

AMANDA A. SCHAEFFER FRY

CONTACT INFORMATION

Department of Mathematics
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RESEARCH AND SCHOLARLY INTERESTS

I am a dedicated educator who is committed to furthering the success and mathematical understanding of her students, as well as a motivated researcher. My primary research interests are in group theory and representation theory of finite groups. In particular, much of my work involves the representations of finite groups of Lie type.

ACADEMIC EMPLOYMENT

Michigan State University, East Lansing, Michigan USA **August 2013-Present**
Department of Mathematics

Visiting Assistant Professor (Postdoctoral Appointment)

University of Arizona, Tucson, Arizona USA **August 2009-May 2013**
Department of Mathematics

Instructor
Graduate Teaching Assistant
Graduate Research Assistant

EDUCATION

University of Arizona, Tucson, Arizona USA

Ph.D., Mathematics, May 2013

Thesis defended: April 3, 2013

GPA: 4.0 out of 4.0

Thesis Title: *Irreducible Representations of Finite Groups of Lie Type: On the Irreducible Restriction Problem and Some Local-Global Conjectures*

Advisor: Dr. Pham Huu Tiep

Coursework in Mathematics:

year-long sequences in Algebra, Real Analysis, Geometry/Topology;

year-long sequence in Group Theory;

year-long sequence in Algebraic Number Theory;

year-long sequence in Lie Groups and Lie Algebras;

topics course on Iwasawa Theory;

topics course on Algebraic Groups and Finite Reductive Groups

Coursework in Dept. of Electrical and Computer Engineering:

Channel Coding

independent study on Information Theory

University of Arizona, Tucson, Arizona USA

B.S., Mathematics; Minor in Music, May 2009

GPA: 4.0 out of 4.0

Graduated with Honors, Summa cum laude

PROFESSIONAL
DEVELOPMENT
PROGRAMS
COMPLETED

Michigan State University Calculus Mentoring Program (Fall 2013)
University of Arizona Professional Development Program in Teaching Mathematics (Spring 2011)
University of Arizona Mathematics Teaching Assistant Training (Fall 2010)

TEACHING
EXPERIENCE

Michigan State University, East Lansing, Michigan USA

Instructor for MTH 305 - Functions and Calculus for Elementary and Middle School Teachers
(upcoming) Spring 2014

Will serve as an independent instructor for a course for pre-service middle school teachers exploring concepts on functions and calculus needed for understanding connections between topics of calculus and the mathematics taught in middle school. Duties include preparing and delivering all lectures as well as writing and grading exams, quizzes, projects, and homework, and holding office hours.

Instructor for MTH 133-Calculus II and MTH 153H - Honors Calculus II **(upcoming) Spring 2014**

Will serve as an independent instructor for a second semester calculus course, concurrent with the honors version of the course. Duties include preparing and delivering all lectures as well as writing and grading exams, quizzes, projects, and homework, and holding office hours, as well as supervising a graduate teaching assistant for the course.

Instructor for MTH 132-Calculus I and MTH 152H - Honors Calculus I **Fall 2013**

Served as an independent instructor for a first semester calculus course, concurrent with the honors version of the course. Duties included preparing and delivering all lectures as well as writing and grading exams, quizzes, and homework, and holding office hours.

University of Arizona, Tucson, Arizona USA

Super TA for Math 323-Formal Mathematical Reasoning **Fall 2012**

Assisted Dr. Daniel Madden in teaching students in a course aimed at introducing undergraduate math majors to mathematical reasoning and writing proofs. Duties included holding problem/review sessions and office hours.

Co-Super TA for summer algebra qualifying exam review sessions **Summer 2012**

Held problem sessions throughout the summer to help prepare the first year graduate students for the written qualifying exam in algebra.

Instructor for Math 124-Calculus I with Applications **Spring 2012**

Served as an independent instructor for a first semester calculus course. Duties included preparing and delivering all lectures as well as writing and grading exams, quizzes, and homework, and holding office hours.

Super TA for Math 511-Abstract Algebra **Academic Year 2011-2012**

Assisted Dr. Klaus Lux in teaching students in the first year abstract algebra core course for the mathematics graduate students. Duties included preparing and delivering a small number of lectures and holding problem/review sessions and office hours.

Instructor for Math 112-College Algebra **Summer 2011**

Served as an independent instructor for a college algebra course. Duties included preparing and delivering all lectures, writing and grading exams, quizzes, and homework, and holding office hours.

Instructor for Math 112-College Algebra **Spring Semester 2011**
Served as an independent instructor for a college algebra course. Duties included preparing and delivering all lectures, writing and grading exams, quizzes, and homework, and holding office hours.

Super TA for Math 511A-Abstract Algebra **Fall Semester 2010**
Assisted Dr. Ana-Maria Castravet in teaching students in the first semester of the first year abstract algebra core course for the mathematics graduate students. Duties included holding problem/review sessions and office hours and some grading.

Super TA for Math 415B-Undergraduate Abstract Algebra **Spring Semester 2010**
Assisted Dr. Ana-Maria Castravet in teaching students in the second semester of a senior-level introductory abstract algebra course for undergraduates. Duties included holding problem/review sessions and office hours and some grading.

Undergraduate Teaching Assistant **August - December 2008**
Assisted Dr. Nathan Carlson in teaching, assigning and grading homework, and helping students in a senior-level linear algebra course.

Undergraduate Teaching Assistant **January - May 2007**
Assisted Dr. Veronika Furst in teaching and helping students in a multivariable calculus course.

Math Tutor in the Schools **August - December 2006**
Assisted various teachers at Sabino High School in teaching and tutoring high school calculus, geometry, and algebra courses both in the classroom and during before/after school help sessions.

OUTREACH AND SERVICE

Sonya Kovalevsky Day **2010-2013**
Sonya Kovalevsky Day is a workshop day held each Spring aimed at promoting mathematics to high school girls. Duties included:

- 2013: Co-ran a workshop introducing high school students to arithmetic in various bases
- 2012: Served as co-organizer: co-wrote the application for the AWM grant; recruited for, organized, and ran SK Day
- 2011: Created and ran a workshop introducing students to graph theory and the four-color theorem
- 2010: Served as a member of the organizational committee, helped run a workshop introducing high school students to group theory through the symmetries of a square

MathCounts Volunteer **2012-2013**
Helped organize the Tucson MathCounts competitions and volunteered at the events.

Graduate/Professional Student Council Travel Grant Application Judge **February 2012**
Served as a judge for the February, 2012 GPSC Travel Grant application process.

Graduate Student Representative **Academic Year 2011-12**
Responsibilities included: assisting with recruitment activities and meeting with potential students, attending meetings of the Graduate Committee, addressing student concerns and bringing them to the attention of the Committee, organizing informal graduate student meetings with visiting speakers.

Integration Workshop **August 2011, 2012**
The integration workshop is a yearly workshop to integrate new graduate students through a series of lectures, problem sessions, and a small project. Duties included:

- 2011: Served as a mentor to the new students - helped students with problems and guided a small group through a project on representation theory.

- 2012: Served on a panel of senior graduate students to answer new students' questions about the program.

University of Arizona College of Science Ambassador

Academic Year 2008-2009

Responsibilities included: assisting with activities to recruit high school and undecided college students to take part in the college of science and pursue majors in STEM fields.

MathCats Executive Committee Member

Academic Year 2008-2009

The MathCats is the undergraduate math club at the University of Arizona. As part of the 4-member executive committee, my responsibilities included helping to organize and run all events and meetings.

Arizona Minority Calculus Workshop

August 2007

This was a summer workshop for incoming minority freshman who planned on enrolling in calculus in their first semester at the University of Arizona, with the goal of increasing the presence and success rate in the calculus sequence among minority and lower-income students. Responsibilities included working with individuals and groups during problem sessions as they reviewed the prerequisite concepts and worked through the first chapter of calculus I.

GRANTS AND AWARDS

Association for Women in Mathematics AWM-NSF Mathematics Travel Grant, October 2013.

UA Department of Mathematics Graduate Student Award in Scholarship and Nomination for College of Science Award in Scholarship, March 2013.

UA Department of Mathematics Bartlett Memorial Fellowship - Scholarship award in remembrance of Daniel Bartlett, March 2013.

AMS Graduate Student Travel Grant to 2013 Joint Mathematics Meetings, January 2013

Selection and travel award from AWM to participate in AWM Workshop at the 2013 JMM, awarded September 2012.

UA Dept. of Mathematics VIGRE travel grant to attend 2013 JMM, awarded September 2012.

Selection and travel award from organizers to participate in University of Washington Summer π -School 2012, awarded April 2012.

UA Graduate and Professional Student Council (GPSC) Travel Grant, awarded December 2011.

AMS Graduate Student Travel Grant to AWM Spring 2012 Western Sectional Meeting, March 2012

Research Assistantship (through NSF Grant DMS-0901241), Summers 2011-12

National Physical Science Consortium (NPSC) Graduate Fellowship, 2009-2013

VIGRE Summer Fellowship for Qualifying Exam Preparation, Summer 2009

Undergraduate Awards:

UA Department of Mathematics: Excellence in Undergraduate Research Award, 2009

UA Department of Mathematics: Outstanding Senior Award, 2009

UA Department of Mathematics: Graesser Foundation Mathematics Scholarship, 2008-2009

UA College of Science: Galileo Circle Scholarship, 2008-2009

Central Michigan University: NSF REU participant, Summer 2008

UA Department of Mathematics: VIGRE Undergraduate Research Assistantship, 2007-2008

University of Arizona: President's Award for Excellence, 2005-2009

- PUBLICATIONS
- Schaeffer Fry, A. *$Sp_6(2^a)$ is ‘Good’ for the McKay, Alperin Weight, and Related Local-Global Conjectures*. To Appear in J. Algebra (Accepted 12-2013). Available: arXiv:1212.5622v1.
- Schaeffer Fry, A. *Cross-characteristic Representations of $Sp_6(2^a)$ and their Restrictions to Proper Subgroups*. J. Pure Appl. Algebra 217 (2013), no. 8, 15631582.
- Lux, K., Schaeffer Fry, A., Vinroot, W.R. *Strong Reality Properties of Normalizers of Parabolic Subgroups in Finite Coxeter Groups*. Comm. Algebra. 40 (2012), no. 8, 3056-3070.
- Haynes, G., Mitchell, L., Park, C., Schaeffer, A., Webster, J. *Orthogonal Vector Coloring*. Electronic Journal of Combinatorics. v 17. 2010.
- INVITED TALKS
- (upcoming) Mathematics Colloquium - College of William and Mary. Williamsburg, VA. April, 2014. Title: TBD
- (upcoming) BIRS Workshop on Global/Local Conjectures in Representation Theory of Finite Groups. Banff, Alberta, Canada. March, 2014. Title: TBD
- (upcoming) Mathematics Colloquium - Kent State University. Kent, OH. February 27, 2014. Title: TBD
- Southwestern Group Theory Day. Tucson, AZ. November 2, 2013. Title: *Self-Normalizing Sylow 2-Subgroups and Odd Characters Fixed by Galois Automorphisms*.
- Special Session on p -Local Group Theory, Fusion Systems, and Representation Theory - AMS Fall 2013 Central Sectional Meeting. St. Louis, MO. October 19, 2013. Title: *Odd Characters and Self-Normalizing Sylow 2-Subgroups*.
- Special Session on Groups, Representations, and Applications - Joint Mathematics Meetings 2013. San Diego, CA. January 11, 2013. Title: *$Sp_6(2^a)$ is ‘Good’ for the McKay, Alperin Weight, and Related Local-Global Conjectures*.
- Special Session on Representations of Groups and Algebras - AMS Fall 2012 Western Sectional Meeting. Tucson, AZ. October 28, 2012. Title: *On the Largest Irreducible Representations of the Finite Unitary Groups*.
- Special Session on Linear and Permutation Representations - AMS Spring 2012 Western Sectional Meeting. Honolulu, HI. March 3, 2012. Title: *Cross-characteristic Representations of $Sp_6(2^a)$ and their Restrictions to Proper Subgroups*.
- OTHER PRESENTATIONS
- (upcoming) *Minicourse on Representations of Finite Groups of Lie Type*. Group Theory Seminar, Michigan State University. East Lansing, MI. January-February, 2014. (Multi-Week Minicourse)
- Local-Global Conjectures in Representation Theory, Character Tables, and Self-Normalizing Sylow Subgroups*. Group Theory Seminar, Michigan State University. East Lansing, MI. September 24 and October 1, 2013. (Two Parts)
- Irreducible Representations of Finite Groups of Lie Type*. Final Dissertation Defense. Department of Mathematics, University of Arizona. Tucson, AZ. April 3, 2013.

Irreducible Representations of Finite Groups of Lie Type - A Practice for My Defense. Department of Mathematics Graduate Colloquium, University of Arizona. Tucson, AZ. March 27, 2013.

Cross-characteristic Representations of $Sp_6(2^a)$ and their Restrictions to Proper Subgroups. AWM Poster Session - Joint Mathematics Meetings 2013. San Diego, CA. January 11, 2013

Local Global Conjectures in Representation Theory and the Goodness of $Sp_6(2^a)$. Algebra and Number Theory Seminar, University of Arizona. Tucson, AZ. December 4, 2012.

Cross-characteristic Representations of $Sp_6(2^a)$ and their Restrictions to Proper Subgroups. Poster Session - University of Washington Summer π -School and Conference on Cohomology and Support in Representation Theory. Seattle, WA. August 1, 2012

Cross-characteristic Representations of $Sp_6(2^a)$ and their Restrictions to Maximal Subgroups. Algebra and Number Theory Seminar, University of Arizona. Tucson, AZ. February 21, 2012.

The Irreducible Restriction Problem: Motivation, Overview, and Results. University of Arizona Graduate Student Colloquium. Tucson, Arizona. November 16, 2011.

On the Largest Irreducible Representations of the Finite Unitary Groups. Poster Session, 2011 Alliance Field of Dreams Conference. Arizona State University. Tempe, Arizona. October 14, 2011.

Maximal Subgroups of the Finite Classical Groups and Representations. University of Arizona Graduate Student Colloquium. Tucson, Arizona. April 20, 2011.

Nonsense With the General Linear Group: the "Field" with One Element and Other Such Absurdities. Univ. of Arizona Dept. of Mathematics Recruitment Workshop. Tucson, Arizona. March 7, 2011.

On the Largest Irreducible Representations of the Finite Simple Groups of Lie Type. University of Arizona Algebra and Number Theory Seminar. Tucson, Arizona. March 1, 2011.

Complex Representations of the Finite Unitary Groups and Their Restrictions to Certain Subgroups. Research Tutorial Group Mini-Conference. Tucson, Arizona. December 10, 2009.

Strong Reality in Coxeter Groups. Nebraska Conference for Undergraduate Women in Mathematics (NCUWM). Lincoln, Nebraska. January 31, 2009.

Vector Coloring. Mathematical Association of America (MAA) MathFest. Madison, Wisconsin. July 31, 2008.

Vector Coloring. Summer Undergraduate Michigan Mathematics Research Conference (SUMMR). Holland, Michigan. July 21, 2008. (With G. Haynes and C. Park).

WORKSHOP AND CONFERENCE ATTENDANCES

BIRS Workshop on Global/Local Conjectures in Representation Theory of Finite Groups. Banff, Alberta, Canada. March 16 - 21, 2014. Invited participant.

Southwestern Group Theory Day 2013. Tucson, Arizona. November 2, 2013. Invited presenter.

American Mathematical Society Central Sectional Meeting Fall 2013. St. Louis, MO. October 19-20, 2013. Invited presenter, Special Session on p -Local Group Theory, Fusion Systems, and Representation Theory.

BIRS Workshop on Permutation Groups. Banff, Alberta, Canada. July 21-26, 2013. Invited participant.

Joint Mathematics Meetings 2013. San Diego, California. January 9-12, 2013. Invited presenter, AMS Special Session on Groups, Representations, and Applications. Selected poster presenter, AWM Workshop.

American Mathematical Society Western Sectional Meeting Fall 2012. Tucson, Arizona. October 27-28, 2012. Invited presenter, Special Session on Representations of Groups and Algebras.

University of Washington Summer π -School and Workshop on Cohomology and Support in Representation Theory. Seattle, Washington. July 27 - August 5, 2012. Funded participant.

AIM Workshop on Cohomology Bounds and Growth Rates. Palo Alto, California. June 2012. Invited, funded participant.

American Mathematical Society Western Sectional Meeting Spring 2012. Honolulu, Hawaii. March 3-4, 2012. Invited presenter, Special Session on Linear and Permutation Representations.

Southwestern Group Theory Day. Tucson, Arizona. November, 2009, 2010, 2011.

Focussed Week on Integral Lattices. Gainesville, Florida. February 15-20, 2010.

Nebraska Conference for Undergraduate Women in Mathematics (NCUWM). Lincoln, Nebraska. January 30-February 1, 2009. Presenter.

Mathematical Association of America (MAA) MathFest. Madison, Wisconsin. July 31 - August 2, 2008. Presenter.

Summer Undergraduate Michigan Mathematics Research Conference (SUMMR). Holland, Michigan. July 21, 2008.

Statistical and Applied Mathematical Sciences Institute (SAMSI) Undergraduate Workshop. SAMSI, Research Triangle Park, North Carolina. February 29 - March 1, 2008.

Southwestern Undergraduate Mathematics Research Conference. Arizona State University, Tempe, Arizona. February 22-24, 2008.

OTHER
PROFESSIONAL
EXPERIENCE

National Security Agency, Fort Meade, Maryland, USA

Summer NPSC Intern

May - August 2010

Worked in the Mathematics Research Group, performing research in finite group theory and representation theory with applications to cryptography and cryptanalysis. Used the computer algebra system Magma to perform calculations and run tests.

COMPUTER SKILLS

- Languages: some experience with C, Java, and MATLAB
- Computer Algebra Systems: GAP, Magma
- Applications: \LaTeX , and common Windows database, spreadsheet, and presentation software
- Operating Systems: Unix/Linux (some experience), Windows

MEMBERSHIPS

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