

Benjamin Tighe

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Research Interests

Moduli Theory, Hodge Theory, and other related topics in Algebraic Geometry; Combinatorics of Coxeter Groups.

Education

Athens, Georgia

University of Georgia

Ph.D in Mathematics

2017-2022

Seattle, Washington

University of Washington

B.S. in Mathematics (Comprehensive)

2014-2017

Departmental Honors. Thesis: Applications of Projective Varieties and the Riemann-Roch Theorem in the Construction of Elliptic Curves (Adviser: Sándor Kovács).

Bremerton, Washington

Olympic College

Associate of Science

2012-2014

With Honors (concurrent with high school diploma with the Running Start (Dual Credit) Program.

Port Orchard, Washington

South Kitsap High School

High School Diploma

2011-2014

With honors.

Work Experience

Graduate Student Teaching Assistant

University of Georgia, Department of Mathematics

I am currently a graduate student at UGA, receiving a stipend that is fulfilled by my grading duties and study hall guidance.

Athens, Georgia

August 2017 - Present

Precalculus Lab Supervisor

University of Georgia, Department of Mathematics

Proctoring for the precalculus tests in the computer labs.

Athens, Georgia

September 2017-Present

Teaching Assistant Counselor

Summer Institute for Mathematics at the University of Washington (SIMUW)

A TA/RA position, instructing and living with high school-aged students who are interested in learning advanced mathematics.

University of Washington

June - August 2017

Mathematics Tutor

CLUE Tutoring

Drop-in style tutoring in undergraduate (and graduate) mathematics along with leading lectures in midterm reviews for calculus courses.

University of Washington

May 2016-Present

Teaching Assistant

Department of Mathematics

Wrote Solutions, responded to emails, and held office hours for (undergraduate) modern algebra.

University of Washington

June 2016-August 2016

Homework Grader

Department of Mathematics

Grading homework for undergraduate courses in mathematics, including mathematical proofs (Math 300), systems of and partial differential equations (Math 309), real analysis (Math 327/328) and modern algebra (Math 402).

University of Washington

January 2015 - Present

Front Desk Manager

Department of Mathematics

Part-time work filing papers and communicating with faculty in the math department.

University of Washington

January - June 2016, March-June 2017

Land Survey Assistant

Kitsap County Public Works, Washington

Summer seasons: Performing land survey for construction jobs in Kitsap county.

Port Orchard

June 2014-September 2016

Mathematics Tutor

Olympic College, Washington

Drop-in style tutoring in undergraduate mathematics and physics.

Bremerton

January-June 2014

Assistant/Head Coach

South Kitsap Special Olympics

Volunteer work with the local Special Olympics group, coaching baseball, basketball, bowling and soccer.

May 2010-Present

Awards, Honors and Nominations

University of Georgia: TA Assistantship, 2017-2022

University of Washington: Departmental Honors; Dean's List; (Nominated) Graduate Award in Excellence in Teaching.

Olympic College: Dean's List; Dual Credit Degree (Associate of Science).

South Kitsap High School: Principal's List; Communications Student of the Year (2011-2012); South Kitsap Offensive Player of the Year (Lacrosse, 2013).

Other: South Kitsap NIB Award for Excellence in Coaching in Special Olympics (2014); AmeriCorps Scholarship for Excellence in Public Works (Kitsap, 2016).

Specialized Courses (Graduate Education/Actuarial Studies)

(Graduate) Algebra: Advanced Group and Ring Theory, Homological Algebra, Semisimple Artinian Rings, Group Representations, Cohomology, Galois Theory, Commutative Algebra, Dimension theory, Algebraic Geometry.

Coxeter Groups: Reflection Groups, Weyl Groups, Coxeter Groups, Dynkin diagrams, Coxeter graphs, polynomial invariants of finite reflection groups, Kazhdan-Lusztig polynomials, applications of parabolic subgroups to the Solomon descent algebra, the Coxeter Complex, affine Grassmannians.

Actuarial Studies: *Probability:* general probability; random variables (discrete and continuous) including binomial (positive and negative), geometric, hypergeometric, Poisson, uniform, exponential, gamma, normal, etc.; multivariate probability distributions. Texts: *Introduction to Probability* by Bertsekas and Tsitsiklis and *Probability for Risk Management* by Matthew Jassett and Donald Stewart.

Independent Study: Affine and projective spaces, Hilbert's Nullstellensatz, local rings, resolution of singularities of projective curves, intersection theory, Riemann-Roch theorem, elliptic curves (Hartshorne's *Algebraic Geometry*, Fulton's *Algebraic Curves*, Lang's *Intro. to Abelian and Algebraic Functions*, Silverman's *The Arithmetic of Elliptic Curves*).

Academic Projects

Hodge Theory VRG

September 2017 - May 2018

I am part of a Vertical Research Group at the University of Washington during the 2017-2018 academic year that focuses on Hodge Theory, Moduli Spaces and other related topics in algebraic geometry.

Depth of a Coxeter Element

March 2017

Under the supervision of Sara Billey, a group of graduates and myself investigated an open problem posed by Petersen and Tenner, focusing on an inequality relating the depth of a Coxeter element to its length. I proved that the inequality was equality in the dihedral case.

Open Conveyor Belts

November 2016-March 2017

Open problem under the supervision of Sara Billey at the University of Washington.

(Departmental Honors) Senior Thesis

September 2016-Present

A paper focused on the Riemann-Roch Theorem and its applications to how elliptic curves embed in projective space, including many examples. This is the culmination of my departmental honors track.

Mathematical Modeling Project

December 2014

Cumulative project representing different mathematical models. The project focused on dynamical systems and war-modeling, based on the film "Mr. and Mrs. Smith." I investigated Guerrilla warfare and love modeling.

Addresses, Lectures and Conferences

September 26, 2017: "The Casas-Alvero Conjecture for Univariate Polynomials over a Field of Characteristic 0" at the Graduate Student Seminar, UGA.

July 31, 2017: Lecture on Projective Spaces over Infinite Fields , SIMUW.

May 8, 2017: "Society of Actuaries Candidate Connect" (Attendee), Seattle.

March 10, 2017: Lecture on final exam material in vector calculus (Math 126), University of Washington CLUE

March 8, 2017: A presentation on Bruhat Intervals, Coxeter Arrangements and λ -Decreasing Saturated Chains (Based on the work of Hultman, Linusson, Shareshan, and Sjöstrand), University of Washington

February 16/23, 2017: Lecture on material in vector calculus (Math 126), University of Washington CLUE.

January 24, 2017: Lecture on midterm material in vector calculus (Math 126), University of Washington CLUE.

December 8, 2016: Lecture on final exam material in pre-calculus (Math 120), University of Washington CLUE.

October 24, 2016: Lecture on midterm material in differential calculus (Math 124), University of Washington CLUE.

March 21, 2016: Undergraduate panel speaker for the University of Washington's annual Mathday.

Languages

English: Native Language

Spanish: Proficient

speaking and writing

French: Intermediate

good with academic literature

Technical Skills

Computer Skills: \LaTeX , Microsoft Office, Mathematica, Logger Pro, and Python