

# CONNECTING EARLY MATHEMATICAL MODELING WITH CULTURALLY RESPONSIVE MATH TEACHING

Jennifer Suh<sup>1</sup>, Julia Aguirre<sup>2</sup>, Holly Tate<sup>1</sup>

<sup>1</sup>George Mason University, <sup>2</sup>University of Washington

*This working group will focus on exchanging research around early mathematical modeling with attention to culturally responsive mathematics teaching with pedagogical practices that support optimal participation for diverse student groups. At each session, we will have participants explore ways mathematical modeling affords opportunities to develop three domains: students' knowledge and identities, rigor and support, and power and participation through modeling experiences situated in real world issues in students' local communities.*

The goal of the working group is to exchange research ideas and examine ways mathematical modeling (MM) can promote student engagement across multiple cultural and community contexts. MM is an iterative process of making assumptions, identifying variables, formulating a solution, interpreting the result, and validating the usefulness of the solution (Blum & Ferri, 2009). Different theoretical perspectives around the world focused on teaching and learning of MM at secondary and tertiary level have been well documented (Stillman, Blum, & Kaiser 2017). More recently, a handbook on early mathematical modeling (Suh et al., 2021) detailed the nature of MM in the early grades with tasks situated in local contexts and illustrated the emergent modeling competencies of elementary students. Our working group frames MM as a humanizing endeavor that authentically connects mathematics to the real world, starting with ill-defined, often messy community-based problems and providing opportunities for students to develop empathy and compassion toward other people, living things and our planet (Aguirre et al, 2019; Gutiérrez, 2018; Lee et al., 2021; Turner et al, 2022). Successful community-based MM requires a teaching approach that centers children's cultural funds of knowledge, honors diverse ways of thinking, empowers decision-making, addresses power dynamics and offers opportunities for children to take action that will help their communities. We will introduce a Culturally Responsive Mathematics Teaching framework that supports community-based math modeling (del Rosario Zavala & Aguirre, 2021).

Through this working group, we invite the international PME community to collaborate and build global perspectives on community-based MM and CRMT in the early grades (English, 2006; Kaiser & Sriraman, 2006). In the first WG session, participants will engage in MM with community-based tasks examining fairness, access, representation, and community uplift (i.e., water crisis, community gardens, access to diverse books) and examine how CRMT can be used as a transformative and

humanizing experience for students through classroom videos and artifacts. In the second session, we will facilitate exploration on ways MM and CRMT enhances equity and empathy and will provide time for participants to get into smaller research groups so that they find synergistic research interests with others. Our working group brings an urgent perspective of bridging culturally responsive mathematics teaching with community-based mathematical modeling to foster innovative scholarship and meaningful learning in elementary-aged children across the globe.

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