

Annie and John Selden Prize

The Annie and John Selden Prize for Research in Undergraduate Mathematics Education honors a researcher who has established a significant record of published research in undergraduate mathematics education and who has been in the field at most ten years. The prize is designed to be an encouragement to such researchers and at most one is awarded every other year.

Estrella Johnson

Virginia Tech

Dr. Estrella Johnson completed her PhD in mathematics education in 2013 at Portland State University. She is currently an associate professor and assistant dean for inclusion and diversity in the College of Science at Virginia Tech. Dr. Johnson's scholarship spans an impressive range of both content and issues in undergraduate mathematics education. Her work encompasses both qualitative and quantitative research methods and includes studies of individuals and classrooms, as well as large national surveys. She has conducted basic research, design research, and evaluation research: basic research about student reasoning and learning in abstract algebra; design research to develop, test, and refine instructional resources; and evaluation research on the dissemination and implementation of these resources. She has also studied the teaching and learning of calculus, where she helped to document current instructional practices on the national level and to identify characteristics of successful programs.

Throughout its broad reach, Dr. Johnson's work has been focused on the implementation of student-centered instruction, especially inquiry-oriented instruction. By engaging mathematicians directly in her work, she provides mathematical as well as pedagogical insight into instructional practice and methods of adapting it to new approaches. Two of her papers define inquiry-oriented instruction and suggest ways to measure it. These papers have been leading the way for researchers to explore similarities and differences across a variety of student-centered instructional modes, an essential development for moving the field forward.

Dr. Johnson has also investigated instructor implementation and equity outcomes of inquiry-oriented instruction across additional areas of advanced mathematics and other STEM disciplines. While many studies seemed to indicate that inquiry-oriented teaching is beneficial for women and other underrepresented STEM populations, Dr. Johnson led research, published in the *Journal for Research in Mathematics Education*, which showed that the outcome is not always positive. Her careful methodology made it possible to begin to analyze the hidden challenges at the interface between equity and inquiry-oriented learning. As Dr. Johnson's nominator wrote, "Her scholarship has significantly shaped the way in which the community investigates inquiry-oriented instruction."

Dr. Johnson's research has appeared in esteemed mathematics education journals, such as the *Journal for Research in Mathematics Education*, the *Journal of Mathematical Behavior*, the *Journal of Mathematics Teacher Education*, the *International Journal for Undergraduate Mathematics Education*, and the *International Journal of STEM Education*. In addition, she has published articles about the practical implications of her research in prominent journals for college mathematics faculty, such as *PRIMUS*, *MAA FOCUS*, and the *Notices of the AMS*.

Dr. Johnson's scholarship is collaborative both in the wide range of her co-authors and in her work with mathematicians who are implementing inquiry-oriented instruction. Her impact is felt through her theoretical contributions, where she helped define the meaning of inquiry-oriented instruction, and through the results of her research, which have led to a reevaluation of the assumptions about the effect of inquiry-oriented instruction on different populations. Her collaborations and her outreach have been an inspiration to researchers and mathematics teachers alike.

Response

It is an immense honor to receive this award from a research community that means so much to me, both professionally and personally. For this award to be dedicated by Annie and John Selden just makes it all the more meaningful in a year when we are reflecting on the life, contributions, and passing of John Selden. Annie and John's professional careers are what we all strive for—transformational research contributions, caring and supportive professional relationships and mentoring, and conscientious stewardship of our research community. It is humbling to be recognized in their name and I hope to carry this honor in a way that lives up to the standard they set for us. I want to thank my co-authors, mentors, students, and friends in the field. It is truly the relationships I have with all of you that keep me energized and invested in research. I also want to thank my family for their unyielding support and enthusiasm for my career.

Biographical Sketch

Dr. Johnson is currently the assistant dean for inclusion and diversity for the College of Science, and an associate professor of mathematics, at Virginia Tech. Her research focuses on the pedagogical practices of mathematicians, with the goal of better understanding and supporting high quality, ambitious teaching in undergraduate mathematics classrooms. She has worked extensively on investigating and supporting mathematicians as they work to implement inquiry-oriented instructional materials (NSF #143195). Additionally, Dr. Johnson has worked on large-scale national survey projects investigating instructional practice, and influences on practice, in undergraduate STEM education (e.g., NSF #1430540, NSF #0910240, NSF #1726281). Most recently, her research and professional interests have taken a turn towards issues of inclusion and diversity—both in the mathematics classroom and in the sciences more broadly. More information about her research can be found at estrellajohnson.com/.