Center for STEM Teaching and Learning Projects

The Center for STEM Teaching and Learning (CSTL) is a research and development center for science and math education in formal and informal learning environments. Major areas of work include professional development for middle school math teachers and implementation of early algebra education initiatives; research and development of web-based and mobile assistive technologies for individuals with disabilities; research and design of educational gaming environments; energy education for elementary students and teachers; Earth science and climate literacy initiatives; and investigations to support teacher practice and professional learning through the use of video-based technology. CSTL hosts the Climate Literacy and Energy Awareness Network (CLEAN); the Educational Gaming Environments group (EdGE); the Poincaré Institute for Mathematics Education; the Inquiry Project; and the Signing Math and Science Dictionaries.

The following list includes all active CSTL projects.

You may also access past CSTL projects.

- Confronting the Challenges of Climate Literacy —

  Principal Investigator: Tamara Shapiro Ledley
  Funders: National Science Foundation

  Website: http://cleanet.org/

  This project is designing, developing, and testing a climate science curriculum and professional development model for high school students and their teachers. More »

- EarthScope Chronicles —

  Principal Investigators: Carla McAuliffe and Erin Bardar
  Funder: NSF EarthScope
  Website: http://serc.carleton.edu/earthscope_chronicles/index.html

  EarthScope Chronicles is a collection of multi-media teaching modules that highlight the personal stories of EarthScope scientists ... More »

- Empowering Teachers through VideoReView —

  Principal Investigator: Sue Doubler
  Website: https://inquiryproject.terc.edu/Videoreview/index.html
  Funder: The National Science Foundation

  This project represents a collaboration between TERC and IntuVision to develop a video recording and analysis system called VideoReView (VRV) that allows grade four science teachers to record, tag, and analyze video in their classroom in real time. More »

- Focus on Energy: Preparing Elementary Teachers to Meet the NGSS Challenge —

  Principal Investigator: Sara Lacy
  Funder: The National Science Foundation

  The Next Generation Science Standards (NGSS) identify an ambitious progression for learning energy, beginning in elementary school. To help the nation's elementary teachers address this challenge, this project will develop and research a system of resources and support for teaching and learning about energy in all scientific disciplines in grades 3-5. More »

- Impact of a Teacher-Led Early Algebra Intervention on Children's Algebraic-Readiness for Middle School —
  Principal Investigator: Maria Blanton
  Co-PI: Rena Stroud
  Funder: U.S. Department of Education (IES)
  Website: LEAP

  Current reforms in mathematics education underscore the critical role of algebra in elementary, middle and high school. The project consists of an Early Algebra Learning Progression (EALP) intervention materials in Grades 3 to 5, accompanying assessments to measure students' learning, and teacher professional development materials. More »

- Impact of Early Algebra on Students' Algebra Readiness —

  Principal Investigator: Maria Blanton
  Funders: The National Science Foundation

  This project is testing the effectiveness of a comprehensive, longitudinal early algebra intervention in elementary grades 3-5 on middle-school algebra-readiness. More »

- Learning Trajectories in Grades K-2 Children's Understanding of Algebraic Relationships —

  Principal Investigator: Maria Blanton
  Funder: The National Science Foundation
  Website: Children's Understanding of Relationships

This project aims to understand specific ways in which grades K-2 children begin to think algebraically. It will identify how children understand mathematical relationships, how they represent the relationships they notice, and how they use these relationships as building blocks for more sophisticated thinking. More »

- Leveling Up —

Principal Investigator: Jodi Asbell-Clarke
Funders: National Science Foundation
Website: http://edge.terc.edu/

EdGE and its commercial game design partner, GameGurus, are creating Leveling Up, a series of games on multiple media platforms. The Leveling Up games will use cutting-edge digital tools such as augmented reality and data collection apps on mobile handhelds (e.g., iPhones), creating a transmedia experience that supports and measures standards-based high school science. More »

- Poincaré Institute for Mathematics Education —

Principal Investigator: David Carraher
Funders: National Science Foundation
Website: http://poincare.mspnet.org/ , http://resourcecenters2015.videohall.com/posters/508

This project seeks to broaden teachers' understanding of mathematics and of mathematics education, focusing on how middle school children think and learn to identify, streamline, and re-envision how they teach critical math and physics topics to reach all students. More »

- Retention of Early Algebraic Understanding —

Principal Investigator: Maria Blanton
Funders: The National Science Foundation
Website: Project LEAP

The project is a unique and time-sensitive opportunity to extend our current NSF-funded research on the impact of a 3-year, longitudinal early algebra intervention on children's algebra readiness for middle grades. More »

- Revealing the Invisible: Data-Intensive Research Using Cognitive, Psychological, and Physiological Measures to Optimize STEM Learning —

Principal Investigator: Jodi Asbell-Clarke
Co-PI: Elizabeth Rowe
Funder: The National Science Foundation

Investigators from TERC, Landmark College, and the Massachusetts Institute of Technology will collaborate to examine the relationships among: (1) patterns of play in a digital game ("Impulse") ... More »

- Signing High School Science —

Principal Investigator: Judy Vesel
Funder: National Science Foundation
Website: http://signsci.terc.edu/index.html

TERC and Vcom3D are producing a unique set of learning tools that will increase access of high school students who are deaf or hard of hearing to educational content in life and physical science. During this four-year project, the partners will use the SigningAvatar® assistive technology to research and develop two illustrated More »

- SportsLab 2020 —

Principal Investigators: Jamie Larsen and Jodi Asbell-Clarke
Funders: National Science Foundation
Website: http://edge.terc.edu/

This project is developing and testing a collaborative game-based interactive environment where students, ages 12-18 form a product design team to create a concept model and pitch for a sport product design challenge. Participants, sport researchers, and product experts determine the best pitches with awards for top designs. SportsLab:2020 brings together More »

- Taking Games to School: Exploratory Study to Support Game-Based Teaching and Learning in High School Science Classes —
Principal Investigator: Jodi Asbell-Clarke
Funder: The National Science Foundation
Website: http://edge.terc.edu/

This project aims to study how teachers can be involved in making science learning games more effective, and how educational science games can better support good teaching. More »

- Zoombinis: The Full Development Implementation Research Study of a Computational Thinking Game for Upper Elementary and Middle School Learners —

Principal Investigator: Jodi Asbell-Clarke
Funder: The National Science Foundation
Website: http://edgeatterc.com/edge/about/projects/

This Full Design and Development project for the Implementation Research Strand of DRK12 is studying the educational impact of the re-release of the award-winning educational computer game: *The Logical Journey of the Zoombinis*. More »