

Futures Forum on Learning: Learning Engineering Tools Competition

2021 - 2022 Winners



Foreword



First launched in July 2020 at the Futures Forum on Learning, the Tools Competition was created to accelerate pandemic-related learning recovery and advance the field of learning engineering. The 2021 Tools Competition generated more than 800 initial proposals from more than 60 countries, showcasing innovative ways to address pressing challenges and opportunities in education.

The 30 winning teams, made up of entrepreneurs, learning scientists, and researchers from around the world, are eligible to receive nearly \$4 million in awards to fund their proposed tool, technology, platform, or research project.

The winning proposals address a range of learning goals—from improving adult learning to boost middle class

wages, to accelerating literacy and math skills for K-12 students, to creating informative assessments to help teachers better address the needs of their students, to creating tools that will accelerate the learning science research process.

The competition was sponsored by Schmidt Futures, Citadel Founder and CEO Ken Griffin, the Walton Family Foundation, the Siegel Family Endowment, the Overdeck Family Foundation, and the Bill & Melinda Gates Foundation.

The competition was administered by Georgia State University and The Learning Agency. For more information, contact toolscompetition@the-learning-agency.com

The Competition

Process Highlights



Eligible award prize of nearly \$4 million



Focus to meet needs of learners across generations



Proposals from over 60 countries



Dozens of new partnerships generated



Over 4 million students impacted

Even as the number of COVID-19 cases is slowing in some areas of the world, the pandemic's scars on the world's education system will remain for years. This year's Learning Engineering Tools Competition still had the goal of assisting a global educational system that is suffering due to the pandemic, but now turns its focus to the entire lifespan.

Rather than silver bullet solutions, the goal was to spur the development and deployment of technologies to maximize improvement over time. The competition looked at both our current reality and future problems as it aimed to mitigate learning loss in K-12 students, reduce educational disparities experienced by students of color, and provide alternative higher education pathways for all adults, but particularly low-income workers.

The winning tools fall under one of four competition tracks or areas in education:

- Accelerate learning in elementary and secondary literacy and math
- Transform K-12 assessments in both cost and quality
- Facilitate faster, better, and cheaper learning science research
- Drive improvements in adult learning that boost middle class wages

To encourage both new entrants and established platforms, participants requested an award based on existing user base and technical infrastructure. These two prize categories included Catalyst prizes (\$50,000 and under) and Mid-Large prizes (\$25,001 - \$250,000).

The competition was designed in multiple phases, allowing time for ideation, planning, team-building, and project refinement.

Sixty-four teams were invited to participate in Phase III, a pitch before a panel of judges. Judges made recommendations for the competition winners. In addition to the prize, the competition organizers will assist winners by connecting them with other experts and organizations in the field. Winning teams will also share insights from their work with external researchers to facilitate experimentation to improve student outcomes and better understand student learning.

Learning Engineering

Scientist Herb Simon first coined the term learning engineering, and it is defined as “the process and practice that applies the learning sciences using human-centered engineering design methodologies and data-informed decision making to support learners and their development.”

There are many sources of evidence that should influence decisions about learning and motivation to learn, including cognitive science, motivational science, social psychology and more. Recently, for example, there’s also been growing interest in the use of computer science to pursue rapid experimentation and continuous improvement with the goal of improving student outcomes.

This learning engineering approach is critical because the current process to test and establish the efficacy of new ideas is too long and too expensive. Learning science research remains slow, small-scale, and data-poor, compared to other fields. The result is that teachers and administrators often have neither proven tools nor the research at hand they need to make informed pedagogical decisions.

The Tools Competition is part of a larger initiative to promote learning engineering, which aims to improve educational outcomes by leveraging computing and data to dramatically increase the effectiveness of learning science as a discipline.



K-12 Accelerated Learning Track

Accelerate learning in elementary and secondary literacy and math

Winning tools in this track help students achieve or exceed proficiency in grade-level literacy or math skills, despite learning loss due to COVID.



Catalyst Winners



ART-Math

A Student-centered crowdsourcing platform that embraces cultural inspirations, critical thinking, collaboration, and creativity in mathematical learning

USA

ART-Math is a research-based, AI-powered interactive learning and creative construction platform for 3-8th grade students to engage in a transformative mathematical learning process: Abstraction, Representation, Transformation (ART). ART-Math substitutes conventional math problems for culturally relevant, student-generated real-life stories involving mathematical ideas, resulting in a unique student-centered approach to math education. This approach empowers students to be creators, supporters and collaborators through the learning process.



Dr. Alora Li, Co-founder, ART Math. Dr. Alora Li is currently working at Apple as a senior PM. She is interested in scalable technologies and innovative ways to support students' learning. Dr. Li has invented educational products and services adopted by large and small school districts in California and provided consultation to school and non-profit organization leaders on technology integration and educational innovation.

Wanli Xing, Co-founder, ART Math. Dr. Wanli Xing is currently working at the University of Florida as an Assistant Professor of Educational Technology. His research interest is artificial intelligence and learning analytics to leverage computing and big data in education to promote STEM and online education. Dr. Xing's work has been funded by the National Science Foundation, Institute of Educational Sciences, and private foundations.

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Catalyst Winners



Oko

An intelligent teaching assistant for small group learning in K-12 education

Oko Labs, Inc.
USA

Oko facilitates fun and rigorous games and puzzles for elementary math instruction in AI-enabled small group work. Small group learning is a powerful tool for differentiation, yet is out of reach for too many teachers due to a perfect storm of widening achievement gaps and severe staffing shortages. Oko solves these challenges using computer vision, natural language processing, and cognitive tutoring to make learning more fun, accessible, rigorous and equitable.



Matt Miller, Co-Founder and CEO, Oko. Matt Miller was previously CTO and VP of Labs at Amplify Education and Head of Product at Flatiron School. He is an active consultant, advisor, and mentor in the education space and serves as Technology Advisor at XQ Institute. He also co-founded Stories Bookshop and Storytelling Lab, a retail and creative education space in Brooklyn, NY. Earlier in his career, Miller co-founded CounterStorm, an AI-based intrusion detection and prevention company later acquired by Raytheon. Miller holds BS and MS degrees in Computer Science from Columbia University.

Laurence Holt, Co-Founder, Oko. Laurence Holt is Entrepreneur in Residence at XQ Institute, and was previously Chief Product Officer of Amplify Education. Prior to that, Holt founded Quidnunc, a consulting firm with clients such as Apple, Sprint, the BBC, and Goldman Sachs. Previously a bond trader with Credit Suisse First Boston, Holt also created "multi-user calendar" software, which he later sold to Microsoft. Holt holds a First Class BSc(Eng) Hons in Computing Science from Imperial College London and a Masters in Neuroscience and Education from Columbia University.

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RightOn!

Mobile platform that inspires math learning by embracing mistakes

RightOn Education
USA, Asia-Pacific

RightOn! is a mobile platform that enables math educators to engage students in identifying and discussing misconceptions, in parallel with correct answers. The platform consists of three components: a student-facing mobile app, a database of distractors and explanations, and a teacher dashboard. RightOn! fosters a positive culture of error, improves student self-efficacy, and increases math proficiency.



Sinclair Wu, Co-founder, RightOn Education. Sinclair Wu's work in education includes over 15 years of collaboration with classroom teachers, after-school program leaders, and diverse youth in underserved communities across the United States. In parallel, Wu also developed and honed skills in software product and program management, leading diverse teams at startups as well as global enterprises including Accenture and Google.

Allison S. Liu, Research Consultant, Righton Education. Dr. Allison Liu has over 10 years of cognitive and educational research experience in learning and motivation. She has led and contributed to many research projects involving large-scale educational math technologies, including ST Math and Graspable Math. Her research has been published in high-impact scholarly journals and presented at annual meetings of academic societies. Dr. Liu received her Ph.D. in Cognitive Psychology (Cognitive Neuroscience concentration) and completed a postdoc in Educational Psychology.

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Catalyst Winners



Bright Start

A tool for bridging reading instruction gaps through the use of a speech technology-enabled autonomous reading tutor

University of the West Indies (UWI), Mona & St. Augustine, CARiLIT
Jamaica, Trinidad and Tobago

Bright Start is a fully functional automated reading tutor that will enable vulnerable young children to access personalized and culturally-relevant reading instruction across the Caribbean. The solution aims to increase the number of young children that are reading before the age of 10. The tutor will supplement current reading instruction and provide targeted attention and feedback to children who are underserved due to large class sizes and difficult socioeconomic circumstances.



Andre Coy, Professor, University of the West Indies. Dr. Andre Coy has expertise in Speech and Language Technologies (SLT) with a focus on applications of SLT for education.

Phaedra Mohammed, Professor, University of the West Indies. Dr. Phaedra S. Mohammed has expertise in Intelligent Learning Systems (ILS). Her current focus is cultural modelling in ILS.



Play. Connect. Learn

A mobile app to foster accelerated learning in early years via parental engagement

Humanitus Learning Sciences and Consulting Services
India

Top Parent App is a free mobile solution that helps young children at home minimize learning loss through parental engagement. It is especially designed to support parents from low-income communities to help prepare their children for ongoing success in school and life. A new version of the app will integrate multimedia content that includes educational videos for children, parent-facing videos to scaffold learning through play, gamified worksheets and monthly assessments that are mapped to an accelerated learning curriculum to take the child from emergent to foundational literacy and numeracy (FLN).



Sashwati Banerjee, Founding Managing Director, Sesame Workshop in India. Sashwati Banerjee is a social development professional with over three decades of experience in organizational leadership, media, & communication for change. Incubated under the Entrepreneur in Residence program at Central Square Foundation, she has recently founded Nudged Trust & Humanitus Learning Solutions to provide an open source, free mobile app to help low income families support their young children's development at home. Banerjee was responsible for establishing Sesame Workshop in India, and has led the organization as the Founding Managing Director since 2006.

Akshina Gupta, Chief Operating Officer, Top Parent. Akshina Gupta is a 2013 graduate from Indian Institute of Technology Delhi (IITD) and has spent 8+ years in the space of EdTech products and strategy consulting. She comes with a deep passion for holistic early childhood education and is committed to using the power of technology to create scalable ECE solutions. In her current role as Chief Operating Officer at Top Parent, she works closely with product, data and marketing teams to rapidly expand Top Parent's reach and build an impactful tech platform addressing the critical ECE needs of lower income segments in the country.

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ThinkZone

Leveraging low-cost technology for personalized at-home learning in vernacular language

ThinkZone
India

ThinkZone's home-based learning solution uses free, low-cost technological solutions to engage parents regardless of their income in their children's learning journey. Delivered in vernacular language via voice calls and messaging apps, the solution supports parents as they work towards developing their children's foundational educational skills. Parents receive structured and personalized activity-based learning content -- whose efficacy is backed by independent research -- which requires only a few minutes of daily engagement.



Binayak Acharya, Founder and CEO, ThinkZone. Binayak Acharya is a World Bank & CEMEX-TEC(Mexico) awarded social entrepreneur. Acharya, a Laureate Global Fellow and MassChallenge Israel Alumnus, has worked extensively in emerging markets for more than 10 years in multiple domains including implementing large-scale ICT4D and skills development programs, education technology products development, and deployment and early-grade education pedagogy. His background also includes working in Global Education Practice (World Bank), Impact Investment (Unitus), and technology products development (L&T Infotech).

Itishree Behera, Program Lead, ThinkZone. Itishree Behera is an India Fellow Alumna with a Masters in Applied Psychology. Behera has multiple years of experience in pre-primary and primary educational content development, grassroots level training (Training of Trainers), community engagement modules development, and education program operations. She has also worked across domains like development communication, monitoring and evaluation, and stakeholder and government communication and partnerships.

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Escritura+

Improving the Spanish-language writing skills of native and heritage speakers with adaptive games

Beereaders, Inc.
USA, Latin America

Escritura+ is a set of games targeting specific Spanish-language writing skills for K-12 native and heritage speakers. Housed within a larger writing platform that BeeReaders is building, the tool will give students engaging ways to correct common writing errors and teachers data on student progress. Teaching and learning to write well takes time, and this tool eases the burden on teachers and empowers Spanish-speaking students to be confident, lucid writers in their home language.

Kristina Cordero, Director of Research, BeeReaders. Kristina Cordero holds a BA in Romance Languages from Harvard College and a PhD in Engineering from Universidad Católica de Chile, where she and a team created literacy apps for primary school students. She is the author of the children's book *Didi recorre Nueva York* (2013), academic and non-academic articles, and a regular blog for BeeReaders. Her research interests include literacy and technology; biliteracy and bilingualism; libraries and library users. She has also translated over 25 books and teaches translation at Brooklyn College, in New York.

Rubén Arias, Co-founder and CEO, BeeReaders. Rubén Arias has been an edtech entrepreneur for over 11 years. He grew up in Santiago, Chile in a low-income home, and was the first in his family to go to college, thanks to hard work and scholarships. After earning his degree in engineering, he chose to focus on education as a way of helping to drive change for students like him. To date, Arias has created edtech products that have served over half a million K-12 Spanish-speaking students in Latin America. His companies have raised over \$6M in venture capital and generated over \$5M in revenue.

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K-12 Assessment Track

Transform K-12 assessments in both cost and quality

Winning tools in this track improve the quality of assessment to better meet the needs of educators, students and families while reducing the time or cost to develop or administer them.



Catalyst Winners



GrouPer

A learning analytic tool for real-time assessment and group-based personalized instruction in the science classroom

Weizmann Institute of Science
Israel

GrouPer (Group-based Personalization) is an assessment and recommendation system that uses big data and machine learning to assist science teachers in providing personalized instruction. It identifies student knowledge profiles and recommends learning sequences that match their needs. GrouPer also collects teachers' choices and improves its recommendations based on their collective wisdom. The tool was co-designed with teachers and was recently integrated into PeTeL, a free learning platform that serves teachers across Israel, developed within Weizmann's Science Teaching Department.



Giora Alexandron, Assistant Professor in the Department of Science Teaching, Weizmann Institute of Science. Giora Alexandron is the head of the Computational Approaches to Science Education (CASEd) research group. His research combines science education and the learning sciences, AI, and human-computer interaction, in order to study and develop learning environments that are more adapted to the needs of different learners. Alexandron's main focus is on K-12 science education and on Teacher:AI partnership - how AI can work alongside teachers in order to assist them in providing more personalized instruction..

Tanya Nazaretsky, Doctoral student, Department of Science Teaching, Weizmann Institute of Science. Tanya Nazaretsky is a computer scientist by education and started her professional career in the hi-tech industry as a software architect and engineer and later as an engineering manager. In recent years, she has aimed to apply her computer science background to education. Nazaretsky studies and develops AI and Natural Language Processing methods to assist teachers in providing personalized instruction. Her research has already led to the development of two AI-powered technologies for science teachers.

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Catalyst Winners



Kvasir

Automated question generation for improving text comprehension

Clevent Technology LLC
Romania

Kvasir generates relevant questions of varying complexity for a given text using Natural Language Generation (NLG) methods and validation by a tutor. While question answering is an effective way of improving reading comprehension, tutors have limited time for asking individualized questions and providing personalized feedback. Through its Human-in-the-Loop (HITL) approach, Kvasir provides tutors and teachers with a resource for making a complex and time-consuming task easier.



Mihai Dascălu, CTO, Clevent. Mihai Dascălu is a Professor of Computer Science at University Politehnica of Bucharest, and has extensive experience in national and international research projects with more than 250 published papers. Dascălu holds the US patent #9734144, as well as 4 Romanian patent applications. Moreover, Dascălu obtained a Senior Fulbright scholarship in 2015 and is a corresponding member of the Academy of Romanian Scientists.

Ștefan Rușeți, Lead Programmer, Clevent. Ștefan Rușeți holds a PhD with the highest distinction in Computer Science. Rușeți has worked on Q&A systems and has developed several applications integrating cutting edge tools for applied NLP in Education. He has experience in 7+ national and international projects with more than 45 published papers, including 11 articles at top conferences in AI in education and NLP, renowned international conferences and Q1 journals.

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Short Answer

Short Answer

Peer feedback for increased student engagement and deeper learning

Stanford University
USA

Short Answer leverages peer-driven formative assessment to close the feedback time gap and increase student agency in grades 6-12. On the Short Answer platform, students construct responses to teacher-generated questions, compare and provide feedback on peer answers, and converse as a class to deepen understanding of material. Short Answer is grounded in best practices of formative assessment, empowering teachers to make more informed instructional decisions, engage their students, and reduce achievement gaps.



Adam Sparks, Graduate student, Stanford University. Adam Sparks was raised by a family of educators in Louisville, Nebraska. He is a licensed teacher with 7 years of middle and high school teaching experience in Nebraska, China, and Chicago. Sparks is currently a full-time Master's student in Stanford's Learning Design and Technology program. In his work at Stanford, Sparks focuses on improving formative assessment for teachers and students. Outside of work, Sparks loves to read, travel, and cheer on the Nebraska Cornhuskers (Go Big Red).

Ben Thier, Graduate student, Stanford University. Ben Thier was born and raised in New York City. He graduated from Duke University where he studied neuroscience and education. Thier is currently a full-time Master's student in Stanford's Learning Design and Technology program. Previously, Thier worked as an education systems support analyst at Macmillan Learning and interned on learning experience design projects for large companies and start-ups. Thier enjoys solving crosswords, playing tennis, scuba diving, and watching Survivor.

Alexa Sparks, Senior Software Engineer, WP Engine. Alexa Sparks grew up in Omaha, Nebraska. She is a senior software engineer at WP Engine with 5 years of software development experience. Sparks previously worked as an ESL teacher and is passionate about using technology to help make teachers' jobs easier. Outside of work, Sparks loves to read, travel, golf, ski, and enjoy the outdoors.

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Catalyst Winners



Tracking the Math Process

A teaching platform that collects thinking data

Uplift K12
USA

Uplift K12 is a teaching platform that builds foundational fluency in math through active participation, live peer collaboration, and formative assessment. The new tool substitutes concrete manipulatives, such as wooden or plastic blocks, for virtual manipulatives, bringing the highly effective CRA (Concrete-Representational-Abstract) methodology into the virtual classroom. Anonymous data of student performance, keyboard clicks, and mouse movements are collected and stored for researchers to access for free.

Mehul Shah, Co-founder, Uplift K12. Mehul Shah taught for 10 years in low performing schools and low income communities. His focus was on math intervention and helping students catch up to grade level and build math confidence using manipulatives. He then transitioned full-time into product management and front-end web development before co-founding Uplift K12 with Michelle.

Michelle Shah, Co-founder, Uplift K12. Michelle Shah was a Montessori-certified teacher, who worked in public school settings for 10 years. Her experience focused on the early grades of Pre-K-3 to kindergarten. Shah now focuses on curriculum design and operations as a co-founder for Uplift K12.

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Dyscover

Web app to facilitate dyslexia screening and reading assessment at scale

Dystech
Australia & Spain

Dyscover is an online reading assessment platform that uses Artificial Intelligence (AI) and machine learning to reduce hours of traditional reading assessment into a 5-minute online test. The tool provides normed scores through the use of voice recognition technology, objectively assesses users based on six aspects of reading, and screens for dyslexia. In doing so, Dyscover provides teachers and educators with immediate and accurate measurements of learner reading performance efficiently and at scale.

Hugo Richard, Co-founder and CEO, Dystech. Hugo Richard believes all problems have solutions if we keep looking. He is an entrepreneur doing his best work at the intersection of artificial intelligence, ed-tech and dyslexia. While the work he does matters to him, his ambition is for it to ignite lives around the world, especially that of children. And the first step is through democratising dyslexia & reading assessment.

Kate Bertoncello, Product Owner, Dystech. Kate Bertoncello is a literacy interventionist, ex-primary school teacher and a mom to a dyslexic son. Bertoncello's passion is to support students who have been officially identified as having learning differences as well as those who are casualties of the educational system. Bertoncello is a product owner at Dystech working with the same passion but helping to positively impact many, many more children beyond the boundaries of Bertoncello's city.

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Actionable Assessment

Scaffolding students' experience with assessment results

Wisconsin Center for Education Research at University of Wisconsin-Madison, Activate Learning USA

Actionable Assessment is a digital reporting tool that engages students in interpreting and using assessment results to drive learning, improving the quality of the student assessment experience. The tool will help make students' assessment results interpretable and actionable, fostering positive assessment use and learning habits. It will also report information to teachers, enabling them to better meet learning needs.



Laura J. Wright, Project Director, University of Wisconsin-Madison. Dr. Laura Wright has more than 20 years of experience in education and education research. She began her career as an ESOL teacher and holds a PhD in sociolinguistics from Georgetown University. Her research focuses on how students express understanding through discourse in complex learning environments. She has investigated how students demonstrate evidence of knowledge, skills, and abilities through multiple modalities such as action, speaking and writing. She has worked in assessment for 15 years and specializes in technology-based assessments.

Linda Malkin, Outreach Specialist, University of Wisconsin-Madison. Linda Malkin spent 19 years as an informal educator and administrator before becoming a middle school science teacher in 2010. She holds a BS in Meteorology from the UW-Madison, an MA in Urban Education Studies from Yale, and a certificate in Online Teaching and Learning from Michigan State. Before joining the ONPAR team as an Outreach Specialist in 2016, she spent 3 years working on a grant-funded effort to transform her K-8 general education school into a S.T.E.M. magnet school. In her spare time, Malkin enjoys environmental stewardship activities and working as a Master Naturalist.

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Fast Cycle Feedback

Studying the efficacy of feedback at scale

Formative USA

Fast Cycle Feedback within the Formative platform tightens the student-teacher feedback loop by making feedback instant, meaningful, and personalized. Research shows that feedback has the power to drive foundational learning -- but we don't yet know exactly why. Fast Cycle Feedback will make it possible to study how the speed, frequency, and modality of feedback impact student achievement outcomes. The team will share the data collected with the education research community, furthering insights on effective feedback for students and teachers everywhere.



Craig Jones, Co-founder and CEO, Formative. As a science teacher at a struggling public middle school in Los Angeles, Craig Jones built Formative to help understand his students' strengths and weaknesses. Jones's role in this initiative will be providing executive oversight to the project. Jones will work with stakeholders in the education space to share findings around feedback and ensure that best practices can be implemented in classrooms everywhere.

Sana Gabula, Chief of Staff, Formative. Sana Gabula brings deep experience in her role from executive roles at BrightBytes, a data and analytics platform for education, and is passionate about scaling impact through data-driven operations and technology in education. Gabula's role in this initiative will be to serve as the project manager. In this capacity, she will work with Formative's engineering and data teams, as well as the project team's research partner LearnPlatform and the education research community to ensure that the insights developed can be used by educators everywhere.

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Smart Paper

Technology to connect paper and digital learning

Playpower Labs, Shonan Seminar
India & Japan

Smart Paper is an assessment technology that analyzes learning data on paper. By leveraging AI and handwriting recognition, it has the potential to impact each and every child in the world who learns on paper, reaching students in high-tech, low-tech and no-tech areas. Smart Paper lowers the cost of administering classroom assessments, reduces teachers' evaluation time, and improves the learning communication between students, teachers, and parents by using existing community and school resources. The tool will empower educators to better support students by showing their strengths and weaknesses in written problem-solving processes. By connecting paper with digital tools, Smart Paper will enable users to equitably measure learning at scale.



Nirmal Patel, Chief Data Scientist, Playpower Labs. Nirmal Patel is a multi-award-winning edtech researcher and a computing child prodigy. He has close to fifteen years of hands-on work experience spanning across programming, data science, AI, and learning science. Patel started his edtech career as an educational game developer. Later, he started doing educational data research for which he received several awards, including a best paper award at the Intelligent Tutoring Systems conference. Patel has published more than ten peer-reviewed research articles in the area of education technology, showcasing ideas that can impact learners at scale.

Yoshi Okamoto, Director of SHO-zemi Labs, Shonan Seminar. Yoshi Okamoto is a published expert on EdTech, AI, Human-Computer Interaction, and Natural Language Understanding who has worked on collaborative research projects with and in tech startups and universities. His recent projects have applied technology specifically to the classrooms and have included innovative research with some of the world's leading universities and educational institutions. In addition, he has consulted and mentored EdTech startups, communities, and government entities globally.

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The Platform for Actionable Reading Assessment

An online reading assessment and intervention platform that measures the efficacy of reading interventions

Literably
USA

The Platform for Actionable Reading Assessment (PARA) is an online reading assessment and intervention platform. PARA's assessment uses speech recognition, human transcription, and selected response to provide fast, accurate, actionable data, across all key reading skills. PARA's intervention platform provides teachers with personalized recommendations by student and class and allows researchers to rapidly measure the efficacy of reading interventions.



Tyler Borek, CEO and Founder, Literably. Tyler Borek and the team at Literably are on a mission to help every child master reading. Under Borek's leadership, Literably has grown to serve hundreds of thousands of students across hundreds of school and district customers, including some of America's largest school districts. Before Literably, Borek was an Urban Fellow at the New York City Department of Education and a Corps Member at MATCH Charter Public School. He graduated with honors from Yale College.

Seamus Martin, VP of Engineering, Literably. Seamus Martin began his career as a high school math teacher before moving into software engineering, with a focus on educational assessment. Martin built Schoology's assessment scoring pipeline, which scores hundreds of thousands of assessments per day. At Literably, Martin leads the engineering team. Martin has a Masters in Education from Johns Hopkins.

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ThinkCERCA

Writing and Feedback Tool

USA, Argentina, & Uruguay

ThinkCERCA is developing an assessment and feedback tool trained to identify aspects of an argument. When students compose an argumentative essay, the tool highlights key writing elements, thereby assessing students while they write, enabling formative feedback and providing mini-instructional events to drive learning while writing. As a result, ThinkCERCA provides authentic assessment of learning experiences and assists teachers to provide actionable feedback.



Eileen Murphy, Founder and CEO, ThinkCERCA. ThinkCERCA is a tool designed to support systems-level literacy growth. Eileen Murphy spent 20 years as a classroom teacher, English department chair, and Director of Curriculum and Instruction for 115 schools before founding ThinkCERCA. She is also an NCTE author and a Pahara Aspen Fellow.

Harry Layman, PhD, Senior Engineer, ThinkCERCA. At ThinkCERCA, Harry Layman, PhD, leads the development of the assessment and feedback tool. Previously, he was an Executive Director for the College Board. He has an MBA and a BS in Computer Science from Columbia University, and earned a PhD in Educational Assessment, Testing and Measurement from the University of Leicester. Dr. Layman holds certifications in machine learning and solution architecture and has been CTO for multiple venture-funded enterprises.

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Learning Science Research Track

Facilitate faster, better, and cheaper learning science research

Winning tools in this track accelerate the learning science research process by facilitating A/B testing and random controlled trials, improving research design, promoting replication, or releasing knowledge and data for external research.



Catalyst Winners



Automated Assessment of Classroom Discussion Quality

Web-Based app to advance learning science research

University of Pittsburgh's Learning Research and Development Center
USA

Automated Assessment of Classroom Discussion Quality will create a web-based application that uses natural language processing and machine learning methods to analyze classroom discussion quality at scale. Discussion quality measures will look at both teacher and student talk moves, will be fine-grained enough to test theory-driven hypotheses around the role of talk and learning, and will facilitate longitudinal studies to better understand trajectories of growth toward ambitious and equitable teaching practices.



Diane Litman, Professor of Computer Science, Senior Scientist at the University of Pittsburgh's Learning Research and Development Center. Diane Litman's research focuses on enhancing the effectiveness of educational technology through Artificial Intelligence, particularly Natural Language Processing. Litman is the past Director of the Intelligent Systems Program at the University of Pittsburgh.

Lindsay Clare Matsumura, Senior Scientist, University of Pittsburgh's Learning Research and Development Center. Lindsay Clare Matsumura is a Professor in the School of Education's Learning Sciences and Policy program and a Research-Practice Partner with the Institute for Learning. Matsumura's research centers on literacy learning, measurement of classroom instruction and teachers' professional development.

Richard Correnti, Research Scientist, University of Pittsburgh's Learning Research and Development Center. Richard Correnti's research interests have centered on the measurement, determinants and consequences of high-quality teaching practice. He has examined causal models of how interventions have improved teaching practice. Correnti is an Associate Professor in the School of Education.

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OpenCurriculum Flow

From hypothesis to learning science experiment in less than 10 minutes

OpenCurriculum
USA

OpenCurriculum Flow is a free and open-source learning science experiment builder for researchers and teachers. It comes with ready-made, vetted curricula with which to run A/B tests and Randomized Controlled Trials (RCTs). It takes less than 10 minutes to create a ready-to-go experiment using code-free tools and generate easy-to-share datasets, making experimentation with learning as easy as making a website on Squarespace.

Varun Arora, CEO, OpenCurriculum. OpenCurriculum is an education technology nonprofit which uses expert systems and NLP to help K-12 teachers design pedagogically effective curriculum and instruction, using research and evidence from classrooms around the world. Previously, Varun Arora worked as a Senior AI Product Leader at Baidu's Silicon Valley AI Research Lab, and held several edTech product, engineering, and business intelligence roles at Inkling, the United Nations, and on a One Laptop Per Child deployment in Polynesia, apart from brief teaching stints. He received his Bachelors and Masters from CMU.

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Understanding Mind Wandering During Learning

Creating a large dataset for more generalizable and equitable research

University of Minnesota, University of Pennsylvania
USA

This large-scale dataset will provide opportunities for researchers to develop more accurate and generalizable detectors of mind wandering. Research shows that when a student misses critical information due to mind wandering, it can inhibit their ability to make further connections as the learning session unfolds. Using an unobtrusive, equitable, and low-cost device, a dataset including interaction data, webcam-based eye-gaze features, and self-reports of mind wandering will be collected.



Caitlin Mills, Assistant Professor of Educational Psychology, University of Minnesota. Caitlin Mills has a PhD in Cognitive Psychology, and her research focuses on constructs related to mind wandering and engagement during learning and in everyday life contexts. She aims to characterize when mind wandering occurs, how it influences learning, and ways to automatically detect it in real-time. Other research interests include the influence of mind wandering in ubiquitous tasks such as driving and how it relates to functional aspects of our lives such as affect, mental health, boredom, and creativity.

Ryan Baker, Associate Professor, University of Pennsylvania. Ryan Baker is the Director of the Penn Center for Learning Analytics. Baker's lab conducts research on engagement and robust learning within online and blended learning, seeking to find actionable indicators that can be used today but which predict future student outcomes. Baker has developed models that can automatically detect student engagement in over a dozen online learning environments, and has led the development of an observational protocol and app for field observation of student engagement.

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M-Powering Teachers

A machine learning tool for mathematics instruction measurement and feedback

Harvard University, University of Maryland College Park, Stanford University
USA

M-Powering Teachers (MPT) uses natural language processing to analyze recordings of mathematics teaching for information on student mathematical reasoning, teacher-student mathematical language, and equity-centered classroom practices. Teachers use the MPT tool to receive feedback on their teaching, and researchers can use it to replace or augment human scoring, allowing learning designs to scale more quickly and efficiently.



Heather Hill, Hazen-Nicoli Professor of Teacher Learning and Practice, Harvard Graduate School of Education. Heather Hill studies policies and programs designed to improve teacher and teaching quality.

Dora Demszky, PhD candidate in Linguistics, Stanford University. Dora Demszky works on developing natural language processing methods to support equitable and student-centered education.

Jing Liu, Assistant Professor of Education Policy, University of Maryland, College Park. Jing Liu's research centers on student well-being and human resources policy in K-12 education, with a particular focus on the intersection of data science and education policy.

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Scalable Methods for Customized Digital Learning

A toolkit that enables developers to create personalized in-app student experiences and guide teachers to track progress

Golub Capital Social Impact Lab at Stanford University's Graduate School of Business
USA

Scalable Methods for Customized Digital Learning is a toolkit that provides education application developers with algorithms for assessment of student proficiency. Precise assessment of students' strengths and weaknesses makes it possible to customize learning modules, find the right balance between easy and difficult materials, and substantially improve learning outcomes. These algorithms will make this type of personalization possible, and the accompanying toolkit includes notebooks that guide developers through comparing methods, evaluating performance, and creating teacher dashboards.



Susan Athey, Professor, Stanford Graduate School of Business. Susan Athey is a member of the National Academy of Science, and is the recipient of the John Bates Clark Medal. Her research focuses on the economics of digitization, marketplace design, and the intersection of econometrics and machine learning. She leads the Golub Capital Social Impact Lab, a lab that leverages social science research and technology to improve social sector effectiveness and has several collaborations with educational technology providers.

Ayush Kanodia, Fourth year PhD Student in Computer Science, Stanford University. Ayush Kanodia is supervised by Professor Susan Athey. His research lies in the intersection of Machine learning and Economics, and specifically Economic Structural Modeling, Recommendation Systems and Experimental Design. He has modeled human choice in a variety of settings such as education, retail and labor markets. Kanodia holds an undergraduate degree in Computer Science from The Indian Institute of Technology in Bombay.

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EIDU Contributor Platform

Accelerating research on personalization algorithms

EIDU
Germany & Kenya

EIDU has developed a mobile learning platform and an implementation program for low-income countries, focused on improving numeracy and literacy. The new open EIDU Contributor Platform will enable researchers to contribute and research personalization algorithms. Moreover, it will allow for education research on underserved communities, such as schools in informal settlements and remote villages, in turn helping to narrow opportunity gaps. EIDU Contributor provides a quick feedback cycle of build, measure, and learn using an automated submission and evaluation system.



Bernd Roggendorf, Founder and CTO, EIDU. For 25 years, Bernd Roggendorf has been founding and leading successful market leader tech companies. Then 9 years ago he turned his focus to the underprivileged and lived with his wife and his two daughters for several months in Kibera, one of the biggest slums in Africa. There he learned firsthand how quality education could make a fundamental difference in the lives of millions of children. Combined with the proliferation of mobile devices even in the most remote areas, he saw the chance to improve learning outcomes on a global scale: EIDU was born.

Nina Bolte, Head of Learning, EIDU. Nina Bolte holds a MSc. Developmental Psychology (with specific focus on school psychology), and MSc. Pedagogical Science from the University of Reggio Emilia (with special focus on the Reggio Emilia approach in ECDE settings). Bolte has over eight years of experience in the ECDE sector, and worked as a consultant, teacher trainer, evaluator, and head of several early childhood institutions before joining EIDU in 2016. Bolte loves spending time in Kenya and seeing EIDU's work in action.

[Website](#)



Open Game Data

Accelerating learning science research with games

University of Wisconsin-Madison
USA

Open Game Data is a platform to accelerate research of educational games for learning and assessment. Developed by a growing community of studios, researchers and designers, the tool will reduce a significant barrier for learning science researcher participation with learning games by eliminating the cost associated with common tasks required for data collection while freeing users to concentrate on innovation and discovery. As a result, it will broaden participation in educational data science by making datasets and analysis code openly available.



David Gagnon, Director, Field Day. Field Day is an education research laboratory at the Wisconsin Center for Education Research. Composed of a diverse team of educational researchers, software engineers, artists and storytellers, David Gagnon's lab is focused on the intersection of situated and sociocultural learning theories with digital media, specifically video games, virtual reality and educational data mining. Field Day's games have won numerous awards and are used by millions of learners yearly.

[Website](#)

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Adult Learning Track

Drive improvements in adult learning that boost middle class wages

Winning tools in this track increase the effectiveness or reach of post-secondary education or skill training to prepare adults, particularly non-college educated adults, for the changing economy.



Catalyst Winners



Botter

A platform for creating interactive online courses delivered inside popular messaging apps

Langbot, Inc.
Netherlands & Ethiopia

Botter is a platform for creating online courses delivered through popular messaging apps that many learners use daily. The platform uses chatbots to explain concepts and quiz students using components such as text, images, gifs, audio, or short videos. Botter is available to learners with even low bandwidth, which allows learners with limited access to receive engaging and interactive lessons on any device. Botter's educational chatbots have already helped to support a total of 300,000 learners. In this next stage of the project, Botter will enhance the algorithms that drive the chatbots and make the growing dataset available to researchers.



Nathnael Gossaye Endehsaw, Co-founder and CEO, Botter. Nathnael Gossaye Endehsaw graduated with a degree in Computer Science and has worked as a lead developer at various tech companies for over 8 years building software for clients around the world. Gossaye has also won several awards for different personal projects and given talks on AI in Education at UNESCO panels in Paris and Morocco.

Melikte Paulos, Data Scientist. Melikte Paulos graduated with a Professional Doctorate in Engineering for Data Science from the Technology University of Eindhoven. Prior to a career in data science, Paulos worked as a software engineer and project manager at various companies for 6+ years.

[Website](#)

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Catalyst Winners



My Academic Pathway Toolkit

Helping college students select an educational pathway based on their personal interests

Central Carolina Community College, Central Carolina Community College Foundation, Inc.
USA

The My Academic Pathway (MAP) toolkit—a suite of tools to assist college students in selecting an educational pathway based on their personal interests—has successfully helped 83% of community college students enroll in programs consistent with their interests. This project will modify MAP to reach a larger audience, particularly students in continuing education programs, with a goal of reducing both student program changes and the time required to obtain a credential.



Scott Byington, Associate V.P. for Onboarding and Advising, Central Carolina Community College, Central Carolina Community College Foundation, Inc. Scott Byington oversees onboarding and advising redesign, first year experience courses, and initiatives enhancing college transfer. Byington has served as a consultant for multiple institutions on advising redesign and training, as a reaccreditation reviewer, and has held leadership roles with state and national advising associations. Byington has a B.S. in Biology from James Madison University (VA), an M.S. in Biology from West Virginia University, and an M.S. in Academic Advising from Kansas State University.

Adam Wade, Director of Admissions, Central Carolina Community College, Central Carolina Community College Foundation, Inc. Adam Wade oversees Onboarding, Advising, and Success Coaching, chairs the Behavioral Assessment Team, coordinates the Safe Zone program, and leads efforts for CCCC's Intake Survey. Wade's experience includes Success Coaching, Academic Advising, Orientation, Admissions, First-Year Programs, Behavioral Assessment, LGBTQ+ programming, Housing and Residence Life, and Student Conduct. Wade has a B.A. in Communication Studies from the University of North Carolina Wilmington and an M.A. in College Student Development from Appalachian State University.

[Website](#)

[Twitter](#)



UnlockEd

Unlocking education access for incarcerated students

Unlocked Labs
USA

UnlockEd is an all-in-one education access and management platform for correctional environments. Education has been proven to be the most effective catalyst in creating opportunity and reducing recidivism for incarcerated individuals. Yet the vast majority of incarcerated individuals don't have access to consistent, high quality education. Developed and tested by a team of currently incarcerated individuals, UnlockEd is available without internet access, which will increase access to education and improve outcomes for incarcerated students.



Jessica Hicklin, Co-founder and CTO, UnlockedLabs. Jessica Hicklin came to this role as a formerly incarcerated individual who spent 26 years on the inside during which time she crafted and facilitated many educational initiatives. When she is not working to advance the presence of post-secondary education in the carceral space, Hicklin is also an advocate for the rights of transfolks. Throughout her incarceration she brought and won two landmark trans rights cases (Hicklin v. Lombardi and Kansas birth certificate case).

Haley Shoaf, Co-founder, Unlocked Labs. Haley Shoaf is also the Vice President of Justice Programs for LaunchCode, running coding education programs designed to help current and formerly incarcerated people in Missouri build tech skills. Prior to this role, she worked on national expansion efforts for LaunchCode, and also ran the Georgetown Prison Outreach program facilitating educational opportunities for incarcerated individuals in DC and Virginia.

[Website](#)

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Generation

Generation

Integrated solution to prepare, place, and support adult learners into life-changing careers

Northeastern University
USA & Mexico

Generation trains and places adult learners into careers that would otherwise likely be inaccessible. Generation's tool – three interlocking portals for learners, employers, and staff – captures rich data from each of the seven steps of their methodology. To date, it has 20 million data points across 16 countries and 35 professions – linking socio-demographics with learning outcomes, employment, and personal and financial well-being over time. The aim is to yield insights for academics, policymakers, and practitioners seeking to improve global workforce system outcomes.



Mona Mourshed, Founding CEO, Generation: You Employed. Generation: You Employed is a global employment non-profit network that trains and places adult learners into careers that are otherwise inaccessible. Mona Mourshed has decades of experience as a leader in the education and workforce space and has authored widely cited reports and articles. Mourshed previously founded and led McKinsey & Company's global education practice. She was selected as one of Fortune Magazine's '40 under 40', and sits on the boards of New America, Teach for All, and Last Mile Health. Mourshed has a B.A. from Stanford University and a Ph.D. from MIT.

Ali Jaffer, Chief Operating Officer, Generation: You Employed. Ali Jaffer has been with the organization since 2015. Prior to Generation, Jaffer was an Associate Partner with McKinsey & Company, where he worked with public, private, and non-profit clients. Jaffer has also spent time at global development organizations, including the Aga Khan Development Network and the World Health Organization. Jaffer holds an MBA from Harvard Business School, as well as a B.Sc. and a B.S.N from the University of Pennsylvania. He currently lives in Toronto, where he volunteers with several community organizations.

[Website](#)

[Twitter](#)



YouthNet

Leveraging technology to upskill youth in rural India

Pratham Education Foundation
India

YouthNet is a remote learning program that is aimed at driving a community mission led by Youth who work towards education, environment, health and livelihood. The program is a one-stop solution for learners ages 14-25, allowing them to register for the program, enroll in courses, take assessments, earn certificates, collect data and much more. The tool's features are offered in 6 regional languages through an integrated, easy-to-use and customizable interface which makes the platform scalable according to contextual needs. Working across 20,000 communities in India and 16 states, YouthNet aims to upskill youth and prepare them for higher education, work and life.



Nishant Baghel, Director of Technology Innovations, Pratham Education Foundation. Nishant Baghel leads digital initiatives that typically connect the disconnected across rural parts of India. He specializes in leveraging advanced technologies for rural EdTech and creating learning opportunities for all. He oversees programs that reach more than 500,000 children and have been recognized by the World Economic Forum as the only 'School of Future' from India.

Annapoorni Chandrashekar, Senior Manager, Pratham Education Foundation. Annapoorni Chandrashekar works with digital content, technology, and implementation teams to transition pilots to scale and offer open learning initiatives to diverse learners. Prior to Pratham, Chandrashekar bootstrapped an EdTech startup incubated at IIM Bangalore that helps young learners pursue their passion through mentorship. She is an Alumnus of the Young India Fellowship at Ashoka University, and has a bachelor's degree in automobile engineering. She has been a speaker at TEDx, an IIEP author of learning sciences and a Bharatnatyam dancer.

[Website](#)

[Twitter](#)



ChatClass

Upskilling through conversational learning on WhatsApp and Instagram

ChatClass
Brazil

ChatClass is a conversational learning platform which upskills workers through an interactive chatbot, engaging content, and AI feedback. Using popular chat apps, ChatClass is able to reach and engage many underserved frontline workers that lack access to typical learning platforms or formal professional development programs. This project will facilitate ChatClass to expand capacity for customization by any teacher or HR professional who seeks to use their own content to train and assess more learners.

Jan Krutzinna, Founder and CEO, ChatClass. Jan Krutzinna graduated in Computer Science and Psychology from Harvard University, and holds an MBA from the Harvard Business School. Krutzinna co-founded a fintech venture in New York and led data science at a gaming startup in Brazil. Krutzinna also worked at McKinsey & Company and the United Nations, co-authoring a report on entrepreneurship in developing countries for the Secretary General.

[Website](#)

Judges

The 2021 Tools Competition gathered a judging panel of experts within the education field for each track. To support the diversity of perspectives and regions represented in the competition, our judges included venture capitalists, philanthropists, teachers, and researchers, whose professional experiences and viewpoints guided our selection process. Judges offered expert opinions and feedback during the selection process.

K-12 Accelerated Learning Track

Advisors



Julia Quinn
Deputy Director of
Philanthropy
Citadel



Melanie Dukes
Senior Program Officer
Overdeck Family Foundation



Kumar Garg
Vice President of
Partnerships
Schmidt Futures

Judges



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Partner
NewSchools Venture
Fund



Janet Coffey, PhD
Program Director, Science
Gordon and Betty Moore
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Ian Connell
Investment Principal
Charter School Growth Fund



Peter Konmen
Regional Performance
Manager
Rising Academy Network



Ashwin Rajendra
Senior Portfolio
Manager, Education
One8 Foundation



Callie Riley
Senior Portfolio Manager for
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Charles and Lynn Schusterman
Family Philanthropies



Katrina Stevens
President and CEO
The Tech Interactive



Katie McCarthy, PhD
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K-12 Assessment Track

Advisors



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Walton Family Foundation



Laurie Szejnberg
Director of Research and
Senior Program Officer,
Exceptional Editors
Overdeck Family Foundation



Kumar Garg
Vice President of
Partnerships
Schmidt Futures

Judges



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Co-founder and Head
of School
DeKalb Brilliance
Academy



Tracey Albert
Head of Programmes
- Sierra Leone
Rising Academy
Network



**Angela
Debarger, PhD**
Education Program
Officer
William and Flora
Hewlett Foundation



Gouri Gupta
Director of EdTech
Central Square
Foundation



**September
Jarrett**
Program Officer
Heising-Simons
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Lewis Leiboh
Senior Program
Officer, Educational
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**Katie McCarthy,
PhD**
Assistant Professor
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Psychology
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Jim Short
Program Director,
Leadership and
Teaching to Advance
Learning
Carnegie Corporation
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Carina Wong
Deputy Director &
Senior Advisor for
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Learning Science Research Track

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Kumar Garg
Vice President of
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Judges



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Senior Program Officer
Walton Family
Foundation



Kevin Bromer
Executive Director, Head
of Technology and Data
Strategy
Ballmer Group



Scott Crossley, PhD
Professor of Applied
Linguistics and Learning
Sciences
Georgia State
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Laurence Holt
Entrepreneur In
Residence
XQ Institute



Nancy Lue
Senior Director
Valhalla Foundation



Vivian Tseng, PhD
Senior Vice President, Program
William T. Grant Foundation



Tatiyana Webb
Teacher & Instructional
Coach
Memphis Grizzlies Prep
Charter School

Adult Learning Track

Advisors



Joshua Elder
Director of Grants
Management
Siegel Family
Endowment



Kumar Garg
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Judges



**Courtney Brown,
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Vice President of
Impact and Planning
Lumina Foundation



Nafez Dakkak
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Senior Advisor to the
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Barbara Bush
Foundation for Family
Literacy



Kelly McManus
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**Ben Shapiro,
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Daniel Uribe
Principal
David Velez and Mariel
Reyes' Philanthropic
Platform



**Anika Warren
Wood, PhD**
Operating Partner &
Chief Organizational
Effectiveness Officer
and Member, Operating
Committee
Draper Richards Kaplan
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