Mathematical Sciences Research Institute Undergraduate Program (MSRI-UP)

2020 MSRI-UP

Branched Covers of Curves

Final Research Presentations

Friday, July 24
Mathematical Sciences Research Institute
The MSRI-UP Main Meeting Room on Zoom

MSRI - UP

The Mathematical Sciences Research Institute Undergraduate Program (MSRI-UP)

The MSRI-UP is a comprehensive program for undergraduates that aims to increase the number of students from underrepresented groups in mathematics graduate programs. MSRI-UP includes summer research opportunities, mentoring, workshops on the graduate school application process, and follow-up support.

The primary objective of MSRI-UP is to identify talented students, especially those from underrepresented groups, who are interested in mathematics and make available to them meaningful research opportunities, the necessary skills and knowledge to participate in successful collaborations, and a community of academic peers and mentors who can advise, encourage, and support them through a successful graduate program. We achieve this through an intensive six-week summer program of mathematics research and other activities, along with maintenance of relationships with participating students for years beyond the summer program.

MSRI-UP is coordinated by an experienced team of five directors—Professors Federico Ardila of San Francisco State University, Duane Cooper of Morehouse College, Mercedes Franco of Queensborough Community College, Rebecca Garcia of Sam Houston State University, and Suzanne Weekes of Worcester Polytechnic Institute—who collaborate ongoingly and who annually rotate direct leadership of the program. The program is supported by the leadership and staff of the Mathematical Sciences Research Institute in Berkeley, site (until this year) of each summer's six-week program.

During the 2007-2019 summers, 222 students conducted 75 small group projects in a broad range of research areas—the areas and their faculty research leaders vary each year. After college, most MSRI-UP participants have proceeded to enter graduate programs in the mathematical sciences, most of them earning graduate degrees, including about three dozen new Ph.D.s in the past five years.

This year, 17 undergraduates are completing MSRI-UP, having learned about and engaged in research on Branched Covers of Curves, led by Professor Edray Goins of Pomona College, who has guided the students in conjunction with a postdoctoral fellow and two graduate students—carefully chosen role models—who contribute to the undergraduates' academic, personal, and professional development. Due to global pandemic, the 2020 MSRI-UP was conducted entirely online, primarily using the Zoom videoconferencing software platform, as well as other online communications and applications.

In 2021, MSRI-UP expects to continue with 18 undergraduates conducting research projects in an area of graph theory and combinatorics, led by Professor Michael Young of Iowa State University, hopefully back on site at the MSRI.

MSRI-UP Final Presentations
Branched Covers of Curves

Schedule of Presentations (*all times are Pacific*)

10:15 am
Computing Monodromy of Toroidal Belyi Pairs
Rebecca Lopez, Chidera Okenwa

11 am
Visualizing Toroidal Belyi Pairs
Deion Elzie, Mikaela Nishida, Cameron Thomas

11:45 am till 1 pm
Break

1 pm
Automorphism Groups and Monodromy of Classical Modular Curves
Samuel Heard, Fabian Ramirez, Vanessa Sun

1:45 pm
Explicit Constructions of Finite Groups as Monodromy Groups
Ra-Zakee Muhammad, Javier Santiago, Eyob Tsegaye

2:30 till 3:15 pm
Break

3:15 pm
Dessin d'Enfants from Cartographic Groups
Nicholas Arosemena, Yaren Euceda, Ashly Powell

4 pm
To and From 2-Generated Groups and Origamis: Starting from Square One
Sarai Gonzalez, Elisa Rodriguez, William Sablan

2020 MSRI-UP Staff

Duane Cooper, Morehouse College
Lead Director

Edray Goins, Pomona College
Faculty Research Leader

Alexander Barrios, Carleton College
MSRI-UP Postdoctoral Researcher

Sofía Martínez, Purdue University
Graduate Student Assistant

Adrienne Sands, University of Minnesota
Graduate Student Assistant

MSRI-UP Directors

Federico Ardila, San Francisco State University
Duane Cooper, Morehouse College
Maria Mercedes Franco, Queensborough Community College
Rebecca Garcia, Sam Houston State University
Suzanne Weekes, Worcester Polytechnic Institute

MSRI-UP Thanks:

The MSRI—the Institute and its staff
The National Science Foundation
The Alfred P. Sloan Foundation