

Bringing Social Justice Topics to Differential Equations via a Climate Change Problem: Identity, Power, Access, and Achievement

Nicholas Fortune, Western Kentucky University

Chris Rasmussen, San Diego State University

Karen Keene, North Carolina State University

Tianna Bogart and **Justin Dunmyre**, Frostburg State University

Recently, Adiredja and Andrews-Larson (2017) challenged the undergraduate mathematics education field to consider and recognize the political and contextual nature of teaching and learning postsecondary mathematics, including its power dynamics and social discourses. In this work, we discuss our endeavors to bring social justice topics into a differential equations course. Our goal was to be intentional as mathematics educators in including social justice topics in our teaching practice. Interestingly, in end of semester portfolios students' discussions of their identities, power structures at play, and additional dimensions of equity highlighted by Gutiérrez (2009, 2013) emerged. These dimensions of equity were specifically tied to experiences engaging with a climate change problem, even though the prompt in the portfolio did not seek such discussions. Here, we showcase the students' emergent identities and subsequently charge the field to be more intentional in instructional design to draw out those dimensions more explicitly in the undergraduate mathematics classroom.



Nicholas Fortune is an assistant professor of mathematics education at Western Kentucky University. He received his PhD in mathematics education from North Carolina State University and his master's in applied mathematics from Rensselaer Polytechnic Institute. His research centers around instructional change in undergraduate mathematics and how mathematics faculty can collaborate on pedagogy and student thinking to support their instructional change.



Chris Rasmussen is a professor of mathematics education in the department of mathematics and statistics at San Diego State University. He received his PhD in mathematics education from the University of Maryland. His research focuses on the learning and teaching of undergraduate mathematics, with a focus on courses that serve as a transition from students' current ways of reasoning to more formal and abstract ways of reasoning.



Karen Keene is an associate professor of mathematics education at North Carolina State University. She conducts research in undergraduate mathematics education, primarily concerning differential equations teaching and learning. Her second area of research lies within secondary teacher education, focusing on teachers' content knowledge and how it connects to their teaching and curriculum development.



Tianna Bogart is an assistant professor of geography at Frostburg State University. She earned her PhD in climatology from the University of Delaware. Her research involves the use of climate models to investigate earth-atmosphere interactions, specifically the influence of urban environments on overlying climate. Tianna also enjoys working with STEM outreach initiatives, especially those aimed at promoting the sciences to underrepresented groups.



Justin Dunmyre is an associate professor at Frostburg State University. He earned his PhD in mathematics at the University of Pittsburgh, where he focused his research in mathematical neuroscience. He is a Project NExT fellow (Brown '13), and now focuses most of his academic energy on teaching, especially in inquiry-oriented ways.