Dr Jodi Asbell-Clarke

NEURODIVERSITY INCLUSION SPECIALIST

EXECUTIVE FUNCTION SUPPORT

AUTHOR: *Reaching and Teaching Neurodivergent Learners in STEM*

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PERSONAL STATEMENT

I am a senior researcher at TERC, a non-profit research and development organization focusing on innovative, technology-based math and science education. At TERC, I lead a team of designers, educators, and researchers who study inclusive STEM learning, particularly for neurodivergent learners. We study how theoretically and empirically grounded educational models in games, computational thinking, and mixed reality can be used as learning supports and assessments, particularly to reveal untapped knowledge of cognitively diverse learners.

I started my career as an onboard software verification analyst for IBM during the first 25 missions of the space shuttle. Later I taught Math, Physics, and Astrophysics to some of the brightest students in the country at the laboratory school at University of Illinois. In 1993, I came to TERC and led several science education projects at TERC involving curriculum development, professional development of teachers, and educational research. In an effort to reach a more diverse audience of learners in 2009, I co- founded the Educational Gaming Environments group (EdGE) at TERC with my colleagues to study how game-based learning can transform STEM education. In 2023, I co-founded the Neurodiversity in STEM group at TERC and authored the book *Reaching and Teaching Neurodivergent Learners in STEM: Strategies for Embracing Uniquely Talented Problem Solvers* published by Routledge/Taylor&Francis.

EDUCATION

Rochester Institute of Technology, Rochester, NY
B.S. Computational Math 1983

Rice University, Houston, TX
M.A. Applied Computational Math 1986

University of New Mexico, Albuquerque, NM
M.S. Astrophysics 1989

University of Toronto/OISE, Toronto, ON
Ph.D. Education/Curriculum, Teaching and Learning 2011

PROFESSIONAL APPOINTMENTS

1995 – present
TERC, Inc. Senior Researcher and Director
Principal investigator, lead proposal writer, and project director at an educational research non-profit. Lead a team of about 10 educators, researchers, and designers to conduct innovative research in inclusive STEM education. Brought in over US$20M of federal funds (NSF: US National Science Foundation, US Department of Education).

2002 – present
Part-time Faculty, Saint Mary's University
Design and teach an online course to 240 students per year on Life in the Universe.

1989 – 1992
University of Illinois High School, Associate Faculty
Taught physics and astrophysics at a laboratory high school.

1983 – 1986
IBM, Verification Analyst, Onboard Space Shuttle Software
Developed programs to test and repair onboard navigation software for NASA's space shuttle.

RELATED EXPERIENCES

I continue to serve on numerous proposal review panels for the US National Science Foundation and the US Department of Education. I am also the former chair of NSERC's PromoScience and CREATE proposal review committees.

I continue to serve an many advisory panels which have included the George Lucas Foundation, NSF Center for Innovative Research in Cyberlearning (CIRCL); and the White House committee on STEM Learning and Disabilities.

I have designed and facilitated collaborative design and planning sessions for research teams at universities and no-profits, and managerial sessions for the

inclusion of neurodiversity in STEM. These sessions range from half-day workshops to multi-day retreats and ongoing visioning and planning sessions.

I have authored and won successful proposals for independent research teams from various federal agencies totalling over US$35,000,000.

RESEARCH PROJECTS

Lead Principal Investigator on the following US National Science Foundation grants:

USED/EIR/#U411C190179 $3,999,067 (2019-2024)
INFACT: Including Neurodiversity in Foundational and Applied Computational Thinking

NSF/CSforALL/#1738574 $996,360 (2018-2020)
Personalized Computational Thinking for Grades 3-8

NSF/DRK12/#1502882 $1,941,206 (2016-2019)
Zoombinis: The Full Development Implementation Research Study of a Computational Thinking Game for Upper Elementary and Middle School Learners

NSF/REAL/#1417967 $532,028 (2015-2019)
Collaborative Research: Revealing the Invisible: Data-Intensive Research Using Cognitive, Psychological, and Physiological Measures to Optimize STEM Learning

NSF/DRK12/#1119144 $3,110,415 (2012-2017)
Leveling Up: Supporting and Measuring High School STEM Knowledge Building in Social Digital Games

NSF/SAVI/#1252709 $295,578 (2013-2015)
FUN: A Finland-US Network for Engagement and STEM Learning in Games

NSF/DRK12/#1134919 $499,595 (2012-2016)
Arcadia: The Next Generation - Transforming STEM Learning through Transmedia Games

NSF/DRK12/#1043357 $499,201 (2010-2014)
Arcadia Resource Center: Targeted research towards a Serious Games Pathway

NSF/ISE/#0917520 $2,984,925 (2010-2013)
The Blue Mars Science Center: Designing a virtual science learning environment

NSF/GDSE/RES/#0540444 $964,114
Women's Science Equity Online

NSF/IMD/#0352180 $1,998,783
Investigating Astronomy: A Unique High School Curriculum for All Students

SELECTED PUBLICATIONS

Asbell-Clarke J, Dahlstrom-Hakki I, Voiklis J, Attaway B, Barchas-Lichtenstein J, Edwards T, Bardar E, Robillard T, Paulson K, Grover S, Israel M, Ke F, Weintrop D. Frontiers in Education. (April, 2024) Including Neurodiversity in Computational Thinking. **DOI: 10.3389/feduc.2024.1358492**

Asbell-Clarke J, Bardar E, Edwards T. Global Perspectives on Gameful and Playful Teaching and Learning. Farber M, editor. USA: IGI Global. (2019) The Importance of Teacher Bridging in Game-Based Learning Classrooms. **DOI: 10.4018/978-1-7998-2015-4.ch010**

Rowe E, Almeda M, Scruggs M, Baker R, Bardar E, Gasca S. Computers in Human Behavior. 120. (July, 2021) Assessing Implicit Computational Thinking in Zoombinis Puzzle Gameplay. **DOI: 10.1016/j.chb.2021.106707**

Rowe E, Asbell-Clarke J, Almeda M, Bardar E, Baker R, Scruggs R. Advancing Educational Research with Emerging Technology. Kennedy E, Qian J, editors. USA: IGI Global. (2019) Advancing Research in Game-Based Learning Assessment: Tools and Methods for Measuring Implicit Learning. **DOI: 10.4018/978-1-7998-1173-2.ch006**

Dahlstrom-Hakki I, Asbell-Clarke J, & Rowe E. Mind, Brain, and Education, 13(1), 30-40; 2019. Showing Is Knowing: The Potential and Challenges of Using Neurocognitive Measures of Implicit Learning in the Classroom. **DOI: 10.1111/mbe.12177**