

Thank you for participating in our third session of the 2023 Learning for Life Series!

Founded in 1975 by Shirley Welsh Ryan, the series aims to educate participants on important technological advances and current events. This year's program is focused on Artificial Intelligence.

Artificial Intelligence and Its Many Implications

Artificial intelligence (AI) has taken our society by storm. With the grand promise of reproducing human intelligence within machines, the implications of this rapidly advancing technology are broad. In this lecture series, we'll start with a broad overview of AI, its capabilities and limitations, and then look at its applications in healthcare and education. We'll end with a discussion of the importance of creativity to understand why artificial intelligence may always remain "artificial."

October 24th's program looked at Artificial Intelligence in Education.

Moderator

Jennifer Carolan started her career as a classroom teacher in Chicago where she taught history for 7 years in traditional district schools. She moved to the Silicon Valley in 2000 to attend Stanford University and was inspired by all of the entrepreneurs working on their ideas. She found a way to use her teaching experience to support these founders. She worked at NewSchools Venture Fund, an organization founded by John Doerr and Brook Byers, for 9 years and learned the craft of venture capital. She also co-created and taught the popular course Innovations in Teaching at Stanford University for 3 years. This year, Jennifer is on the teaching team for Lean Launchpad ENGR 245 at Stanford. She co-founded her first fund NewSchools Seed Fund in 2011, her second, [Reach Capital](#) I in 2015, Reach II in 2018 and Reach III in 2020. Reach backs amazing and often unlikely entrepreneurs who are passionate about bringing cutting edge



technology into education. The Reach portfolio of 100+ companies are creating new opportunities for people everywhere who might think of themselves as underdogs due to background or other challenges. Jennifer has sat on the boards of [Nearpod](#), [Ellevation Education](#), [Desmos](#), [Outschool](#), [BetterLesson](#), and [BookNook](#) and is heavily involved in [TeachFX](#), Derivata and [Sketchy](#).

Panelists

As director of the [Cook Family Writing Program](#), **Elizabeth Lenaghan** works with colleagues across the university to help design writing objectives, curricula, and assessments that align with the program's overarching objective: to help writers communicate clearly and persuasively. As part of this work, Lenaghan belongs to the Provost's Advisory Committee on Generative AI.



Lenaghan teaches the college seminar, The Terror and Triumph of Youth, which explores historic and contemporary risk taking critically assess the unique opportunities that college students have to innovate across a variety of domains. Lenaghan's work with graduate writers extends to her role as the assistant director of Northwestern University's Writing Place. She also facilitates writing workshops, interdisciplinary writing groups, and dissertation boot camps aimed at teaching participants concrete strategies and exercises to improve both the quality and productivity of their writing, both within the workshops and outside of them. Like her teaching, Lenaghan's university and professional service focus empowering writers and students to succeed on their own terms. In partnership with the Provost's Office, she has facilitated several faculty writing retreats. She is the academic co-director of the Summer Academic Workshop. And, in her role as faculty-in-residence in the Elder Residential Community, she engages students in regular social events that emphasize the importance of taking breaks from their often over-scheduled lives.

Sepehr Vakil is an associate professor of Learning Sciences in the School of Education and Social Policy at Northwestern University. Previously he was Assistant Professor of STEM Education and the Associate Director of Equity & Inclusion in the Center for STEM Education at the University of Texas at Austin. He received his PhD in the Education in Mathematics, Science, and Technology program at UC Berkeley, and his B.S and M.S in Electrical Engineering from UCLA.



Marcelo Worsley is an Associate Professor in Computer Science and Learning Sciences. He directs the [technological innovations for inclusive learning and teaching \(tiilt\) lab](#), which aims to develop pedagogical and technological solutions for supporting learning among diverse populations in hands-on, collaborative, environments. More specifically, the goal of his research is to promote equity and advance society's understanding of how students learn in complex learning environments by forging new opportunities for using multimodal technology. The use of multimodal technology is multi-fold. First, the environments that he studies allow students to experience learning across a range of modalities. Second, he uses multimodal signal processing and artificial intelligence to study how student learning is demonstrated across different modalities and time scales. Third, he designs multimodal interfaces that support inclusivity and deepen student learning, while also considering ways to use multimodal data to support student and teacher reflection.



Introductory overview from Jennifer Carolan

Jennifer Carolan began as a teacher, teaching for seven years. During this time, she became intrigued with how venture capital could bring cutting edge technologies to schools to bring equity to our schools. Through her funds, she has

supported everything from math platform companies like [Desmos](#) to companies leading the future of work such as Handshake. Another example is [TeachFX](#) which is an app on a phone that allows teachers to record their classes and, within an hour, returns full analytics of the class. The teacher can see how much they talked, the students talked, the tone of the teacher's voice, the cadence of the questions – a very interesting tool.

Jennifer then described Generative AI as an umbrella term for creative AI that produces original content on demand rather than simply analyzing or classifying data. What's interesting is we have these foundational models such as large language models (LLMs) upon which applications are built to generate text, code, images, speech, and video. *Recent studies have indicated that nearly half of all venture funding is currently going to AI companies.*

Jennifer highlighted a number of companies in her portfolio.

- [Wrangle Jobs](#) allows job seekers to feed in their LinkedIn and Twitter profiles and other online presences to produce cover letters, resumes, and job application answers, enabling applicants whose first language may not be English to be better positioned to apply for technical jobs.
- [Turnitin](#) enables plagiarism checking and used mostly in higher ed
- [Duolingo](#)
- [Grammarly](#)
- [Quillbot](#)
- [Elicit](#)

Jennifer began the panel discussion asking Sepher Vakil to provide a historical perspective on technology in education, given this is not the first time we are thinking about how new technology may revolutionize how we teach and learn.

Sepher began by emphasizing the interest in examining not only how technology can improve our competencies but also understanding its societal implications. He highlighted an interesting book written by [Larry Cuban](#) which chronicles the developments in radio, film, television and early efforts in bringing computers into the classroom and how each generation of technology is accompanied by

narratives of disruptive innovation. He finds that introduction of new technologies has led to specific targeted gains in specific contexts but they have also reproduced patterns and behaviors tied to inequality. For example, we remember the incredible attention to MOOCs, massive open online courses. Studies have found that they had their greatest impact for people who already have a master's degree and are earning their second. However, there are positive signals. In 2014, the RAND Corporation studied the effects of Carnegie Learning's cognitive tutor use in algebra classrooms. The study results were mixed but did find a positive, statistically significant increased learning gain for ninth-grade algebra students who were exposed to two years of interventions.

Sepher also mentioned the work of MIT researcher [Justin Reich](#) who has written about the EdTech [Matthews Effect](#) to describe how resources accrue and can deepen inequities.

Jennifer then asked Elizabeth Lenaghan how Northwestern is managing and guiding the use of AI tools at the University.

Elizabeth began by emphasizing that, like many colleges and universities, Northwestern is not providing an overarching policy or recommendation on the use of AI. Different course contexts and different learning objectives should determine and guide use. <https://ai.northwestern.edu/> is a nexus of information about AI – people who do research in the area, events, instructor resources, etc.

Elizabeth emphasized that as co-director of our University's [Writing Center](#), she still places a huge value on human-to-human tutoring and interaction. AI has the potential to extend and be used as a supplement but not as a replacement. One way instructors have been managing the onslaught of AI is by doing more in-class assessments. That has positives and negatives. For example, the writing process often is an extended activity that requires time and thought for revisions. The University is not using the plagiarism detector Turnitin because of the false positives that end up being detrimental to learning.

Jennifer asked Marcelo Worsley to describe how students are using AI and how instructors are incorporating it into their teaching.

Marcelo highlighted work he is doing in conjunction with [Northwestern's Buffett Institute](#) connected to AI, text, and gender equity in language classes. Many instructional materials still use dated representations of women to teach vocabulary. Marcelo and colleagues are using generative AI to rewrite these narratives to provide a more balanced perspective. He also described how this work can be extended to think about how to incorporate non-binary pronouns that is not traditionally within a standard language class.

He also presented how generative AI can “scaffold” students, helping them with the cold start problem, for example getting started on essays. Marcelo emphasized the need to be intentional with the design of AI tools – looking at audience, context, community, and goals.

The question of equity runs through all of today's discussion. Who gets access to these “co-pilot” tools can have remarkable repercussions. For example, there is a **10x difference** in productivity when you compare computer scientists to leverage AI tools to find bugs compared to those who do not. We need to make sure fear does not unfairly deprive segments of our society from something that may be valuable. For example, within 30 days of ChatGPT becoming publicly available, the NYC public schools banned it while some affluent school districts embraced it. This intersection of equity, teacher shortages, and technology will continue to present opportunities and challenges that require careful management.