

Jai Aslam

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RESEARCH INTERESTS

Topological Data Analysis, Categorification, Topological Combinatorics, Discrete Geometry

EDUCATION

North Carolina State University

Ph.D. in Mathematics 2018-2023 (Expected)

Advisor: Radmila Sazdanovic

M.S. in Mathematics 2020

Northeastern University

B.S. in Mathematics and Computer Science 2017

PUBLICATIONS

Splitting Loops and Necklaces: Variants of the Square Peg Problem – *Aslam et al. in Forum Math., Sigma, 8, e5 (2020)*.

On the generalized Erdos-Kneser conjecture: proofs and reductions – *Aslam et al. in J. Combin. Theory, Ser. B, 135 (2019) 227-237*

PREPRINTS

Persistence Curves: Bounding their Distances and Applications to Cancer Genomics – *Joint with S. Ardanza-Trevijano, F. Arsuaga, R. Sazdanovic*

Order polytopes of the face lattices of polytopes - *Joint with D. Albertin, M. Beck, M. Hlavacek, S. Kolhatkar, L. Saud.*

Categorifications of the Chromatic Polynomial of a Hypergraph and Coloring Complexes – *In preparation*

AWARDS

University Graduate Fellowship (NCSU) 2018-2019

Dean's Scholarship (Northeastern U.) 2013-2017

TALKS

Filtrations in Topological Data Analysis, UC Davis REU, (Virtual) Aug. 2021

Polytope Order Polytopes, REACT Final Presentations, (Virtual) Mar. 2021

Intro to Simplicial Homology, NCSU Graduate Topology and Geometry Seminar, Feb. 2020

Intro to Knot Floer Homology, NCSU Topology and Geometry Working Seminar, Mar. 2019

Intersection patterns of sets, University of Miami Combinatorics Seminar, Jan. 2018

Splitting Necklaces, Northeastern University Math Club Meeting, Nov. 2017

Intersection patterns of sets, SPUR Final Presentations at Cornell University, Aug. 2017

Splitting Necklaces and Closed Curves, SPUR Final Presentations at Cornell University, Aug. 2017

The Action of the Symmetric Group on a Tame Knot, JR/SR Honors Thesis Presentation at Northeastern University, Apr. 2017

Modeling the 2014 Ebola Epidemic, Applied Math Capstone Presentation at Northeastern University, Apr. 2016

EMPLOYMENT

Research Assistant, NC State Math Department

June 2020 – Present

Applied techniques from topological data analysis to distinguish patients with different types of breast cancer using their genomic data. Funded by NSF DMS-1854770.

Teaching Assistant, NC State Math Department

Aug 2018 – June 2021

Taught lessons and problem sessions, wrote tests and held office hours for calculus 1-3.

Researcher, Cornell Summer Research Program (SPUR)

June 2017 – Aug 2017

Solved research questions related to necklace splitting and the generalized Erdos-Kneser conjecture.

Software Engineering Co-op, NaviNet

July 2015 – Dec 2015

Generated an estimated \$70,000 annual savings by creating an automated workflow for depositing EDI files into a database used to answer crucial business questions.

Math Tutor, Various Clients

June 2014 – Present

Tutored students in multiple courses including algebra, calculus, upper-level undergraduate math courses and master's-level linear programming.

TEACHING

Instructor of Record at NCSU for MA 121 – Elements of Calculus (Summer II '21)

Instructor of Record at NCSU for MA 241 – Calculus II (Summer I '20)

Recitation Leader at NCSU for MA 241 – Calculus II (SP'20)

Recitation Leader at NCSU for MA 242 – Calculus III (FA'19)

Grader at NCSU for MA 305 – Introductory Linear Algebra (Summer I '19)

Lecture Assistant at NCSU for MA 121 – Elements of Calculus (SP'19)

Lecture Assistant at NCSU for MA 121 – Elements of Calculus (FA'18)

SERVICE

AMS Student Co-Mentor, NC State University

2020 – Present

Advising a first year graduate student on classes, research, time management etc.

COMPUTER SKILLS

Languages: Proficient with Java, C++, Python, R; Familiar with C, Mathematica, SageMath, Matlab, SQL, Racket

Applications: GitHub, LaTeX, Linux