online portal for corporations, foundations and donors to connect & share resources
- **Mentoring Connector**
 - National database of mentoring opportunities
- **National Mentoring Resource Center**
 - National clearinghouse of tools, resources and practices
- **Collaborative Mentoring Webinar Series + IMPACT Webinar Series**
 - Free webinars by practitioners for practitioners
- **Elements of Effective Practice for Mentoring (including supplemental guides)**