



Introducing the 2021 Class of Karen EDGE Fellows

The EDGE Foundation is delighted to announce the 2021 Class of Karen EDGE Fellows. The Karen EDGE Fellowship Program was established with a generous gift from Karen Uhlenbeck on the occasion of her 2019 Abel Prize. The Fellowships are designed to support and enhance the research programs and collaborations of mid-career mathematicians who are members of an underrepresented minority group. The 2021 Fellows were selected on the basis of their excellent research programs and their plans to use the funds for enhancing those programs through collaboration and travel. The Karen EDGE Fellows for 2021 are **Emille Davie Lawrence**, University of San Francisco, and **Manuel Rivera**, Purdue University.



Emille Davie Lawrence



Manuel Rivera

Emille Davie Lawrence received her Ph.D. in Mathematics from the University of Georgia in 2007, under the direction of Will Kazez and Clint McCrory. She was an undergraduate at Spelman College. She was a postdoctoral fellow at the University of California, Santa Barbara, taught at California State Polytechnic University, Pomona, and subsequently joined the faculty of University of San Francisco, where she has taught since 2011. She is currently Term Associate Professor and serves as Department Chair.

Emille's research is in spatial graph theory, a branch of geometric topology in the intersection of knot theory and graph theory. Specifically, spatial graph theory is the study of embeddings of graphs in manifolds, with the manifold S^3 being of particular interest. Her most recent research centers around classifying all groups which can occur as the topological symmetry group for some embedding of an abstract graph or family of graphs. Working with three different sets of collaborators over the years, she has classified all groups which can be the TSG for the graph family known as Möbius ladders, the Petersen graph, and the Heawood graph. She is currently working on this classification for the generalized Petersen family of graphs.

The Karen EDGE Fellowship is a tremendous opportunity for Emille to advance her research endeavors. Doing mathematics is a collaborative effort, yet none of her collaborators are at her university or even in her region. The Karen EDGE Fellowship will allow her to visit her established collaborators and also make new connections with confidence that they would be able to have more than just virtual meetings. She looks forward to giving more conference talks and presentations, as well as attending workshops to further her research. She sees the Fellowship as important not only for her, but for others in the mathematics community to see faces like hers doing high-level research. She wants to break down barriers and dissolve misconceptions that still very much exist about minorities in mathematics.

Manuel Rivera received his B.A. in Mathematics from Massachusetts Institute of Technology and his Ph.D. in 2015 under the direction of Dennis Sullivan at CUNY Graduate Center. He was a CNRS Postdoctoral Researcher at Institut de Mathématiques de Jussieu Paris-Rive Gauche, was a Research Assistant Professor at University of Miami and CINVESTAV, and is currently Assistant Professor at Purdue University.

The overarching goal of Manuel's research is to understand the algebraic nature of geometric space using the ideas and tools of algebraic topology. This led him to think about abstract homotopy theory in general, homological algebra, higher category theory, as well as problems in nearby fields such as representation theory, mathematical physics, and algebraic geometry. In the next three years, he plans to completely characterize spaces up to homotopy equivalence by means of algebraic structures that are symmetric up to an infinite family of higher corrections, culminating decades of work on this problem. He plans to use the Karen EDGE Fellowship towards this goal. To carry out the proposed research, he plans to build a strong team that includes past and current collaborators and graduate students.

Manuel is committed to building an inclusive and diverse research team. He is particularly interested in promoting mathematical research as well as general mathematical culture in Latin America and among groups which are underrepresented in academic research. Under the Karen EDGE Fellowship he plans to strengthen his involvement in several initiatives, such as the Cibercoloquio Latinoamericano de Matemáticas, a weekly online colloquium-style event for the Spanish-speaking mathematical community which he helped found in 2020; support his research team; and organize new events. He plans to culminate the three years of the Fellowship by organizing a research workshop at the University of Puerto Rico that includes a series of mini-courses directed towards graduate students and advanced undergraduates with no previous knowledge of algebraic topology.