

Mason Experimental Geometry Lab Summer 2016 Outreach Summary

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July 29, 2016

1 Summary

During Summer 2016 MEGL Outreach held two outreach activities, developed a new activity, and secured a fall calendar that exceeds the previous semester's.

The outreach activities were *Really BIG Numbers*, held at Hunters Woods Elementary School for their Young Scholars program on July 27, and *Snowflakes and Symmetry*, a new activity developed over the summer, held at George Mason University on July 14 for the F.O.C.U.S. (Females Of Color Underrepresented in Stem) summer program.

Our network in the K-12 educational community continues to grow. As of July 29 we have 15 scheduled activities for the Fall semester, already surpassing our 12 activities from the Spring, and are well on track to reach our goal of 20 activities for the Fall and get a head start on filling our Spring 2017 calendar.

2 Activities

2.1 Snowflakes and Symmetry

The Mason Experimental Geometry Lab was approached by F.O.C.U.S., Females Of Color Underrepresented in STEM, a week-long summer camp organized by the STEM Accelerator Program at George Mason University, to present a 70-minute activity four times, to four different groups of 25 girls each. Feeling that none of our working activities fit the bill, we created a new activity, *Snowflakes and Symmetry*.

In this activity students experimented with and explored the algebra of symmetry. They began by creating their own (4-sided) "snowflakes", labeling the four points on front and back, and seeing how many ways the snowflake can land in alignment with a square gameboard of the same dimensions. When we as a group had discovered these 8 so-called symmetries, we gave them names and explored their algebra by asking what happens if we perform one symmetry followed by another. We then compared this "algebra of symmetries" to the algebra of integers that we are all familiar with, by asking questions



F.O.C.U.S. participants presenting their snowflakes (left), and Young Scholars exploring really big numbers (right).

like “Is this new algebra commutative?”, or “What is the negative of a symmetry?”. The activity concluded with each participant receiving a small 3D-printed permutahedron, since the symmetries of 4-sided snowflakes exist within the larger symmetry group represented by this 3-dimensional object.

2.2 Really BIG Numbers

On July 27 MEGL Outreach visited a STEM enrichment group called Young Scholars at Hunters Woods Elementary School. We presented our *Really BIG Numbers* activity to the group of 24 students ranging between 2nd and 6th grade.

3 Fall Calendar

As of July 29 MEGL Outreach has 15 events scheduled between September 9 and November 19, 2016. These include 3 libraries that are new to our network—Chinn Park Regional Library, Dolley Madison Library, George Mason Regional Library—and we are in conversation with several elementary and high schools that would also be new additions. Compared to Spring 2016 when we held 12 events and were in the process of booking them throughout the semester, we now are on track to hold 20 events in the Fall and to have them all booked before the semester begins, meaning we will probably start booking Spring 2017 soon. In short, the network is growing and demand is high.