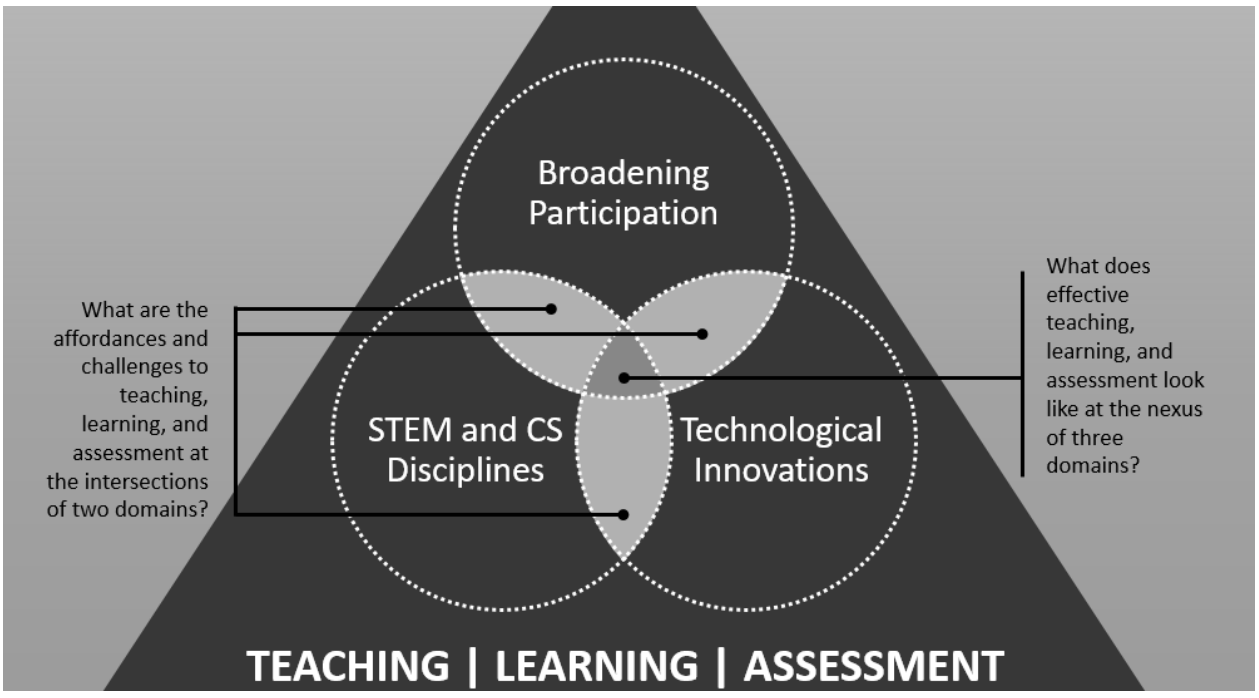
MEETING THEME

Nexus of Change:
Exploring the Intersections Between Broadening Participation, STEM and Computer Science Disciplines, and Technological Innovations in Education

Broadening participation, STEM and computer science disciplines, and technological innovations are three domains that shape the landscape of STEM education (see Figure 1). DRK–12 and STEM+C projects are situated often at the intersections of two of these domains and sometimes at the nexus of all three. The 2018 DRK–12 PI Meeting will highlight how this cross-domain, collaborative work both capitalizes on the affordances and meets the challenges that emerge in these spaces, as well as how this work contributes to reaching the goal of the *10 Big Ideas for Future NSF Investments* (https://www.nsf.gov/about/congress/reports/nsf_big_ideas.pdf).[1]



[1] *10 Big Ideas for Future NSF Investments* includes (a) NSF INCLUDES: Enhancing Science and Engineering Through Diversity, (b) The Future of Work at the Human–Technology Frontier, and (c) Harnessing Data for 21st Century Science and Engineering.

Figure 1. Intersections and nexus of broadening participation, STEM and computer science disciplines, and technological innovations.

Broadening participation in STEM education is becoming ever more critical as traditionally underrepresented groups in terms of socioeconomic status and race/ethnicity are now the majority across the nation. Furthermore, English learners make up a sizable and the fastest growing subset of the U.S. student population. Broadening participation also includes students with disabilities and cognitive differences, women and girls, students in rural areas, and other student groups that are underserved and/or underrepresented in STEM.

The increasingly diverse student population is expected to meet new college- and career-ready content standards by the end of high school, including the *Common Core State Standards for Mathematics* and the *Next Generation Science Standards.* In particular, the new content standards call for all students to engage in academically rigorous, language-intensive STEM disciplinary practices (e.g., reasoning, developing and using models, arguing from evidence, constructing explanations). In addition, the *STEM Education Act of 2015* states that "'STEM education' means education in the disciplines of science, technology, engineering, and mathematics, including computer science" (https://www.congress.gov/bill/114th-congress/house-bill/1020/text)—formally expanding the definition to highlight computer science within the school curriculum. Simultaneously, computational thinking, computer science, and data science are becoming increasingly essential for all students to become STEM professionals or participants in an information society.

Technological innovations are not only changing the nature of the STEM workforce; they are also transforming the landscape of teaching, learning, and assessment. For instance, technology-based assessments can generate new insights into students' developing understandings and give teachers unprecedented access to data that can support more personalized learning or enable intelligent tutoring systems to customize student learning. Technological innovations make STEM learning experiences more accessible to a broad spectrum of learners and enable them to build on their unique strengths.