CATHERINE RAY

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EDUCATION

2017-Present	**Northwestern;** PhD Student in Maths
2015-2017	**UChicago;** Divisional Masters Program in Maths; advised by Peter May
2012-2013	**George Mason University;** B.S. in Computational Physics (graduated winter 2013); advised by Dimitrios Papaconstantopoulos
2010-2012	**Mary Baldwin College:** Program for the Exceptionally Gifted: Mathematics, Computer Science, and Physics; advised by John Ong

EXPERIENCE

2016-Present	**Math Circles Teacher**; Chicago, IL
2016&2017	**REU Mentor;** University of Chicago, Chicago, IL
2014-2016	**2014 Thiel Fellow (Mathematics and Assitive Tech)**; Thiel Foundation; Berkeley, CA
2015	**Visiting Researcher**; Max-Planck-Institut für Mathematik; Bonn, Germany
2015	**Visiting Researcher**; Santa Fe Institute of Complex Systems; Santa Fe, NM
2013-2014	**Mouse Vocalization Specialist & Audio Processing Engineer**; Mousera; Belmont, CA
2013	**Software Engineering Intern**; Cloudera; Palo Alto, CA
2013	**Computational Chemistry Research;** George Mason University, VA
2013	**Automated Computational Semantics (& Machine Learning) Research**; George Mason University; Fairfax, VA
2012	**Human-Computer Interaction Intern (Autonomous Robotics)**; George Washington University; Washington D.C.
2012	**Teaching Assistant for College Algebra**; Mary Baldwin College
2011	**Research Assistant in Materials Science Lab;** Mary Baldwin College; Staunton, VA

PUBLICATIONS/TITLES OF CREATIVE WORK

2017 **On Techniques Used in Calculating the Homotopy Groups of tmf at the prime 2,** UChicago Master's Thesis

2016 **Filling a Gap in Gromov's Proof of the Polynomial Ham Sandwich Theorem**

2015 **A Geometric Model of Morava E-theory**

2015 **Simplifying Multiscale Modeling,** Santa Fe Insitute of Complex Systems

2014 **A New Female-Female Mouse Vocalization Discovered via Unlabeled Machine Learning,** Mousera

2014 **On the Detection and Prevention of Aggression in Lab Mice via Quasi-Real Time Analysis,** Mousera

2013 **Contextual Machine Learning through the Analysis and Chunking of Partially Translated Grade 2 Braille,** George Mason Computational Semantics

NONPROVISIONAL PATENT [PENDING]

2013 **Robotic Mobility Assistive Wheelchairs,** 90776.0001USP1

FELLOWSHIPS

2017 Awarded **NSF GRFP Fellowship (102K + 36K)**

2014-2016 Awarded **Thiel Fellowship (100K)**

AWARDS AND HONORS

2013 **Outstanding Rising Senior Award** in Computational and Data Sciences, SPACS 2013

2012-2013 **Dean's List,** George Mason University

2010-2012 **Dean's List,** Mary Baldwin College

INVITED TALKS

Simplifying Multiscale Modeling, Santa Fe Institute of Complex Systems – 2015

Elliptic cohomology, Geometric Langlands Seminar, Berkeley – 2015

Introduction to formal group laws in homotopy theory, UChicago – 2015

Forms of K-theory, UChicago – 2015

Polynomial Ham Sandwich theorem, Young Topologists Meeting, Københavns Universitet – 2016

A Partition-based Proof of the Jacobi Triple Product formula, UChicago – 2016

SEMINARS RUN

Geometry for Prime Addicts, Northwestern – 2018

Tamagawhat? Northwestern – 2018

ATTENDED CONFERENCES

Introduction to Geometric Langlands, MSRI – 2014

Homotopy theory, manifolds, and field theories, Bonn, Germany – 2015

p-adic methods in Number Theory, Berkeley – 2015

Midwest Topology Seminar, UChicago – 2015

Midwest Topology Seminar, Northwestern – 2016

Midwest Topology Seminar, Wayne State – 2016

2016 Talbot: Kervaire Invariant One problem, Salt Lake City, Utah – 2016

Young Topologists Meeting, Copenhagen – 2016

Homotopy Theory and Number Theory: WCATSS, Eugene, Oregon – 2016

European 2016 Autumn School in Topology, Utrecht, Netherlands – 2016

Conference on invertible objects and duality in derived algebraic geometry and homotopy theory, Regensburg, Germany – 2017

Midwest Topology Seminar, UChicago – 2017

2017 Talbot: Obstruction theory for Structured Ring Spectra, Boise, Idaho – 2017

Homotopy Theory: Tools and Applications, UIUC – 2017

Homotopy Theory in the Ecliptic, Reed College – 2017

Midwest Topology Seminar, Northwestern – 2018

Chromatic Homotopy Theory: Journey to the Frontier, CU Boulder – 2018

REFERENCES

EDWARD FRENKEL
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PETER MAY
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