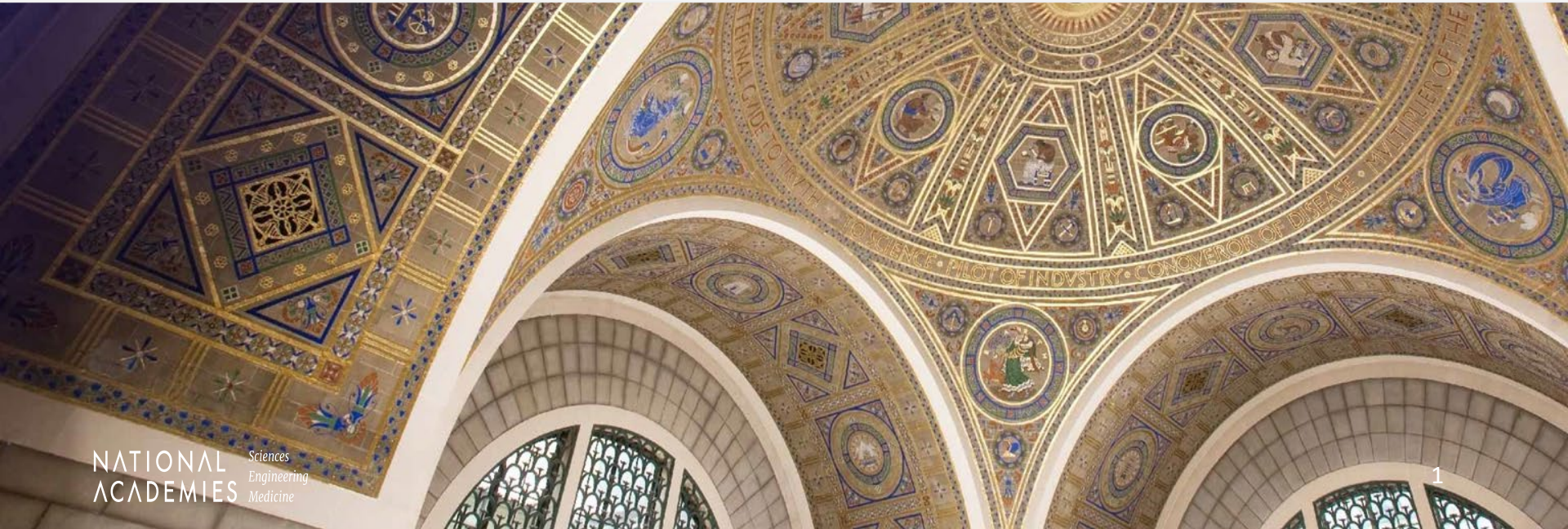
International Practices in K-12 Mathematics Education: the Role of Computational Thinking, Data Science & AI

NATIONAL ACADEMIES Sciences Engineering Medicine

February 23, 2026



WELCOME

Ana Ferreras Fiel, PhD

Innagurated in April 28, **1924**

President Calvin Coolidge - **"Temple of Science"**

Combines elements of “Classicism” and "Alexandrian" style.

NATIONAL ACADEMIES *Sciences Engineering Medicine*

The National Academies provide independent, trustworthy advice that advances solutions to society’s most complex challenges.

www.nationalacademies.org

Planning Committee

Oh Nam Kwon
South Korea

Lindsey Henderson
USA

Hollylynne Lee
USA

Claudia Vargas
Chile

Sarah Schoenbrodt
Austria

David Weintrop
USA

Padhu Seshaiyer
USA (Chair)

Richard Velasco
USA

Toh Tin Lam
Singapore

Sponsors

GATES FOUNDATION

The National Academies

-Chartered by Congress in **1863** under an Act signed by **Abraham Lincoln**

-Provide **crucial scientific advice to the nation**

-An **independent, non-profit, non-partisan, neutral convener** that gathers world experts and distinguished researchers in their respective scientific fields

Why?

- Less than 3 percent of U.S. children are receiving data science education
- Deficit of US school teachers
- No global analysis available
- Hard to improve when we do not know where we stand
- Because it is important - socioeconomically

Project

- A Hybrid Workshop - February 23-24, 2026
- A Webinar Series (4-5 webinars this Spring)
- A Survey - Also link in the chat
- A Distribution List - Sign Up - Link in the chat
- A Workshop Proceedings Report - June 2026

Scope of Work

- **Three Frameworks**
  - Data Science
  - Computational Thinking
  - Artificial Intelligence
- **Four Themes**
  - Curriculum Development and Policy Implementation
  - Assessment Techniques and Student Learning
  - Technology Tools and Frameworks
  - Instructional Approaches and Professional Practice
- **Two Grade Levels**
  - 70% on High School Math Ed (Grades 9-12)
  - 30% on K-8 Math Ed (Grades 1-8)

Thematic Session

Each Session (**90 minutes**) - except Mixed-Mini Session (45 minutes)

- Presentations should not last for more than 50 minutes - **Each speaker** has **7 minutes**

- Speakers are **addressing the same questions**

- **Discussion and Questions** should not last more than **40 minutes**

  - **In-person** participants **ask first**

  - **Virtual participants** ask last (post questions in the **Questions Section**)

Workshop Program

DAY 1 (Feb 23, 2026 - Monday)

- **9 am - 9:30 am**: Welcome
  - Ana Ferreras (10 min)
  - Hannah Weissman (5 min)
  - Padhu Seshaiyer (15 min)
- **9:30 am - 10:45 am**: Lightning Talks
  - **1 min**
  - Anyone invited in person or in the agenda present
- **10:45 am - 11:00 am**: Coffee Break
- **11:00 am - 12 pm**:
  - Keynote 1 - **Conrad Wolfram**
- **12 pm - 1 pm**: Lunch
- **1 pm - 2:30 pm**: **Session 1**
- **2:30 pm - 2:45 pm**: Coffee Break
- **2:45 pm - 4:15 pm**: **Session 2**
- **4:15 pm - 5:00 pm**: Lessons learnt
- **5:00 pm - 6:00 pm**: Networking
- **6:00 pm - 6:45 pm**: Mixed-Mini Session
- **6:45 pm - 8 pm**: Dinner

DAY 2 (Feb 24, 2026 - Tuesday)

- **8 am - 9 am**
  - Keynote 2 - **Junaid Mubeen (virtual)**
- **9 am - 10:30 am**: **Session 3**
- **10:30 am - 10:45 am**:
  - Coffee Break
- **10:45 am - 12:15 pm**: **Session 4**
- **12:15 pm - 1:15 pm**:
  - Wrap Up
  - Impact-Effort Matrix
  - Conclusions
- **1:15 pm - 2 pm**:
  - Lunch or/and Airport
- **2 pm - 3 pm**: Tour of the NAS

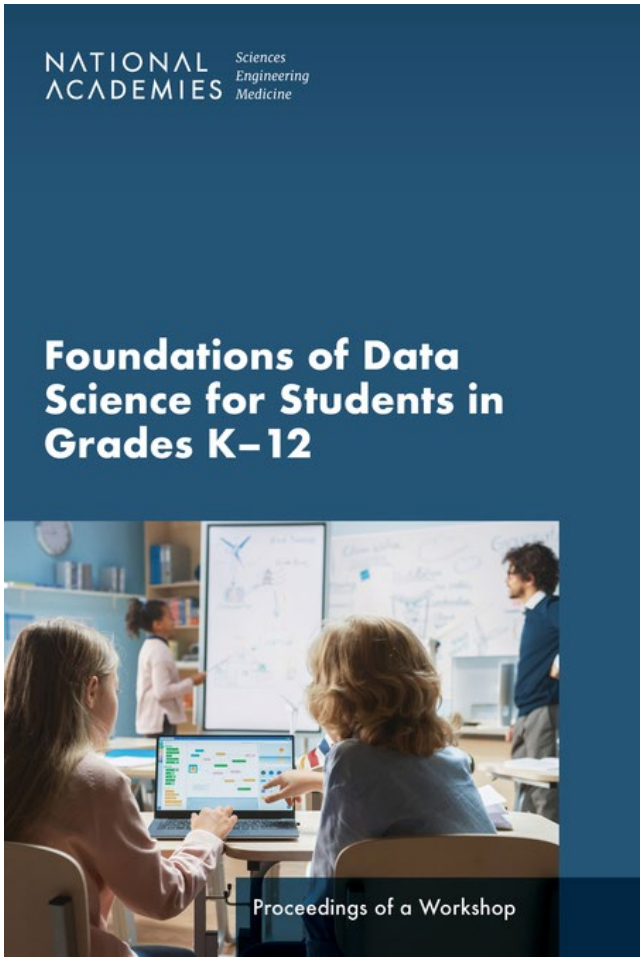
Disclaimer

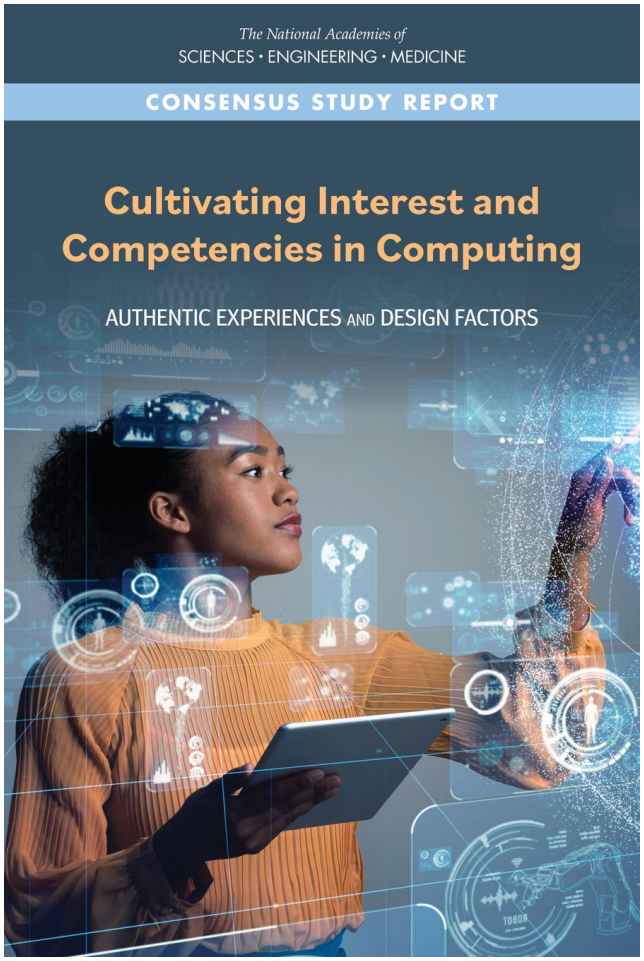
-Evidence-based advice

-Avoid political or partisan statements or commentary and maintain a culture of mutual respect

-The statements and presentations during our meetings or events are solely those of the individual participants and do not necessarily represent the views of other participants or the National Academy of Sciences.

NASEM Reports





Announcements

Developing Competencies for the Future of Data and Computing: The Role of K-12

Release Date: **March 12, 2026**

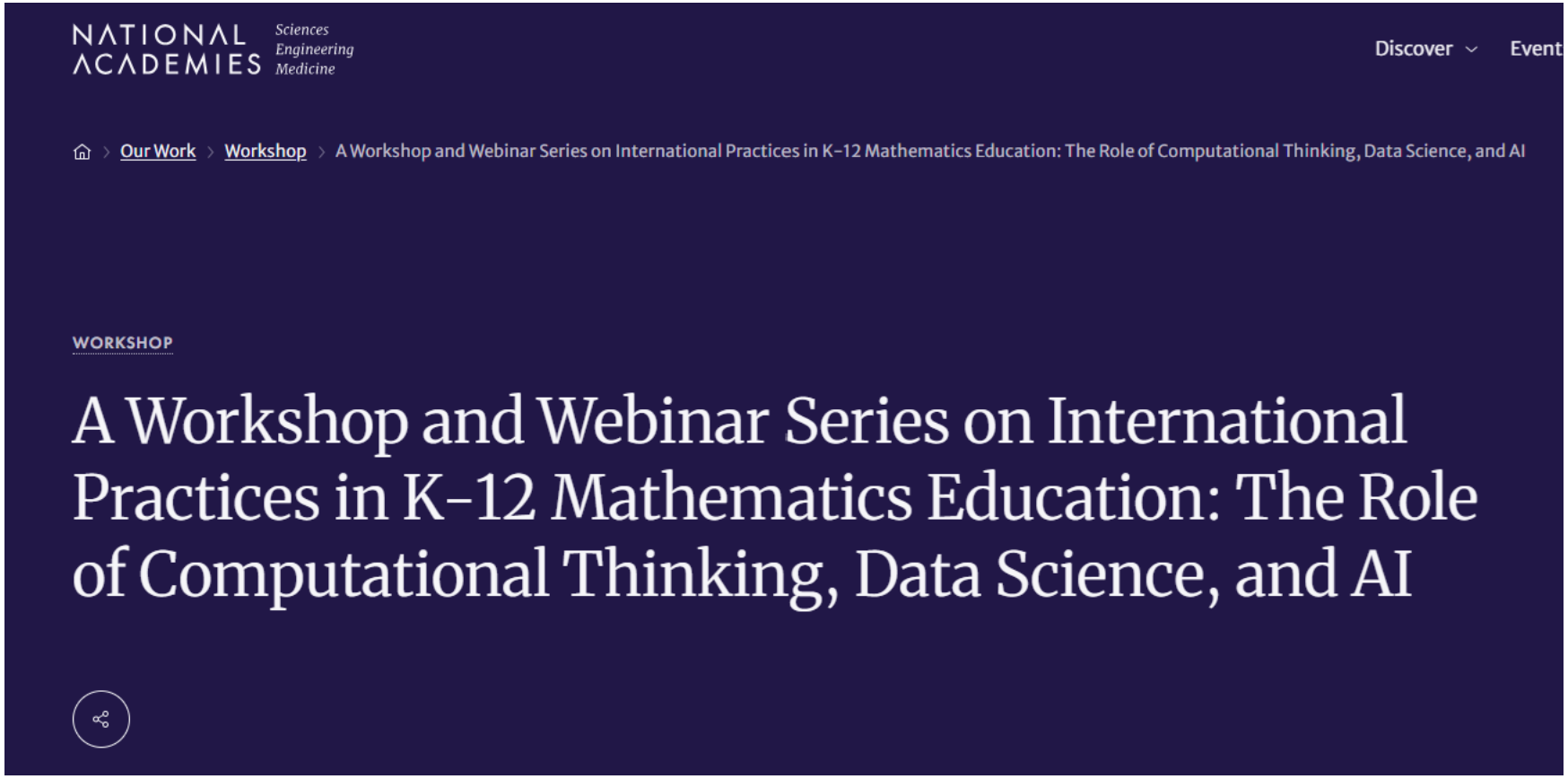
Modernizing Mathematics Education for Grades 9-14

A new Consensus Study

Expected Outcomes

- Advancing the body of knowledge
- A global understanding of best practices
- A **National Plan** and/or a **Consortium of Stakeholders**
- New collaborations and partnerships
- Development of new policies or revise old policies

Project Website - Follow Us

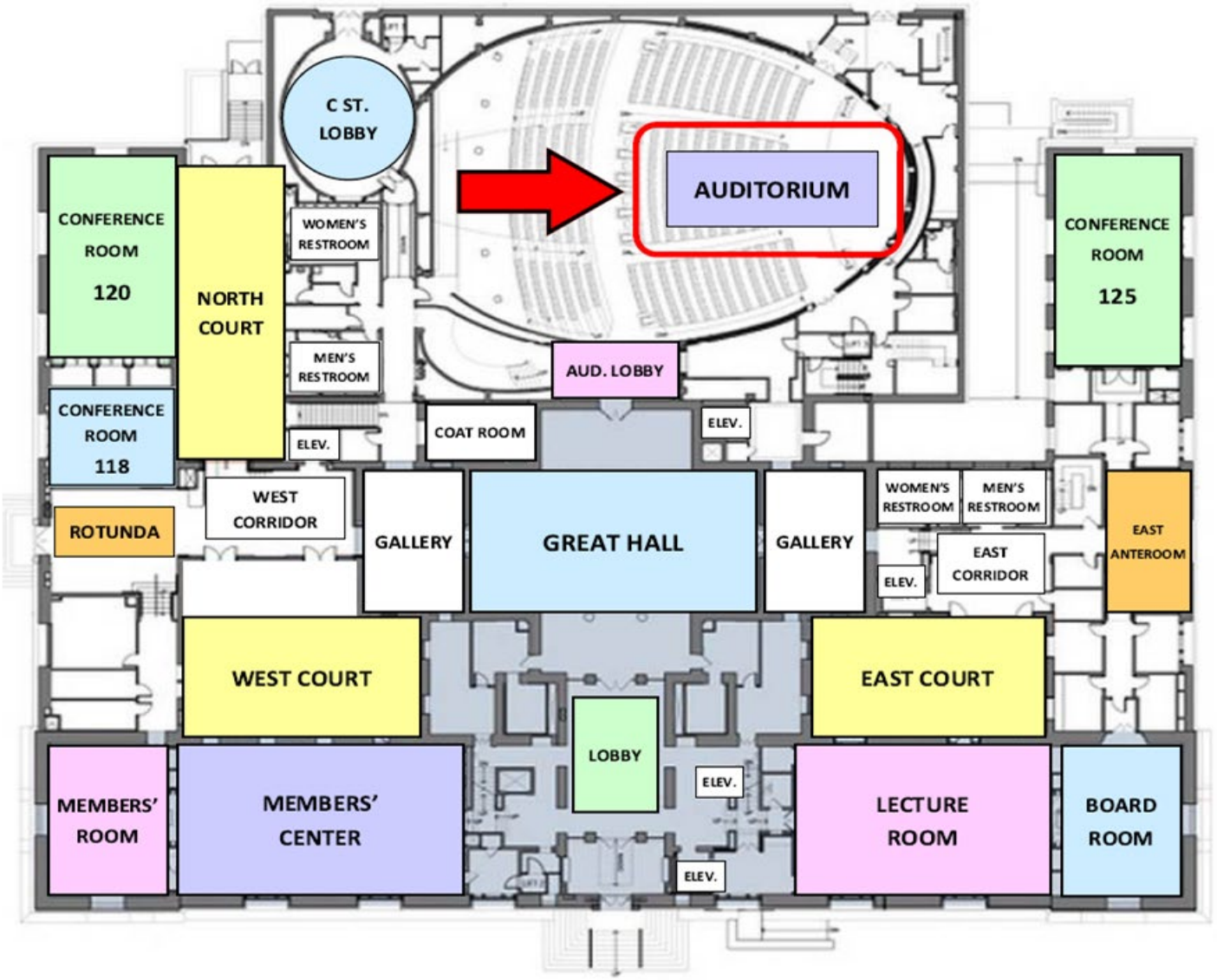


NASEM Staffers

Diamond de Guzman

Sophia Nordt

C STREET NW



CONSTITUTION AVENUE NW

-Let's continue the conversation!

-Email me (aferrerasfiel@nas.edu)
-Sign-up (distribution list)
-Join us (webinar series)
-Take the survey

Zarek Drozda

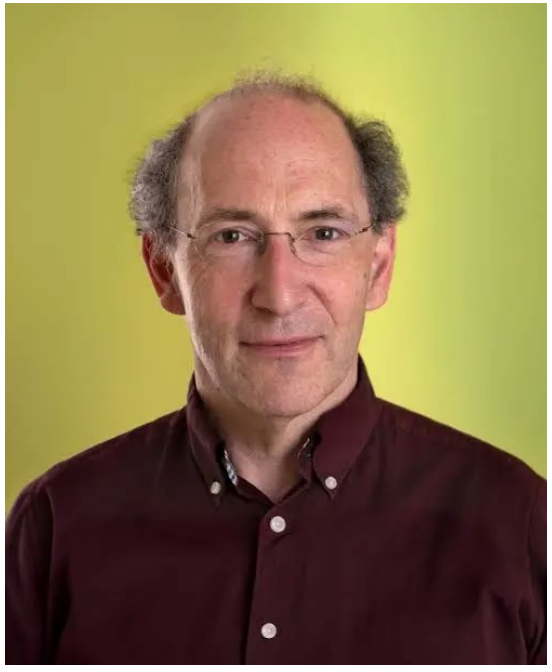
Zarek Drozda is the Director of Data Science 4 Everyone, a national initiative and coalition based at the University of Chicago. Zarek helped launch DS4E in 2019, co-organizing a coalition of 3000+ education leaders to advance data science, data literacy, and AI education in K-12 schools across 19 states. Zarek previously served for the U.S. Department of Education's Institute of Education Sciences (IES), where he led research on emerging technology and advised the national COVID response, coordinating data analytics for an inter-agency team between the White House, Department of Education, and Center for Disease Control (CDC). Zarek earned a Bachelor's degree in Economics from the University of Chicago, and loves using data to tackle complex social problems.

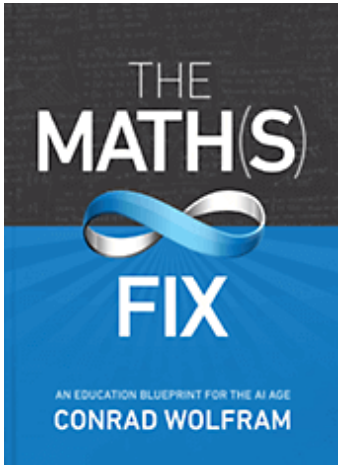
Padhu Seshaiyer

Dr. Padhu Seshaiyer is a Professor and Director at George Mason University where he has served in multiple leadership positions. During the last decade, he initiated and directed a variety of research, educational and outreach programs including faculty development, post-graduate, graduate and undergraduate research, K-12 outreach, teacher professional development, and enrichment programs, to foster the interest of students and teachers in Mathematics education at all levels. He serves on multiple appointed state-wide boards for the Office of the Governor. He has also helped to lead the VDoE taskforce for developing Data Science Standards of Learning, Curriculum and Implementation for Virginia. In April 2019, he was selected as one of the “Figures that Matter” for his contributions to Academia and Society and was awarded an honorary doctorate by Vrije Universiteit Brussels.

Lightning Talks

Conrad Wolfram





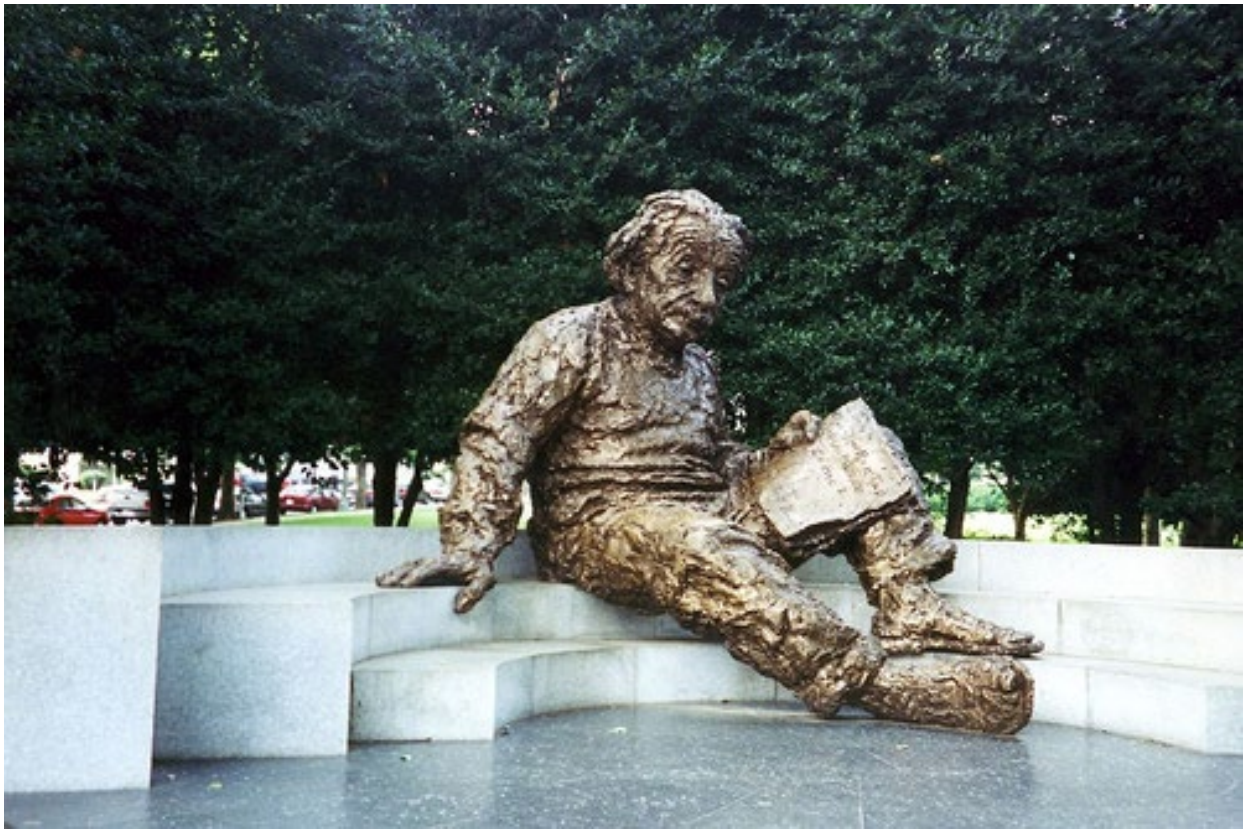
A physicist, mathematician, and technologist, has been Strategic Director and European Co-Founder/CEO of Wolfram - the “computation company” behind Mathematica, Wolfram Language and Wolfram|Alpha—for over 35 years.

Conrad is recognised as a thought leader in hybrid AI, ubiquitous computation, and 21st century education. He has pioneered a radical fix to transform maths to computer-based maths education, a subject fit for the AI age. To manifest this vision, he founded computerbasedmath.org and computationalthinking.org, rebuilding the curriculum to step up capabilities of top computational thinkers through to achieving computational literacy for everyone.

His acclaimed 2020 book, The Math(s) Fix lays out the detailed proposal. He regularly appears in the media to cover subjects ranging from decision-making in the computational age, education, and human capabilities for survival and value-added existence in the AI age.

Conrad attended Eton College and holds degrees in Natural Sciences and Maths from the University of Cambridge.

Group Picture and Lunch



Sessions - Day 1
Feb 23, 2026

Curriculum Development and Policy Implementation **Session 1** 1:00 PM - 2:30 PM	Moderator: **Padhu Seshaiyer & Hollylynne** **Speakers:** Kate Farrell (**Scotland**), Cheong Kang Hao (**Singapore**), Kyungwon Lee (**S. Korea**), Justine Sakurai (**Australia**)
Assessment Techniques and Student Learning **Session 2** 2:45PM - 4:15PM	Moderator: **Richard Velasco** **Speakers:** Pip Arnold (**New Zealand**), Stefania Bocconi (**Italy**), Sarah Schonbrodt (**Austria**), Claudia Vargas (**Chile**), Keith Young (**Ireland**),
Mixed Mini-Session 6:00PM - 6:45PM	Moderator: **Ana Ferreras** **Speakers:** Balazs Koren (**Hungary**), Pilar Velez (**Spain**), Ricardo Baeza Yates (**Global**)

Session 1

Curriculum Development and Policy Implementation

Feb 23, 2026

1:45 PM - 3:15 PM

In-Person Moderators:

Padhu Seshaiyer & Hollylynne Lee

Virtual Moderator: **Richard Velasco**

Speakers

Kate Farrell (**Scotland**)

Cheong Kang Hao (**Singapore**)

Kyungwon Lee (**S. Korea**)

Justine Sakurai (**Australia**)


IT'S TIME FOR
a
Coffee
BREAK

Session 2

Assessment Techniques and Student Learning

Feb 23, 2026

3:30PM - 5:00PM

Virtual Moderator: **Richard Velasco**

In-person Moderator: **Ana Ferreras Fiel**

Speakers

Pip Arnold (**New Zealand)**

Stefania Bocconi (**Italy**)

Sarah Schonbrodt (**Austria**)

Claudia Vargas (**Chile**)

Keith Young (**Ireland**)


LESSONS
LEARNED

Reflecting on Day 1

Curriculum Development

- What shifts are needed to integrate computational thinking and AI meaningfully?
- What content is outdated?
- What must become core rather than enrichment?

Policy Implementation

- What policy levers enable change?
- What barriers exist (funding, teacher prep, standards alignment)?
- Where is misalignment between vision and practice?

Assessment Techniques

- Are we assessing procedural fluency or mathematical thinking?
- How can AI/CT/data tools enhance formative assessment?
- What unintended consequences should we avoid?

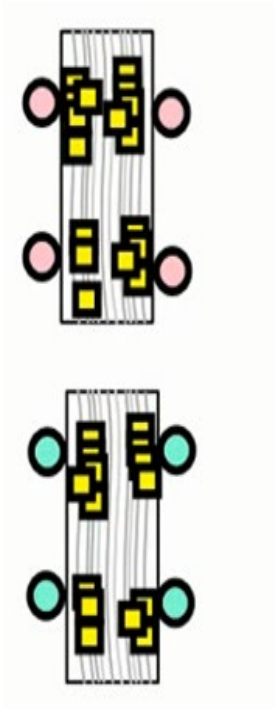
Student Learning

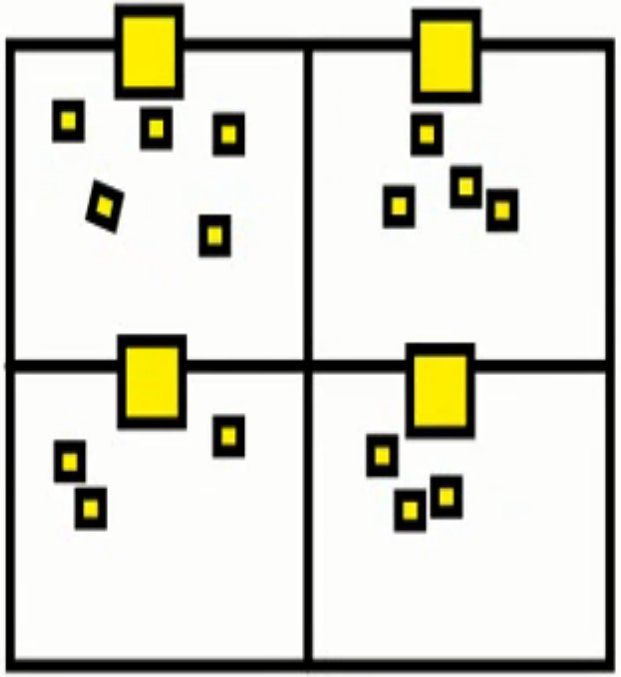
- What cognitive skills are most critical for the AI era?
- How do we preserve deep reasoning and creativity?
- How do we measure durable learning vs short-term performance?

Your Guiding Question
Four Quadrant Activity

From the two sessions, what are some of the most important insights, tensions, or opportunities you noticed?

- Curriculum Development
- Policy Implementation
- Assessment Techniques
- Student Learning





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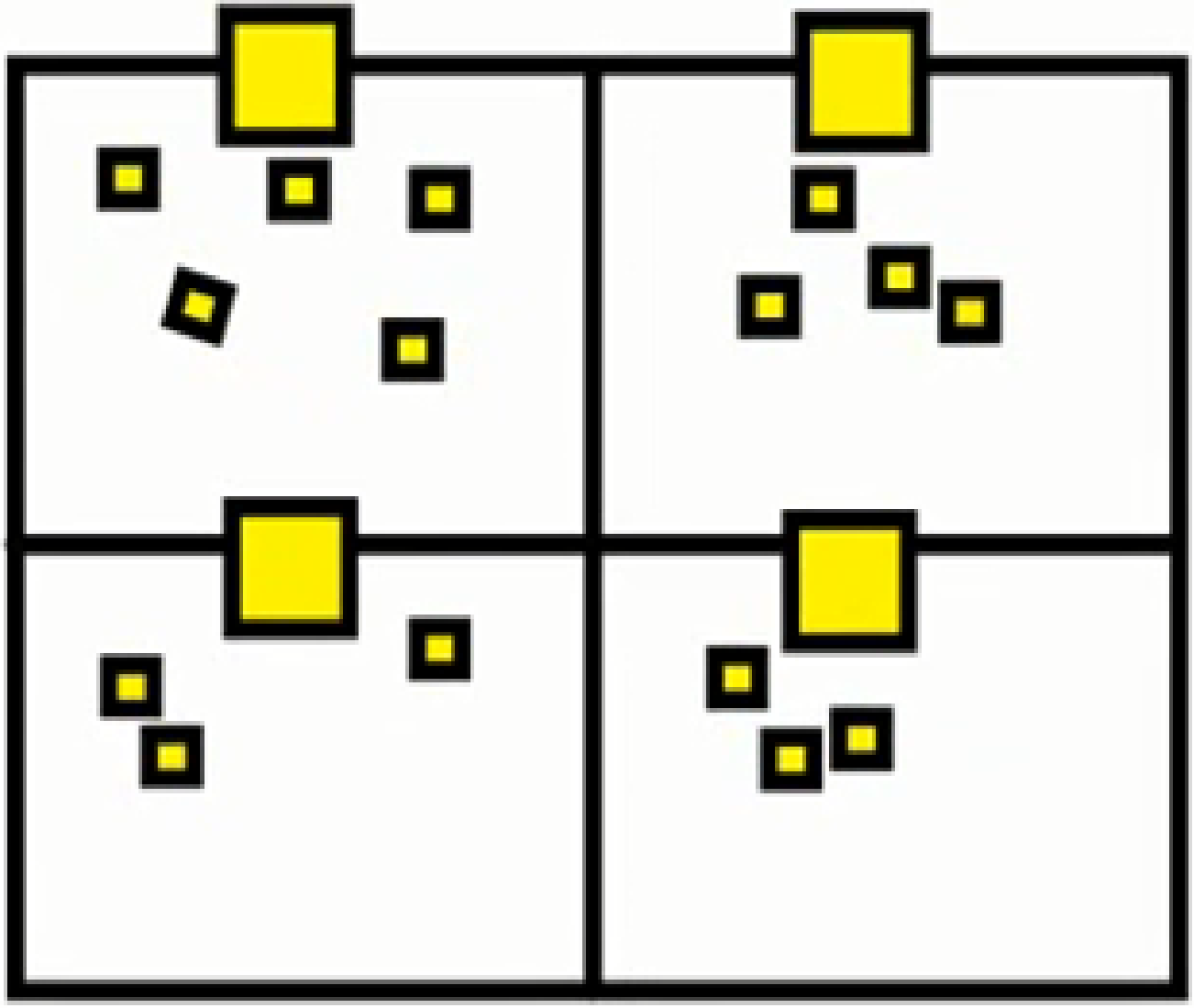


NETWORKING

Mixed Mini-Session

Feb 23, 2026 (7-8 Min)

6:30PM - 7:15PM

In-Person Moderator: **Ana Ferreras**

No livestreaming, only recording

Speakers:

Balazs Koren (**Hungary**)

Pilar Velez (**Spain**)

Ricardo Baeza Yates (**Global**)

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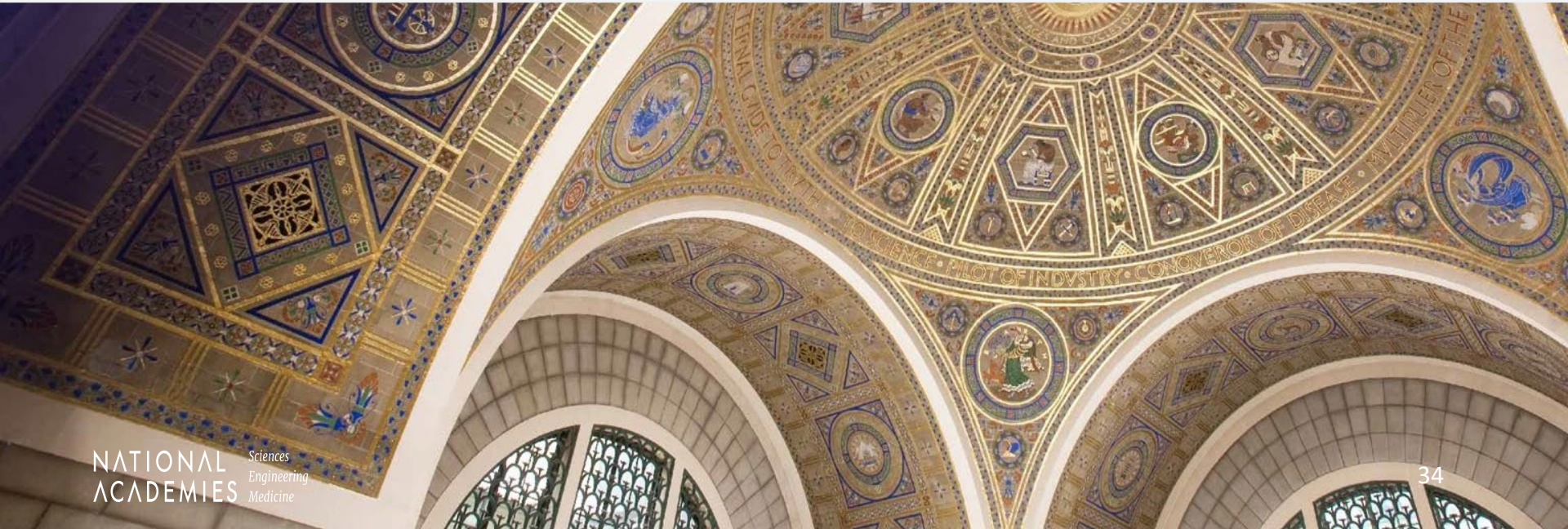
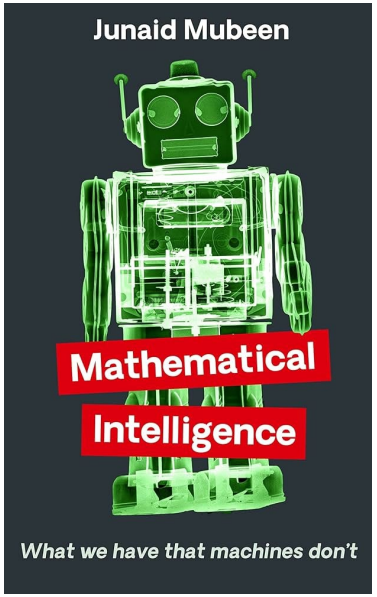


Junaid Mubeen



Dr. Junaid Mubeen is a mathematician turned educator, writer and speaker. He is the Director of Parallel, a set of online math education initiatives that he has developed with fellow writer Simon Singh. Dr Mubeen is author of two books, *Mathematical Intelligence: What we have that machines don't* and *Think Like a Mathematician*. He has a doctorate in Mathematics from Oxford and a master's in Education from Harvard, where he studied as a Kennedy Scholar.

Sessions - Day 2
Feb 24, 2026

Technology Tools and Frameworks **Session 3** **9:00am - 10:30am**	Moderator: **David Weintrop** **Speakers:** Steffen Schneider (**Germany**), Zhu Tianming (**Singapore**), Sejun Oh (**S. Korea**), Matti Tedre (**Finland**), Lucas Machado Rocha (**Brazil**)
Instructional Approaches and Professional Practice **Session 4** **10:45am - 12:15pm**	Moderator: **Hollylynne Lee** **Speakers:** Tin Lam Toh (**Singapore**), Rolf Biehler (**Germany**), Marku Hannula (**Finland)**, Takashi Kawakami (**Japan**), and Sibel Kazac (**Turkey**)

Session 3

Technology Tools and Frameworks

Feb 24, 2026

9:00AM - 10:30AM

In-person Moderator: **David Weintrop**

Virtual Moderator: **Hollylynne Lee**

Speakers:

Steffen Schneider (**Germany**)

Zhu Tianming (**Singapore**)

Sejun Oh (**S. Korea**)

Matti Tedre (**Finland**)

Lucas Machado Rocha (**Brazil**)

hyvää syntymäpäivää


IT'S TIME FOR
a
Coffee
BREAK

Session 4

Instructional Approaches and Professional Practice

Feb 24, 2026

10:45AM - 12:15PM

In-person Moderator: **Hollylynne Lee**

Virtual Moderator: **David Weintrop**

Speakers:

Tin Lam Toh (**Singapore**)

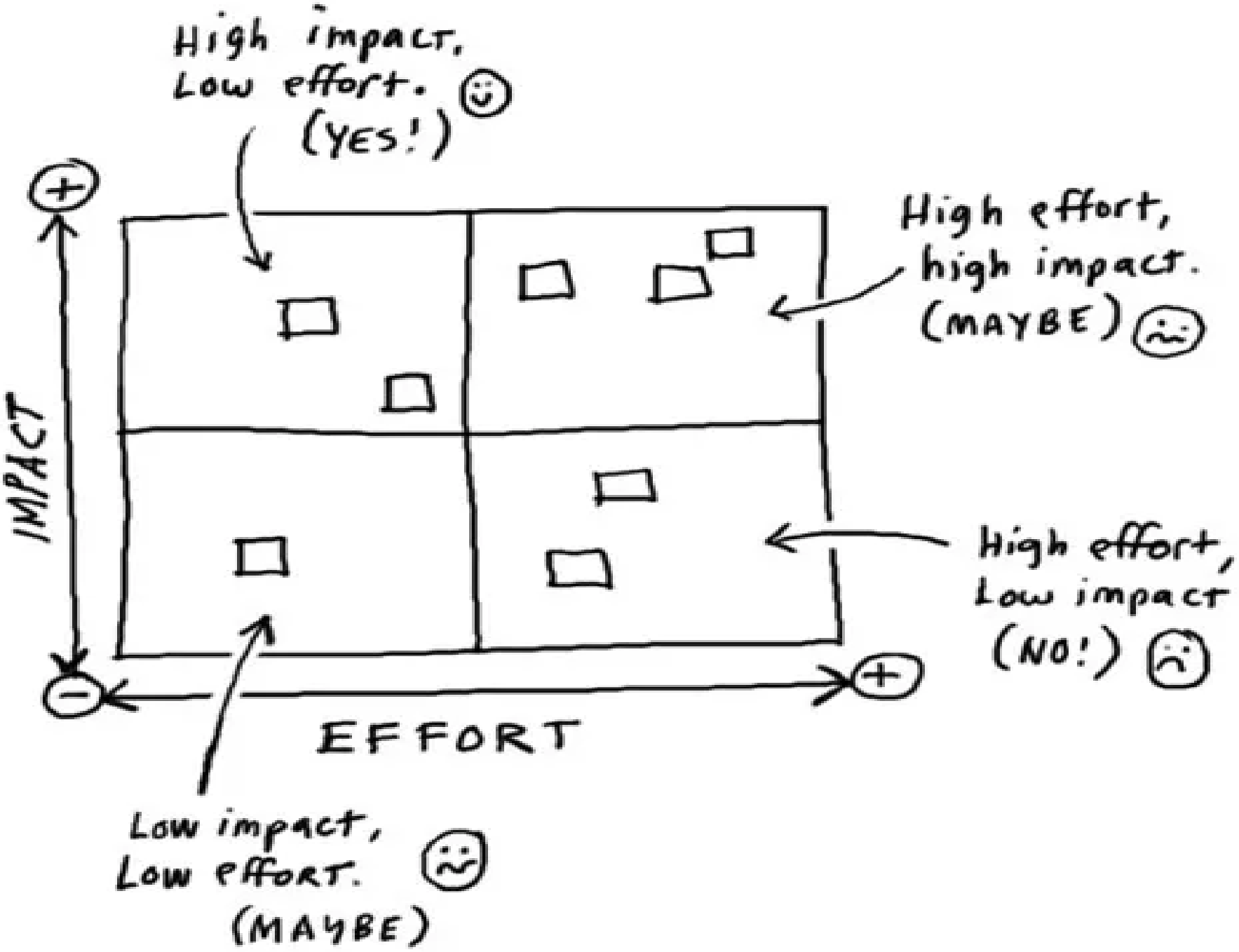
Rolf Biehler (**Germany**)

Markku Hannula (**Finland**)

Takashi Kawakami (**Japan**)

Sibel Kazak (**Turkey**)


LESSONS
LEARNED


High impact, Low effort. (YES!)
High effort, high impact. (MAYBE)
High effort, Low impact (NO!)
Low impact, Low effort. (MAYBE)
IMPACT
EFFORT
+
−
+

Workshop Takeaways

NATIONAL ACADEMIES Sciences Engineering Medicine

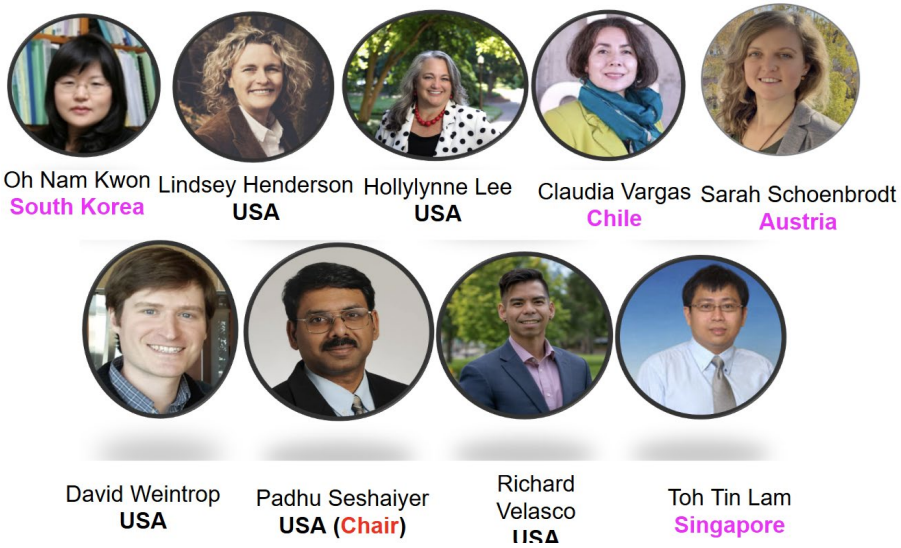
Ana Ferreras

Diamond de Guzman

Sophia Nordt

- Thank you!
- Quick Follow-up Survey
- Repository
  - Recordings
  - Master Slidedeck
  - Lightning Talks
  - Session Talks
  - Keynote Talks
  - Your input needed
- Picture Gallery
- Workshop Report
- Collaboration, Collaboration, Collaboration

Planning Committee



Oh Nam Kwon, South Korea
Lindsey Henderson, USA
Hollylynne Lee, USA
Claudia Vargas, Chile
Sarah Schoenbrodt, Austria
David Weintrop, USA
Padhu Seshaiyer, USA (Chair)
Richard Velasco, USA
Toh Tin Lam, Singapore


Announcements
AND UPCOMING EVENTS

YEAR OF MATH 2026

Home About Programs Events News

A Year Long Celebration of Mathematics

This national celebration and campaign aims to reignite America's appreciation for mathematics. By targeting a broad, nationwide audience, the initiative engages people to experience the beauty, relevance, and potential of math in profound ways. The Year of Math invites individuals of all backgrounds to explore the subject without fear of judgment or failure.

ICM 2026

https://theyearofmath.org/

International Mathematical Union IMU

International Congress of Mathematicians (ICM) 2026 in Philadelphia, USA | 23–30 July 2026

20th IMU General Assembly in New York City, USA | 20–21 July 2026

Association of Mathematics Teacher Educators

Lead the Way

AMTE is the largest professional organization devoted to the improvement of mathematics teacher education – it includes over 1,000 members supporting the preservice education and professional development of preK-16 teachers of mathematics. Members include professors, researchers, teacher-leaders, school mathematics coordinators, policy experts, graduate students, and others. »Learn More

2026 AMTE Annual Conference

- 866 Registrations (336 first time!)
- 589 Speakers

See you in Baltimore February 11-13, 2027

- Envision/Enact Collaborative Projects & Funded Research Efforts
- Inform/Challenge/Support as a Truly Global Community

Thank you!