

# Alison “AJ” Bu

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## EDUCATION

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**Rutgers, The State University of New Jersey** September 2018-Present  
*PhD Student in Mathematics*  
New Brunswick, NJ  
Concentration: Experimental Mathematics  
Advisor: Doron Zeilberger

**Boston College**, Morrissey College of Arts and Sciences May 2017  
*Bachelor of Arts- Mathematics; Philosophy minor; magna cum laude*  
Chestnut Hill, MA  
GPA: 3.77/4.00; Major GPA: 3.75

## TEACHING EXPERIENCE

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**Rutgers, The State University of New Jersey** Summer 2022, Summer 2023  
*Instructor of Record*  
New Brunswick, NJ

- Instructor of Record for Calculus II
- Created a lecture schedule and lesson plans, ran lectures, and facilitated group learning
- Wrote worksheets, quizzes, workshops, and exams
- Graded quizzes, workshops, and exams

**Rutgers, The State University of New Jersey** Fall 2019-Spring 2020, Fall 2021, Fall 2022  
*Teaching Assistant*  
New Brunswick, NJ

- Teaching assistant for Calculus I (Fall 2019, Fall 2021), Calculus II (Spring 2020), and Linear Algebra (Fall 2022)
- Ran recitations or workshops –created lesson plans, reviewed material covered during lecture, and facilitated group learning
- Created worksheets and quizzes
- Graded workshops, quizzes, and exams

**Newark Academy** January-August 2018  
*Summer Session Teacher (June-August) and Substitute Teacher (January-August)*  
Livingston, NJ

- Taught Algebra I during the summer session and created individualized lesson plans
- Planned and taught lessons as a per diem and long-term substitute
- Substituted regular and honors level math courses: (6<sup>th</sup> grade, Pre-Algebra, Algebra I, Geometry, Algebra II/Trig, precalculus, AB/BC Calculus, IB Math)
- Graded tests

**Self-Employed Tutor** August 2017-August 2019

- Tutor for algebra, geometry, precalculus, calculus, the SAT, and the ACT

**Brighton High School** Spring 2015  
*Student Teacher*  
Brighton, MA

- Completed placement in urban school for one full school day per week
- Planned and taught lessons in Physics (Special Education) and Advanced Algebra classes
- Created handouts and worksheets to aid student learning and assess student understanding

**The Winston School** May-June 2013  
*Full-Time Classroom Intern*  
Short Hills, NJ

- Assisted in classes grades 3-8 for students with language-based learning disabilities
- Taught students in grades 3-8 one-on-one in math, English, science

## **RESEARCH EXPERIENCE**

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### **Rutgers University**

June 2020 – Present

#### *Thesis Research*

- Research in Experimental Mathematics under the guidance of Dr. Doron Zeilberger

### **Boston College Mathematics Department**

Summer 2016

#### *Undergraduate Research Fellow*

- Researched computational algebraic number theory under Dr. Ellen Goldstein

### **Lynch School of Education, Boston College**

Fall 2016

#### *Research Assistant*

- Researched educational testing with Dr. Michael Russell

## **PUBLICATIONS AND PREPRINTS**

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A. Bu. “Explicit Generating Functions for the Sum of the Areas Under Dyck and Motzkin Paths (and for Their Powers).” *Preprint* arXiv:2310.17026 (2023).

A. Bu and D. Zeilberger. “Using Symbolic Computation to Explore Generalized Dyck Paths and Their Areas.” *Preprint* arXiv:2305.09030 (2023).

A. Bu “A Combinatorial Approach to the Groebner Bases of Ideals Generated by the Elementary Symmetric Functions.” *E-JC* 29 (3) (2022). Article P3.4.

A. Bu and R. Dougherty-Bliss. “Enumerating Restricted Dyck Paths with Context-Free Grammars.” *Integers* 21 (2021). Article 69.

A. Bu “Automated Counting of Restricted Motzkin Paths.” *ECA* 1 (2) (2021). Article S2R12.

## **TALKS**

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“Enumerating Restricted Dyck Paths.” New York Combinatorics Seminar. (November 5, 2021).

## **Mentoring Experience**

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### **Rutgers, The State University of New Jersey**

Summer 2023

#### *Summer Session Head TA*

*New Brunswick, NJ*

- Served as a mentor and resource for graduate students teaching a summer course
- Conducted teaching observations for graduate students and wrote a review for the math department
- Provided feedback and suggestions to the instructors during the semester

### **Spectrum Retreat**

Spring 2017

#### *Mentor*

- Led, gave a talk, and facilitated group discussion on a formation retreat for LGBTQ students at Boston College

### **Pride Peers**

September 2014-May 2017

#### *Mentor and Presenter*

- Mentored LGBTQ Boston College students in self-discovery and social, familial, academic, and LGBTQ issues
- Facilitated small group discussion and aided mentees in self-reflection and self-discovery
- Gave presentations and facilitated discussions in dorms and classes about gender identity and sexuality

- Trained by University Counseling Services, University Mission and Ministry, and the Dean of Students Office

## **PROFESSIONAL DEVELOPMENT**

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### **Rutgers Math Teaching Group**

September 2020-Present

*Active Participant*

- Participate in weekly discussions on undergraduate teaching and pedagogical methods
- Led a discussion on how to run workshops online

## **AWARDS AND HONORS**

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**SAS Fellowship**, Rutgers University

Fall 2020-Spring 2021, Spring 2023

**Janice Pattwell Annual Mathematics Fellowship**, Rutgers University

Fall 2018

**Magna Cum Laude**, Boston College

Spring 2017

**Departmental Honors**, Boston College Mathematics Department

Spring 2017

**The Order of the Cross and Crown**, Boston College

Spring 2017

**Dean's List: First Honors**, Boston College (7 semesters)

## **VOLUNTEER EXPERIENCE**

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### **Stepping Stones School Volunteer**

Summers 2012-2014

- Assisted in classroom for students ages 5-9 with Down syndrome
- Instructed students in speech, sign language, reading, writing, and counting
- Observed and assisted in physical therapy and occupational therapy

*Roseland, NJ*

## **LEADERSHIP AND OTHER ACTIVITIES**

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### **GRADient**

June 2020-Present

*President*

- President of the LGBTQ+ professional and graduate student association at Rutgers University
- Worked to make GRADient a recognized Graduate Student Organization

### **Undergraduate Government of Boston College**

April 2015- May 2016

*Coordinator (2015), Asst. Director of Gender Programming (2016) - GLBTQ Leadership Council*

- Planned, organized, and implemented campus wide events that promote awareness on LGBTQ+ issues