

Fiona Knoll

fknoll.people.clemson.edu

Department of Mathematical Sciences
University of Cincinnati, Cincinnati, OH 45221

EDUCATION

Clemson University

Doctor of Philosophy, Mathematical Sciences
Thesis: Johnson-Lindenstrauss Transformations
Advisor: Dr. Shuhong Gao

Clemson, SC
August 2017

Master of Science, Mathematical Sciences
Master's Thesis: Secret Sharing and Network Coding
Advisor: Dr. Shuhong Gao

May 2013

Bob Jones University

Bachelor of Science, Mathematics Education

Greenville, SC
May 2011

RESEARCH INTERESTS

Dimension reduction techniques and its applications; cryptography in both hardware, such as securing the device from side channel analysis, and software, such as homomorphic encryption; coding theory, specifically in the area of distributed data storage; graph theory; mathematics in music

PUBLICATIONS

- "Mathematics in Infrastructure for Data Science." In preparation.
- Michael Burr, Shuhong Gao, **Fiona Knoll**. "On the Lower Bounds of Johnson-Lindenstrauss Transformation." In preparation.
- Lin You, **Fiona Knoll**, Yue Mao, Shuhong Gao. "Practical Johnson-Lindenstrauss Transforms via Algebraic Geometry Codes." Conference Proceedings of ICCAIRO 2017.
- Shuhong Gao, **Fiona Knoll**, Felice Mangianello, Gretchen Matthews "Codes for distributed storage from 3-regular graphs." *Discrete Applied Mathematics*, 229:82-89, 2017.
- S. Hedetniemi, **F. Knoll**, R. Laskar. "Split Domination, Independence, and Irredundance in Graphs." *Congressus Numerantium*, 2016.
- A. Grady, **F. Knoll**, R. Laskar, DJ Lipman. "Cycle Domination, Independence, and Irredundance in Graphs." *Congressus Numerantium*, 224:159-174, 2015.
- A. Grady, **F. Knoll**, D. J. Lipman. "Clique Independence, Domination, and Irredundance in Graphs." *Congressus Numerantium*, 223:193-198, 2015.

PROFESSIONAL EXPERIENCE

WiSDM Workshop, Brown University

Summer 2017

Attended the Women in Data Science and Mathematics workshop and performed research on implementation of codes in parallel computation.

REU, Clemson University

Summer 2017

Assisted with the prep-REU held at Clemson University. Presented and led research on the topic of Coding Theory, specifically Algebraic Geometric Codes.

RTG Research Assistant, Clemson University

Fall 2016 – Present

The coding, cryptography, and number theory group of Clemson University has been awarded the research training group (RTG) grant. As a part of this grant, two graduate students are chosen as recipients of the grant and have duties including research, leading a math GRE seminar, participating at conferences, and working in an REU during the course of the summer.

Research Assistant, Clemson University

Summer 2016

During the summer, I performed research in the area of coding theory pertaining to distributed data storage centers and in the area of Johnson-Lindenstrauss transformations.

Zentrum für Technomathematik, Universität Bremen

Bremen, Germany

Visiting Scholar

Summer 2012

Researched baseline removal methods for MALDI (Matrix Analysis Laser Desorption Ionization) mass spectrometry under the supervision of a PhD student. Funded through Clemson-Bremen Exchange Program.

TEACHING EXPERIENCE

University of Cincinnati, Cincinnati, OH

Fall 2017 – Present

- Sole Instructor, *MATH 1061 Calculus I (1 semester)*
 - Flipped class style – created videos, handouts, and led review sessions for all the Calculus I students
- Sole Instructor, *MATH 1062 Calculus II in Spring, 2018*

Clemson University, Clemson, SC

Fall 2012 – Present

- Sole Instructor, *RTG Math GRE Seminar (1 semester)*
 - Preparation course for students both at Clemson and other colleges using the application Blue Jeans
- Sole Instructor, *MATH 1080 Calculus of One Variable II (2 semesters)*
- Sole Instructor, *MATH 1070 Differential and Integral Calculus (1 semester)*
- Sole Instructor, *MATH 1040 Pre-calculus and Introductory Differential Calculus (1 semester)*
- Sole Instructor, *MATH 2070 Multivariable Calculus (3 semesters)*
- Sole Instructor, *MATH 1020 Introduction to Mathematical Analysis (1 semester)*
- Teaching Assistant, *MATH 1080 Calculus of One Variable II (2 semesters)*

Blue Ridge High School, Greer, SC – Undergraduate Student Teaching

Spring 2011

- Student teacher, *AP Calculus BC, Probability and Statistics, and Algebra II Honors (1 semester)*
- Earned South Carolina Teaching Certification.

HONORS AND AWARDS

Excellence in Teaching Award, Mathematics Dept., Clemson University

April 2016

Awarded to one graduate student in the Department of Mathematical Sciences each academic year for his/her excellence in teaching.

Outstanding MS Award, Mathematics Dept., Clemson University

May 2013

Awarded to graduate students in the Department of Mathematical Sciences each spring for finishing a Master's degree with a cumulative GPA of 4.0.

Outstanding Citizenship Award, Mathematics Dept., Clemson University

May 2013

Awarded to 2-5 graduate students in the Department of Mathematical Sciences each spring for exceptional service to the department. Received for co-founding the student chapter of the Association for Women in Mathematics

Outstanding Senior Award, Mathematics Dept., Bob Jones University

May 2011

Awarded to one graduating senior each year at Bob Jones University who excelled in mathematics.

OUTREACH

WISE Camp

June 2014, 15, 16, 17

During the summers of 2014, 2015, and 2016, I assisted with the week-long WISE (Women in Science and Engineering) camp held at Clemson University by developing curriculum, leading sessions, and providing support during the student group activity times.

Association for Women in Mathematics – Clemson Chapter

Spring 2013 – Fall 2016

Vice President (2015 Fall – 2016 Spring), Secretary (2013-2015 Spring), Outreach Chair (2013-2015 Spring), co-founder of the Clemson Chapter

Creator of STEM After School Program

Spring 2014 – Spring 2016

I started an after school program at the Frazee Center, a Greenville downtown community center. I presented to the middle school students fun and interesting facts that are not normally taught in school in the core areas of STEM (Science Technology Engineering Mathematics) through hands-on learning. As the leader and the initiator of this excursion, I made the contacts, developed the curriculum, and led the sessions.

WISE STEM Day Volunteer

Spring 2013, 14, 15, 16, 17

Volunteer during the math section of the day, helping approximately 30 high school students with cryptology activities, encoding and decoding messages and doing modular arithmetic

Seminar: Integrating STEM in Special Education*Fall 2015*

Speaker at a seminar held for students in the field of Special Education at Bob Jones University. Gave a presentation on ways of integrating STEM in Special Education.

UEA Seminar: Integrating STEM In and Outside the Classroom*Fall 2014*

One of three speakers at a UEA (University Educators' Association) meeting held at Bob Jones University. Gave a presentation to approximately 40 undergraduate students in the education field on 'Integrating STEM In and Outside the Classroom'.

Home School Math Day

Created and led a 40-minute class of 13 fifth and sixth grade students and then a 40-minute class of about 15 seventh and eighth grade students. Class consisted of a short lecture on cryptography and the math involved and then helping the students with cryptology activities, such as decoding and encoding messages.

ADDITIONAL SERVICE**Panelist, Women in Math Panel for Summer at ICERM REU Program***July 2017***Panelist, Southeastern Undergraduate Women in Mathematics Conference***November 2016***Trip Organizer, Undergraduate Women Math Conference***November 2016***Co-organizer, Graduate Student Combinatorics Conference***April 2016*

Created and maintained the website. Created the abstract program.

Panelist, Grad Student Teaching Panel*March 2016***Graduate Student Recruiting, JMM***January 2016***Calculus Challenge Volunteer***Spring 2012, 13, 14, 15, 16, 17*

Volunteer for the Clemson Calculus Challenge, a competition organized by Clemson University for approximately 300 high school students from schools throughout South Carolina.

Math-In (day of tutoring)*Fall 2013 - Present*

Volunteer for two to three hours at a time at the end of the semester to tutor students who drop-in for help in any math class.

CONFERENCE PRESENTATIONS**Presentation, 2017 Joint Mathematics Meeting***January 2017*

Presentation: Precise Dimensions That Guarantee a Transformation Preserving the Euclidean Distance

Invited Presentation, 2016 Fall Central Sectional Meeting*October 2016*

Presentation: Explicit Johnson-Lindenstrauss Projection of High Dimensional Data

**Presentation, Forty-Seventh Southeastern International
Conference on Combinatorics, Graph Theory, and Computing**

March 2016

Presentation: Split Domination, Independence, and Irredundance in Graphs

Published submitted paper: "Split Domination, Independence, and Irredundance in Graphs"

Presentation, 2016 Joint Mathematics Meetings

January 2016

Presentation: Towards Efficient Dimension Reduction via Algebraic Geometry codes.

Poster, AWM Research Symposium

April 2015

Poster: Johnson-Lindenstrauss projection of high dimensional data.

**Presentation, Forty-Sixth Southeastern International
Conference on Combinatorics, Graph Theory, and Computing**

March 2015

Presentation: Cycle Domination, Independence, and Irredundance in Graphs

Published submitted paper: "Cycle Domination, Independence, and Irredundance in Graphs"

AFFILIATIONS

- Society for Industrial and Applied Mathematics (SIAM)
- Association for Women in Mathematics (AWM)
- American Mathematical Society (AMS)

SKILLS

- Python
- MATLAB
- R (basic familiarity)
- AMPL (basic familiarity)
- C++ (Currently learning)

REFERENCES

- **Shuhong Gao:** Professor, Mathematical Sciences, Clemson University (Ph.D. advisor). Email: sgao@clemson.edu
- **Gretchen Matthews:** Professor, Mathematical Sciences, Clemson University. Email: gmatthe@clemson.edu
- **Michael Burr:** Professor, Mathematical Sciences, Clemson University. Email: burr2@clemson.edu
- **Jim Coykendall:** Professor, Mathematical Sciences, Clemson University. Email: jcoyken@clemson.edu
- **Felice Manganiello:** Professor, Mathematical Sciences, Clemson University. Email: fmanganm@clemson.edu
- **Meredith Burr:** Professor, Mathematical Sciences, Clemson University. Email: burr3@clemson.edu