ArunSuresh

Contact
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Languages
English
Tamil
LaTeX

Programming
♥ Python
♥ Julia
Macaulay2
C++, Haskell, R

Education

2021 – Now **PhD** in Mathematics (Advisor: Dr. D Edidin) [GPA: 4.00] University of Missouri

2020 – 2021 **M.S.** in Mathematics (Advisor: Dr. F Enescu) [GPA: 4.04] Georgia State University

2016 – 2019 **B.S.** in Mathematics (Minor: Physics) [GPA: 4.18] Georgia State University

Research Interests

I am currently doing my doctoral studies with Dr. Dan Edidin. I am primarily interested in using tools from algebra, algebraic geometry and representation theory to approach problems in analysis. My current research project is concerned with the so-called crystallographic (Fourier) phase retrieval problem with real and complex frames. When I am not busy retrieving phase, I think (and read) about applied algebraic geometry and representation theory.

Research Positions

Jun '23 – Aug '23 **University of Missouri - Department of Mathematics** Columbia Missouri
Graduate Research Assistant

Worked with Dr. Dan Edidin on problems concerning generic recovery of real and complex signals from it's power spectrum.

Apr '20 – Jul '20 **Georgia State University - Department of Mathematics and Statistics** Atlanta, Georgia
Graduate Research Assistant

Worked with the research group of Dr. Yaroslav Molkov to implement various parameter estimation models in Julia, with the motive of rewriting some existing research models as a differentiable program.

Jan '18 – Dec '19 **Georgia State University - Department of Mathematics and Statistics** Atlanta, Georgia
University Assistant

Was supported by the Honors College at GSU to continue my research in commutative algebra with a particular focus on numerical semigroups.

Oct '17 – Jan '18 **Georgia State University - Department of Mathematics and Statistics** Atlanta, Georgia
RIMMES Undergraduate Researcher

Participated in the RIMMES (Research Initiation in Mathematics, Mathematics Education and Statistics) program under Dr. Florian Enescu, working on commutative algebra and ring theory. This research, by Jan 2018 transferred into my University Assistantship Position (UAP)

Publications

Jul '23 **The generic crystallographic phase retrieval problem** D. Edidin and A. Suresh
[submitted to] The Journal of Applied and Computational Harmonic Analysis

Jul '21 **The Generators, Relations and Type of the Backelin Semigroup** F. Enescu and A. Suresh
Communications in Algebra

Teaching Experience

Aug '21 – Present **University of Missouri - Department of Mathematics** Columbia, Missouri
Graduate Teaching Assistant

Teaching:
- Fall 2023: Math 1500H, Calculus and analytic geometry 1 - Honors
- Fall 2023: Math 1500, Calculus and analytic geometry 1
- Spring 2023: Math1400, Calculus for life sciences
- Fall 2022: Math 1300, Finite Mathematics
- Summer 2022: Math 1100, College algebra
- Spring 2022: Math 1100, College algebra
- Fall 2021: Math 1100, College algebra

Grading:
- Spring 2023: Math 3000, Introduction to advanced mathematics.
- Fall 2022: Math 3000, Introduction to advanced mathematics.
- Spring 2022: Math 3000, Introduction to advanced mathematics.

Aug '20 – May '21 **Georgia State University - Department of Mathematics and Statistics** Atlanta, Georgia
Graduate Teaching Assistant

Teaching:
- Fall 2020 – Spring 2021: Math 1111, College algebra

Sep '17 – Aug '20 **Mathematics Assistance Complex (MAC) at GSU** Atlanta, Georgia
Graduate Lab Assistant

Positions:
- Graduate Lab Assistant [Jan '20 – Aug '20]
- University Assistant [Jan '18 – Dec '19]
- Student Assistant [Sep '17 – Dec '17]

Classes tutored:
- All mathematics courses up to calculus
- All post-calculus mathematics courses barring those that required a statistics or bio-informatics concentration.

Apr '17 – Aug '17 **IIT-BUDS Private ltd.** Chennai, TN, India
Mathematics Teacher -- RMO coach

Was responsible for preparing students towards their regional mathematics Olympiad.

Topics Covered:
- Theory of equations and functions
- Coordinate geometry
- Fundamentals of calculus

Extra Curricular

Feb '23 – Present **Directed Readings Program (DRP) at MU** Columbia, Missouri
Founder, Mentor

Aug '22 – Present **American Mathematical Society -- MU Graduate chapter** Columbia, Missouri
President

Aug '22 – Present **(Student led) Algebraic geometry reading group** Columbia, Missouri
Coordinator, presenter

Aug '22 – Present **Graduate student seminar** Columbia, Missouri
Coordinator

Sep '18 – May '21 **Continuum Group at GSU** Atlanta, Georgia
Founder, President

Aug '18 – May '21 **Mathematics and Statistics Club at GSU** Atlanta, Georgia
President

May '16 – Aug '16 **Organization for the promotion of science** Chennai, TN, India
Member, Speaker

Presentations and Projects

Fall '23 **Western Algebraic Geometry Symposium (WAGS)** St.Louis, Missouri
Poster: Second moment of dihedral actions, incidence varieties and ensuring signal recovery

Summer '23 **Codes and Expansions (CodEx) Seminar** Online
Talk: The generic crystallographic phase retrieval problem

Spring '23 **Commutative Algebra Regional Expository Seminar (CARES)** Online
Talk: The Betti numbers of the Backelin semigroup

Spring '23 **Pre-print seminar at MU** Columbia, Missouri
Talk: Exploring the Backelin semigroup.

Fall '22 **Graduate student seminar at MU** Columbia, Missouri
*Talk: All the money in the world can not can not buy me 151 Chicken McNuggets**

Fall '22 **Pre-print seminar at MU** Columbia, Missouri
Talk: Every algebraic set in n—space is the intersection of n—hypersurfaces (Eisenbud, Evans)

Fall '20 **GSU Department of Mathematics - Numerical Analysis Research Group** Atlanta, Georgia
Project: Compressed Sensing using (Accelerated) Proximal Gradient Descent and wavelet transforms for non-sparse signals

Summer '20 **eCARs (early Commutative Algebra Researchers) Conference** Online
Poster: Betti-sequence of the Backelin semigroup

Summer '20 **Mathematical Nexus - Student body at Indian Statistical Institute** Online
Talk: The Generators, Relations and Type of the Backelin Semigroup Ring

Spring '20 **33rd Annual Mathematics Conference at Perimeter College** Clarkston, Georgia
Talk: La Pendu: An exploration of Neo-Riemannian Transforms and Euclidean Rhythms. Original Musical Composition: La Pendu

Fall '19 **Georgia Undergraduate Research Conference** Gainsville, Georgia
Talk: The Minimal Generating Set of the Presentation Ideal of Backelin Semigroup Ring

Spring '19 **Georgia State University Research Conference (GSURC)** Atlanta, Georgia
Poster: The Minimal Number of Generators of a Semigroup Ring and the Frobenius Coin Exchange Problem

Spring '19 **GSU Department of Mathematics and Department of Music** Atlanta, Georgia
Talk: Neo-Riemannian transformations and Sierpinski like walks across the Tonnetz. Original Musical Composition: Spring

Spring '19 **GSU Department of Mathematics - RIMMES program** Atlanta, Georgia
Report: The Minimal Number of Generators of a Semigroup Ring and the Frobenius Coin Exchange Problem

Fall '18 **Georgia Undergraduate Research Conference (GURC)** Gainsville, Georgia
Poster: On The Existence Of An Arbitrarily Large Number Of Generators For The Presentation Ideal Of a Numerical Semigroup Ring.

Fall '18 **Undergraduate Mathematics Symposium (UMS)** Chicago, Illinois
Poster: On the minimal number of relations among the generators of Backelin's semigroup

Fall '18 **Physics4500: Computational Fluid Dynamics** Atlanta, Georgia
Project: Collapse Of Spherical Magnetic Molecular Cloud Core With ENZO AMR MHD Code. Used GSU's supercomputer "Harlow" for computation

Spring '18 **GSU Department of Mathematics and Statistics - Algebra Seminar Series** Atlanta, Georgia
Talk: On the number of generators for the presentation ideal of a semigroup ring.

Awards and Achievements

Spring '23 **Excellence in graduate teaching** University of Missouri
Graduate student award recognizing exceptional performance as a graduate student instructor. This award entailed a $300 scholarship.

Spring '23 **Huckaba scholarship in algebra** University of Missouri
Graduate student award for exceptional overall performance in research concerning algebra and related fields. This award entailed a $1,200 scholarship prize

Fall '21 **Excellence in qualifying exams - Algebra, Analysis** University of Missouri
Secured the highest scores in the 2021 Algebra and Analysis qualifying exams. This award entailed a $600 scholarship prize

Spring '21 **V.V. Lavroff award for exceptional graduate student achievements** Georgia State University
This award entailed a $600 scholarship prize.

Spring '19 **V.V. Lavroff award for exceptional undergraduate student achievements** Georgia State University
This award entailed a $300 scholarship prize.

Spring '19 **Dean's List** Georgia State University
Was mentioned in GSU's Dean's List for achieving a semester GPA of 3.98

2016-2019 **President's List** Georgia State University
Was mentioned in GSU's President's List for the following terms: Fall '16, '17, '18, '19; Spring '17, '18; and Summer 18' – for achieving a semester GPA greater than 4.0

2017-2019 **Mathematics Competitions and Integral Bees** Georgia State University
Participated in the annual Mathematics competition held by MathStat club at GSU and secured a prize in terms Spring '17, '18 and '19; and respective integral bees in Fall '17 and '19

Fall '17 **First place in Oratory Competition** Georgia State University
Won first place in an oratory competition held by the Human Communications Department at GSU for a talk under the title "An invite to reconsider mathematics"

Fall '17 **Kirkland Sattlemeyer Scholarship** Georgia State University
Recipient of the Kirkland Sattlemeyer Scholarship from Honors College for the last two years of my undergraduate studies. This award waived $2000 off my yearly tuition fees.

Fall '16 **Campus Atlanta Scholarship** Georgia State University
Recipient of the Campus Atlanta Scholarship (at GSU) that waives the out of state portion of my Tuition ($18000/ academic year) for the four years of my undergraduate studies.

Interests and hobbies

Professional: Abstract Algebra, Algebraic Geometry, Representation theory, Quiver invariant theory, Analysis, Mathematical Modelling, Numerical Analysis, Numerical Semigroups.
Personal: Competitive Problem solving, Climbing, Biking, Programming, Music, Yoga, Cooking, and Dungeons & Dragons.

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References available upon request.