

Abstracts of Posters
Mathematical Outreach Programs
2018 Joint Mathematics Meetings
San Diego, Thursday, January 11, 10am-noon

Title: Math, Cryptography, and Cyber Security Conference for High School Students

Presenter: Dr. Violeta Vasilevska, Utah Valley University

The Math, Cryptography, and Cyber Security Conference

(<http://www.uvu.edu/conferences/mathcybersecurity/index.html>) is a one day conference at Utah Valley University aimed at high school students in the surrounding area. The main objective of the conference is to show high school students, their teachers, as well as the undergraduate students involved in it, the importance of cyber security and the application of math in cryptography. In addition, the conference gives students the opportunity to encrypt/decrypt secret messages and provides opportunities for them to learn about various cyber security careers. Moreover, students have the opportunity to talk to cyber security scientists and learn how they use math in their everyday jobs. In this poster presentation, we discuss the goals, the structure, and the impact of the program on all of the involved participants.

Title: Inspired By Math Program: The Second Year and the Future

Presenters: Qiang Shi and Cortnie Raine Emporia State University; Laura Albertson and Josh Tuttle, Emporia Middle School

Inspired By Math is a young math enrichment program in Emporia, Kansas. The program attracts motivated and talented middle school students in the Emporia area. The program is in its second year. We had a successful 3-day summer camp in July. In the fall semester, students worked on the AMC 8 problems and other math projects, and attended two math expository talks. This presentation will give an overview of the program objectives and structure, introduce the math activities we have been doing, analyze the early impact and assessment of the program, and discuss the possibility of connecting the program with underserved and underrepresented students. The Inspired By Math program is funded by Dolciani Mathematics Enrichment Grant, Math Circle Grant, Emporia State University, Emporia Middle School, and Wolf Creek Nuclear Operating Corporation.

Title: Mathlete Coaching Project at Pacific Lutheran University

Presenter: Ksenija Simic-Muller, Pacific Lutheran University

This poster showcases the work of the Mathlete Coaching Project (MCP), an after-school program facilitated by Pacific Lutheran University students (“coaches”) whose goal is building community around mathematics and creating a lasting impact on the attitudes of the student Mathletes toward mathematics. The MCP trains university students to serve as coaches, mentors, and role models to middle school students: they help them improve their relationship to mathematics, and encourage them to pursue college education, in particular in STEM fields. MCP is open to all students at the school, and serves up to fifty 6-8 grade students each year, approximately 85% of whom are students of color. Coaches develop strategies for working with students with varying mathematical backgrounds, typically through mathematical games, hands-on activities, and projects. The project is supported by a Tensor-SUMMA grant.

Title: IC Women in Math

Presenters: Vira Babenko, Ted Galanthay, Cristina Gomez, and Megan Martinez, Ithaca College

This year, with the help of MAA Tensor Grant for Women in Mathematics, we are pleased to provide our undergraduate students and students from local high schools with more events aimed at encouraging women to pursue mathematics and supporting them in their endeavors! We began the academic year by welcoming new female math majors into a new Student Peer Mentoring program. In September, we kicked off the Tensor Lecture Series which brings together students with prominent and passionate female speakers. We are planning an exciting event, which will include an Industry Panel discussion, for parents and female students from local high schools for the spring. In the spring, we will also continue our Tensor Lecture Series. Come explore our progress so far and share your thoughts on how we all can encourage women to pursue their dreams!

Title: Girls Exploring Mathematics

Presenter: Meghan De Witt, St. Thomas Aquinas College

We describe an outreach program creating math clubs for girls in local high schools, sponsored by MAA/Tensor. Four undergraduate female math students are taught to design and prepare a lesson plan and then brought to two different local high schools where they teach an after school club. Topics include Platonic and Archimedean Solids, the Fibonacci Numbers and the Golden Ratio, and the mathematics of architecture. Each club meeting covers the necessary mathematics, highlights the history of the topic, and culminates in a creative art project utilizing their new-found knowledge.

Title: Mentoring Mathematical Science Fair Projects

Presenter: Jennifer Nordstrom, Linfield College

The Math PLUS program is a partnership between Linfield College and a local middle school, which seeks to encourage more mathematics in local and regional science fairs. Linfield students are paired with middle school students to mentor science fair projects with a mathematical focus. One goal of the program is to provide access to greater mathematical resources to underserved middle school students who show an interest and aptitude in mathematics. Students are encouraged to research their own questions. Projects have included college level mathematics from number theory to statistics. We will describe the program and discuss the impact on the middle school students, the college student mentors, and the local science fair. The program is funded by a Dolciani Mathematics Enrichment Grant.

Title: MAGIC (Mathematics Advances Great Intellectual Confidence)

Presenters: Jie Liu, Clare Banks, and Vinodh Chellamuthu Dixie State University

In summer 2017, the mathematics department of Dixie State University (DSU) hold a math summer camp for a group of students who had just completed the 5th grade. We are the recipients of 2017 Dolciani mathematics Enrichment Grant. The goal of this program was to encourage students' math confidence and interests, build a math community for young students and increase community awareness of the importance of mathematics. The summer camp was a great success. In our poster, we will share our experiences and the results of our MAGIC summer program.

Title: Girls Talk Math - Engaging Girls through Math Media

Presenter: Francesca Bernardi and Katrina Morgan, University of North Carolina at Chapel Hill

Francesca Bernardi and Katrina Morgan, Ph.D. candidates in Mathematics at the University of North Carolina at Chapel Hill, were awarded the MAA Tensor Grant for Women and Mathematics in 2016 to found the camp Girls Talk Math. The grant was renewed in 2017. The program is a free 2-week-long day-camp directed at high school female-identifying students interested in Mathematics. The campers, divided into small groups, work on challenging math problems and research the story of a female mathematician whose work was relevant to the topic they explored. Each group then wrote a blog post detailing solutions to their math problems and recorded a podcast telling the story of their mathematician.

The goal of Girls Talk Math is to encourage girls to consider careers in mathematics. The main barriers tackled by the program are a lack of female representation among mathematicians, lower confidence in mathematical abilities reported by female students, and less encouragement from peers and teachers. The size of camp increased by 35% in its second run in June 2017 and we hope to recruit 40 students for 2018. No grades or reference letters are required in the application process, just an interest paragraph written by the students explaining why they want to attend camp. We aim at recruiting all students interested in Mathematics, regardless of their GPA. We had a diverse group of attendees, including a few returning students. Local media attention and UNC support make us hopeful for the sustainability of our program.

Title: Minorities in Mathematics Speaker Series

Presenters: Pamela Harris, Williams College, Alicia Prieto-Langarica, Youngstown State University, and Marco V. Martinez, North Central College

In this poster, we present part of our multi-institutional Minorities in Mathematics Speaker Series (MIMSS), a program supported by the Mathematical Association of America through a Tensor-SUMMA grant. The goal of MIMSS is to promote the dissemination of minority mathematicians' research and to provide a venue where students can meet and interact with minority researchers invested in mentoring underrepresented students in mathematics. The three institutions involved in this series are Williams College, Youngstown State University, and North Central College.

Title: Northern Colorado Math Circles

Presenters: Gulden Karakok and Katherine Morrison, University of Northern Colorado, Delia Haefeli, Winograd K-8 School, Cathleen Craviotto, Boulder High School

The mission of the *Northern Colorado Math Circle for Middle School Students* is to provide mathematical problem-solving enrichment activities for 4th through 8th grade students in local school districts. Our goal is to promote problem-solving activities that will increase excitement about and appreciation of mathematics among these students. We piloted six monthly evening sessions during the 2015-2016 academic year and our first 3-day Student Math Circle Summer Camp in June 2016 at the University of Northern Colorado campus. Two mathematics faculty members and two local teachers recruited students and facilitated all of these problem-solving sessions. During our first summer camp, we hosted 52 students. Four pre-service teachers and two graduate students served as mentors. Our program continued our program during the 2016-2017 academic year with 7 monthly evening sessions and had our second 3-day Student Math Circle Summer Camp in June 2017 with 23 students. In this camp, we again had 4 undergraduate preservice students and 2 graduate students as mentors. At this poster presentation, we will share the structure of our summer camps and evening sessions and describe some of the math problems implemented with students' solutions. Our summer camp and current academic year evening sessions are partially funded by the MAA Dolciani Mathematics Enrichment Grant.

Title: Mathematics Intensive Summer Session, an outreach program for high school females in Algebra 2/Integrated Math 3 and Pre-calculus.

Presenter: David Pagni, California State University, Fullerton

The Mathematics Intensive Summer Session is a month-long summer program serving high school female students who are often the first in their family to aspire to attend college. A supportive environment prepares students to be successful in the mathematics course they will take in the fall, including Algebra 2/Integrated Math or Pre-calculus. Since it began in 1990, over 1700 students have completed the program with 98% entering college; 33% coming to Cal State Fullerton. In November 1992 MISS was featured as a founding member of the SUMMA Consortium (SUMMAC), a project of the Mathematical Association of America's Strengthening Underrepresented Minority Mathematics Achievement Program. The Mathematics Intensive Summer Session continues to be part of SUMMA, and is listed in its Directory of Intervention Projects. In addition, the Mathematics Intensive Summer Session was recognized by Excelencia in Education in the organization's 2007-2015 editions of "What Works for Latino Students: Examples of Excelencia Compendium." In Spring 2011, the Mathematics Intensive Summer Session was featured in an article entitled "Programs have a clear STEM-phasis", published in the Lumina Foundation *Focus*. The Mathematics Intensive Summer Session is a program that can be replicated on other college campuses

Title: Middle School Mathematics Days Promoting Undergraduate Student Leadership

Presenter: Theresa Martinez, University of the Incarnate Word

This program is designed to assist girls with the transitions between middle/high school mathematics. A survey published in the Notices of the AMS showed that students make decisions about whether to continue their studies of mathematics early in their high school years; however, they do this with little guidance from parents, teachers or counselors. In particular, in the state of Texas, students are given a choice of 8th grade mathematics courses. In most cases, this choice puts them on a track to either end high school with Algebra 1 or Calculus 1, students and parents are often unaware of these tracks. This program looks to show the use of mathematics in school and careers to encourage them to continue mathematics studies. In past years, we have hosted a traditional one day event with speakers, activities, and prizes. However, because the participants only saw the faculty and undergraduate volunteers once or twice the mentor relationship did not continue. In order to reach more students as well as strengthen the mentor relationships we have brought the events of the Sonia Kovalevsky Middle School Mathematics Day events to the students. Undergraduate students meet with the middle school students monthly after school, each month a different mathematical or science activity.

Hispanic Outreach Programs

Presenter: Betsy Yanik, Emporia State University

After over twenty years of hosting multiple outreach programs for young women, Emporia State has branched out during the last ten years to hosting STEM outreach programs for Hispanic and Latino middle school students. This poster describes two of these programs, Si Se Puede (a one day statewide outreach event) and ESU Summer Scholars (a regional three day summer program).

Title: Increasing Math Self-Efficacy through Middle School Math Club

Presenters: Chip Goutcher and Brynja Kohler, Utah State University

Mathematics has often been stigmatized, thought of as something reserved for intellectuals. This myth perpetuates the nation-wide problem of math anxiety. Math anxiety is defined as dread or fear of going to class, taking a test, or working problems. Apathy for mathematics usually starts during the middle school ages and continues on through high school and beyond. Math club is a way to combat this issue by increasing math self-efficacy. Math self-efficacy is defined as one's belief in one's ability to succeed in mathematical situations or accomplish a mathematical task. Math club provides students opportunities for positive math experiences which effectively increases their self-efficacy. As their math self-efficacy increases, math anxiety decreases.

Title: Jackson State University Girls Engaging in the Mathematical Sciences Program

Presenters: Jana Talley, Jackson State University and Lecretia A Buckley, University of Mississippi Medical Center

The goals of the JSU GEMS summer program are to (1) engage middle school girls in rigorous mathematics learning experiences, (2) introduce middle school girls to the process of applying to college, (3) introduce middle school girls to and expand their awareness of mathematics-intensive careers, and (4) engage middle school girls in mathematics learning experiences that utilize technology. To achieve these goals the program offers daily rigorous content instruction by faculty in mathematics, computer science and bioinformatics. The program also comprises college readiness activities, technology-intensive projects, and a speaker series by practitioners in mathematics-intensive, STEM fields. This poster will explain the logistical techniques used to successfully facilitate the program as well as reflections from both the participants and members of the leadership team.