

Foundations of Data Science for Students in Grades K–12 A Workshop

September 13–14, 2022

Lecture Room, National Academy of Sciences

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TUESDAY, SEPTEMBER 13, 2022 (All Times are ET)

Purpose

To bring increasing visibility to the rapidly growing field of K-12 data science education, this workshop will survey the current landscape of work, surface what is currently known, and identify additional research to support student learning, curriculum and tools development, assessment, and the preparation of educators. The workshop will bring together researchers and practitioners engaged in K-12 data science education from a variety of contexts including formal and informal; designed and emergent; elementary and secondary; and whose efforts include standalone curricula as well as activities integrated within other content areas (e.g., STEM disciplines and the humanities).

Resource Sharing: We are encouraging the sharing of ideas (via chat) and resources throughout this event. To coalesce all that is shared, in lieu of sharing resources in the chat, we are providing this Google document for the resources to be added to: [Resource Sharing](#). This resource document will be available on the project page following the event.

9:15–10:00 AM

Registration and Breakfast

Breakfast will be provided.

10:00–10:05 AM

Welcome from the National Academies

Heidi Schweingruber, *Director, Board on Science Education*

10:05–10:20 AM

Opening Remarks and Workshop Framing

Nicholas Horton (Co-chair), *Amherst College*

Michelle Hoda Wilkerson (Co-chair), *University of California, Berkeley*

10:20–11:20 AM

A Vision for High Quality Data Science Education

This session will explore what defines a valuable learning experience for students, what research tells us about successful vs. unsuccessful curricular intervention, and how those learnings can be articulated into policy and practice.

Moderator:

Michelle Hoda Wilkerson, *University of California, Berkeley*

Panelists:

Rob Gould, *University of California, Los Angeles*

Josh Recio, *Dana Center*

Tricia Shelton, *National Science Teaching Association*

Alfred Spector, *Massachusetts Institute of Technology* (virtual)

Trena Wilkerson, *Baylor University; National Council of Teachers of Mathematics*

11:20–11:45 AM

Networking Break

Coffee and light refreshments will be provided

11:45 AM–12:45 PM

Where and How is Data Science Happening?

The goal of this session is to explore the research on the settings and contexts of K-12 data science education with an emphasis on what data science looks like in these contexts and the connections with informal contexts relevant to K-12 learners' lives.

Moderator:

Tammy Clegg, *University of Maryland*

Panelists:

Marshini Chetty, *University of Chicago* (virtual)

Kayla DesPortes, *New York University*

Rafi Santo, *Telos Learning*

Stephen Uzzo, *New York Hall of Science*

12:45–1:45 PM

Working Lunch: What are the Outcomes that We Want?

Lunch will be provided.

During lunch, participants will be broken up into small groups to discuss the outcomes that we want for data science education. These could be student-level outcomes (e.g., development of specific skills and proficiencies, developing interest or disciplinary identity) or outcomes related to policy and practice (e.g., access to opportunities, funding). As part of the discussion, also consider the research that is needed to further what is known about these outcomes.

Virtual Audience: We are not facilitating breakout groups. We invite you to share your ideas in this document: [Virtual Outcomes](#). You are welcome to provide your name next to your suggestion, but it is not required. Ideas provided in this document will be incorporated into the next session and will also be available on the project page following the event.

1:45–2:45 PM

Invited Commentary on Outcomes and Report Out from Working Groups

This session will explore the evidence on what we know about learning and critical data literacy to identify (and outcomes identified by participants) to consider what it is that we want students to be able to do with data and identify how those intended outcomes can be measured.

Background Readings:

- [A Secret Agent. K-12 Data Science Learning Through the Lens of Agency](#)
- [Critical Data Literacy: Creating a More Just World with Data](#)

Moderator:

Nicholas Horton, *Amherst College*

Presenters:

Ryan Seth Jones, *Middle Tennessee State University*

Jo Louie, *Education Development Center, Inc.*

Discussant:

Jo Boaler, *Stanford University* (virtual)

2:45–3:00 PM

Break

Coffee and light refreshments will be provided

3:00–4:00 PM

How are Tools and Resources Supporting Data Science Learning Experiences?

Through this session, there will be an exploration of the tools and data sets that exist or are needed to support learning in acquiring data understanding and skills.

Background Reading: [Tools to Support Data Analysis and Data Science in K-12 Education](#)

Moderator:

Tim Erickson, *Epistemological Engineering*

Panelists:

Rolf Biehler, *Paderborn University, Germany (virtual)*

Chad Dorsey, *Concord Consortium*

Randy Kochevar, *Education Development Center*

Victor Lee, *Stanford Graduate School of Education*

Andee Rubin, *TERC*

4:00–4:25 PM

Townhall

What are the highest priorities for additional research?

4:25–4:30 PM

Adjournment and Plan for Day 2

Michelle Hoda Wilkerson (Co-chair), *University of California, Berkeley*

Nicholas Horton (Co-chair), *Amherst College*

END OF DAY 1

WEDNESDAY, SEPTEMBER 14, 2022 (All Times are ET)

9:15–10:00 AM

Registration and Breakfast

Breakfast will be provided

10:00–10:15 AM

Welcome and Reflections on Day 1

Michelle Hoda Wilkerson (Co-chair), *University of California, Berkeley*

Nicholas Horton (Co-chair), *Amherst College*

10:15–11:15 AM

Hearing from Practice: What is Happening in and Out of Schools?

This session will explore the reality on the ground in data science education, with a deep focus on the specifics of designing student learning opportunities. Topics will include student learning progressions, opportunities for different school subjects to impart data science topics, and the wrap-around resources needed for implementation.

Background Reading: [Previewing the National Landscape of K-12 Data Science Implementation](#)

Moderator:

Zarek Drozda, *Director, Data Science 4 Everyone, University of Chicago*

Panelists:

Suyen Machado, *University of California, Los Angeles*

Stephanie Melville, *San Diego Unified School District*

Paul Strode, *Fairview High School*

Katie Headrick Taylor, *University of Washington*

11:15–11:30 AM

Break

Coffee and light refreshments will be provided

11:30AM –12:30 PM

How is Data Science Integrated in Content Areas?

This session will explore the ways in which data science has been integrated with other subjects beyond mathematics. Panelists will share, through discussions of their own and related work, approaches for integrating data science into the study of other subjects as they are explored across settings including school-based and out-of-school contexts.

Moderator:

Camillia Matuk, *New York University* (virtual)

Panelists:

Rahul Bhargava, *Northeastern University*

Angela Calabrese Barton, *University of Michigan*

Josh Radinsky, *University of Illinois at Chicago*

Emmanuel Schanzer, *Bootstrap*

Lissa Soep, *Vox Media, LLC.* (virtual)

12:30–1:30 PM

Lunch

Lunch will be provided

1:30–2:30 PM

What is the State of Teacher Preparation in Data Science?

The goal of this session is to examine issues on teachers' use of data and the preparation needed to teach statistics/data science/computation for prospective teachers and practicing teachers in formal and informal education settings.

Moderator:

Hollylynne Lee, *North Carolina State University*

Panelists:

Anna Bargagliotti, *Loyola Marymount University*

Stephanie Casey, *Eastern Michigan University*

Ann Leftwich, *Indiana University Bloomington* (virtual)

Gemma Mojica, *North Carolina State University*

Leticia Perez, *WestEd*

Joshua Rosenberg, *University of Tennessee, Knoxville*

2:30–3:00 PM

Townhall

How can practice inform current and future research needs?

3:00–3:15 PM

Funder Reflection

Nancy Lue, *Valhalla Foundation*

Joined by:

- Ulrich Boser, *Schmidt Futures*
- Lark Park, *California Education Learning Lab* (virtual)

3:15–3:30 PM

Final Reflections from Planning Committee

Nicholas Horton (Co-chair), *Amherst College*

Michelle Hoda Wilkerson (Co-chair), *University of California, Berkeley*

3:30 PM

WORKSHOP ADJOURNS