

# Harrison Chapman

## CURRICULUM VITAE

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## Education

B.A. Mathematics and Computer Science, Bowdoin College, 2011.

- Cum laude
- Honors in Mathematics (advisor: Thomas Pietraho)

M.S. Mathematics, University of Georgia, expected August 2015.

Ph.D. Mathematics, University of Georgia, 4th year, all but dissertation, expected May 2017.

- Advisor: Jason Cantarella.

## Teaching

1. Graduate assistant, Online Precalculus (MATH1113E), University System of Georgia. (Fall 2014–)
2. Recitation instructor, Analytic Geometry and Calculus (MATH2200), University of Georgia (Fall 2011, Spring 2012, Fall 2014)
3. Instructor, Calculus for Science and Engineering I (MATH2250), University of Georgia (Spring 2014)
4. Instructor, Precalculus (MATH1113), University of Georgia (Fall 2013)

## Publications

1. On probabilistic unknotting algorithms using only local information.  
with J. Cantarella, E. Lybrand. In preparation.  
*There is a simple deterministic algorithm for converting any knot diagram to a diagram of the unknot by crossing changes, but it requires global information about the diagram. Using our enumeration of diagrams, we consider whether there is a probabilistic algorithm for unknotting a diagram as such with only local information. This question is relevant to the untangling of DNA by topoisomerase action.*
2. Random Knot Diagrams.  
with J. Cantarella, M. Mastin. In preparation.  
*We compute the exact probability that a random diagram of  $n$  crossings has a given knot type (for  $n \leq 10$ ) by directly enumerating and classifying the knot diagrams of  $n$  crossings. Our enumeration method is based on identifying knot diagrams with a class of embedded 4-regular planar graphs.*
3. A Group-theoretic Approach to Human Solving Strategies in Sudoku.  
with M. Rupert (Mentor: E. Arnold). *Colonial Academic Alliance Undergraduate Research Journal* (2012) vol 3, article 3.  
*Paper produced during an NSF REU at James Madison University in 2010. We quantify the data of Sudoku board states by considering which numbers cannot go in a given cell and consider how a typical player's solving strategies are a group acting on this set of states.*

4. On orbital varieties of type A.

Advisor: T. Pietraho. *Honors thesis*, (2011). Bowdoin College.

*Thesis on the Smith conjecture on orbital varieties of nilpotent orbits in the Lie group  $GL_n$ . Outlines the correspondence between Young tableaux and orbital varieties and concludes with conditions for which certain shapes of Young tableaux will admit orbital varieties which are not Smith.*

## Talks

1. University of Georgia, Graduate Student Seminar, February 2015.  
*Virtual Knot Theory.*
2. University of Georgia, Geometry Seminar, January 2014.  
*Random Planar Diagrams.*
3. University of Georgia, Graduate Student Topology Seminar, November 2014.  
*The Poincaré homology sphere as the link of a singularity.*
4. University of Georgia, Research Group on Minimal Surfaces, November 2014.  
*Discrete Ricci Flow.*
5. University of Georgia, Mock AMS Conference, June 2014.  
*The Tropical Grassmannian.*
6. University of Georgia, Mock AMS Conference, June 2013.  
*Hope for slackers: Playing games to prove theorems.*
7. University of Georgia, Mock AMS Conference, June 2012.  
*The Classification of Surfaces.*
8. University of Georgia, VIGRE Research Group on Minkowski's Geometry of Numbers, March 2012.  
*Vinogradov's generalization of a theorem of Aubry-Thue.*
9. AMS Joint Meetings, January 2011.  
AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs.  
*Packets, Solving Symmetries, and Sudoku.*
10. The Ohio State University, Young Mathematicians Conference, August 2010.  
*Packets, Solving Symmetries, and Sudoku.*

Last updated: March 11, 2015

<http://hchapman.github.io/static/CV.pdf>