#### ISSN: 1087-3430

# Electronic Journal for Research in Science & Mathematics Education

Flagship Journal of the International Consortium for Research in Science & Mathematics Education (ICRSME)



## **EJRSME**

Electronic Journal for Research in Science & Mathematics Education

#### **EDITORS**

Mark A. Bloom, Science Education, *Dallas Baptist University* Sarah Quebec Fuentes, Mathematics Education, *Texas Christian University* 

#### MANAGING EDITOR

Morgan Jansing, Texas Christian University

#### **COPY EDITOR**

Audrey Meador, West Texas A&M University

#### ASSOCIATE EDITORS

Daniel Alston, University of North Carolina at Charlotte Ian Binns, University of North Carolina at Charlotte Lisa Ann Borgerding, Kent State University Stacey Britton, University of West Georgia Stephen R. Burgin, University of Arkansas Sarah Bush, University of Central Florida Malcolm B. Butler, University of Central Florida Danxia Chen, Dallas Baptist University Matthew Perkins Coppola, Purdue University Kelly Feille, University of Oklahoma Kimberly Figaro, Dallas Baptist University Kathryn Green, Clarke County School District Rita Hagevik, The University of North Carolina at Pembroke Hayat Hokayem, Texas Christian University Gabriela Jonas-Ahrend, Paderborn University Ravinder Koul, The Pennsylvania State University Christopher S. Long, University of North Texas Stefanie Livers, Missouri State University Cherie McCollough, Texas A&M University – Corpus Christi James A. Mendoza Álvarez, University of Texas at Arlington Patricia Morrell, University of Queensland Suzanne Nesmith, Baylor University Erin Peters-Burton, George Mason University Christine Schnittka, Auburn University Byung-In Seo, *Chicago State University* Julie Westerlund, Texas State University Robert Wieman, Rowan University

#### **PUBLISHER**

ICRSME, International Consortium for Research in Science & Mathematics Education

Cover designed by Dusty Crocker

# **CONTENTS**

Volume 26 No. 4 | Winter 2022/2023

Editorial: Lessons Learned: Reflecting on Our First Three Years as Editors of EJRSME	
Mark A. Bloom and Sarah Quebec Fuentes	i
RESEARCH / EMPIRICAL	
Nature of Science Understandings and Instructional Perceptions: Moroccan	
Preservice Primary Science Teacher Educators' Responding Variables to a	
Professional Development Series	1
Mila Rosa Librea-Carden, Farnaz Avarzamani, Peter Rillero, and Florence Hamel	
Emergent Multilingual Learners Use of Multimodal Discursive Resources in Science Journals to Communicate "Doing" and "Learning" Callie Price, Daniella Biffi, Molly H. Weinburgh, Kathy Horak Smith, Cecilia Silva, Monica Amylett, and Antonia Domino	17
Oh, the Places We Learn! Exploring Interest in Science at Science Fiction Conventions Gina M. Childers, Donna Governor, Kania Greer, and Vaughan James	40
Examining Pre-Service Elementary Teacher Self-Efficacy for Engineering Education Lara Smetana and Cynthia Bushar Nelson	62
An Analysis on the Effect of Design-Based STEM Activity Development Process on Prospective Maths Teachers' Problem-Solving Skills and Scientific Creativity Canay Pekbay and Emine Kahraman	84
PRACTICE/THEORETICAL	
Centering Students in Transdisciplinary STEAM Using Positioning Theory Daniel Edelen, Richard Cox, Jr., Sarah B. Bush, and Kristin Cook	111

### ALL RIGHTS RESERVED

© International Consortium for Research in Science & Mathematics Education (ICRSME) Electronic Journal for Research in Science & Mathematics Education (EJRSME)