Rayan K. Ibrahim

CONTACT INFORMATION	Grace E. Harris Hall, Fourth Floor 1015 Floyd Ave. Box 842014 Richmond, Virginia 23284-2014 ibrahimr3@vcu.edu

EDUCATION

Ph.D. Systems Modeling and Analysis — May 2024 (Expected)
Concentration in Discrete Mathematics
- Advisors: Craig E. Larson & Allison H. Moore
- Virginia Commonwealth University, Richmond, VA

M.S. Mathematics — May 2021
- Virginia Commonwealth University, Richmond, VA

B.S. Mathematics — Jan. 2019
- The City University of New York,
  The College of Staten Island, Staten Island, NY
- The Verrazzano School - Undergraduate Honors Program

RESEARCH EXPERIENCE

Graduate Research Assistant, Virginia Commonwealth University — Aug. 2021 – Present
- Funded by: National Science Foundation DMS–2204148, &
  The Thomas F. and Kate Miller Jeffress Memorial Trust,
  Bank of America, Trustee,
- Topology, Knot Theory, Graph Theory, Combinatorics
- Supervisor: Allison H. Moore, PhD

Undergraduate Research Assistant, The College of Staten Island — Feb. 2017 – Jun. 2019
- Funded by: Grants from The Gulf of Mexico Research Initiative
  to the Consortium for Advanced Research on Transport of
  Hydrocarbon in the Environment (CARTHE)
- Oceanography, Data Processing
- Supervisor: Andrew C. Poje, PhD

REU in Mathematics, Hobart and William Smith Colleges — May 2018 – Aug. 2018
- Funded by: National Science Foundation DMS–1757616
- Graph Theory
- Supervisor: Erika L.C. King, PhD

TEACHING EXPERIENCE

Instructor of Record, Virginia Commonwealth University
- Introduction to Contemporary Mathematics — Sm20
- Algebra with Applications — F20
- Precalculus — Sm21, Sm22, Sm23
- Calculus I — F23

Graduate Teaching Assistant, Virginia Commonwealth University — F19, Sp20, Sp21
- Grader: Basic Practice of Statistics, Mathematical Modeling, Precalculus
- Classroom Assistant: Precalculus

Mathematics Tutor — Sep. 2016 – Dec. 2018
- The College of Staten Island
- Courses: Remedial Mathematics, Calculus I, II, & III (Multivariate), Probability,
  Calculus Lab (MATLAB)

Mathematics Tutor, Website Designer — Jul. 2017 – Aug. 2017

- The College of Staten Island,
  The Verrazzano Honors School and
  Macaulay Honors College
- Funding provided by NYC DYCD Summer Youth Employment Program

PUBLICATIONS

1. E. King, **R. Ibrahim**, R. Jackson. (2022) Introducing 3-Path Domination. *Journal of Combinatorial Mathematics and Combinatorial Computing.*

2. M. Berta, A. Griffa, A. C. Haza, J. Horstmann, H. S. Huntley, **R. Ibrahim**, B. Lund, T. M. Özgökmen, A. C. Poje. (2020) Submesoscale Kinematic Properties in Summer and Winter Surface Flows in the Northern Gulf of Mexico. *Journal of Geophysical Research: Oceans*, 125

3. M. Elpers, **R. Ibrahim**, A. H. Moore. Determinants of Simple Theta Curves. *Under Review.*

4. **R. Ibrahim**, H. Lafayette, K. McCall. Bootstrap Percolation, Connectivity, and Graph Distance. *Under Review.*

5. V. Bednar, Y. Bidav, N. Bushaw, C. Flippen, M. D. Gibellato, **R. Ibrahim**, C. E. Larson, R. Wieman. Notes on Hadamard Matrix Graphs. *In Preparation.*

6. **R. Ibrahim**, A. H. Moore, P. Liu. Clique Complexity of RNA Pseudoknots. *In Preparation.*

PRESENTATIONS

1. **R. Ibrahim**, H. LaFayette, K. McCall. New Results on Bootstrap Percolation. Virginia Commonwealth University Discrete Mathematics Seminar. (Nov. 2023)

2. M. Elpers, **R. Ibrahim**, A. H. Moore. Determinants of Simple Theta Curves. Joint Mathematics Meetings, AMS Contributed Paper Session on Topology. (Jan. 2023)

3. **R. Ibrahim**. The Structure of Graphs With Independence Number 2. Virginia Commonwealth University Discrete Mathematics Seminar. (Feb. 2022)

4. **R. Ibrahim**. The Reconstruction Problem. Virginia Commonwealth University SYSM Research Seminar. (Feb. 2021)

5. E. King, **R. Ibrahim**, R. Jackson. Introducing 3-Path Domination. Presented at
   - National Technical Institute for the Deaf, Rochester Institute of Technology. (Jul. 2018)
   - MAA MathFest 2018 Undergraduate Sessions. (Aug. 2018)
   - The Ohio State University Young Mathematicians Conference 2018. (Aug. 2018)

OUTREACH

Geometry Summer Camp   Jun. 12 – 16, 2023
- Volunteer position.
- Guided middle school students through interactive mathematics activities and demonstrations.

OTHER ACTIVITIES

Student Geometry Workshop   Aug. 2022 – May 2023
- Virginia Commonwealth University

AMS Math Research Community   Jun. 5 – 11, 2022
Trees in Many Contexts *(Selected)*
- Week-long workshop with funding from the AMS and National Science Foundation DMS–1641020.
- Advised by Stephan Wagner on inverse problems on trees.

Graph Theory Computational Discovery Lab   May 2022, May 2023
- Virginia Commonwealth University
- Annual research workshop with a focus on discrete mathematics and generating conjectures via automated conjecturing (The Graph Brain Project).
- Topics Explored: Graphs, Knots, and Independence (2022), Hadamard Matrices (2023).

The Discrete MathemaTea   Aug. 2022 – Present
- Virginia Commonwealth University
- An informal, student led discussion group on current research.
- Co-organizer with Neal Bushaw and presenter.

Math and Magic with Manjul Minicourse   Sep. 2018 – Dec. 2018
- National Museum of Mathematics, New York, NY
- Participant in a minicourse involving magic tricks and the math behind them.

Math Club   Aug. 2017 – May 2018
- The College of Staten Island
- President and Event Organizer

Computer Science Club   Sep. 2016 – May 2018
- The College of Staten Island
- Member

Awards and Scholarships		
Albert V. Maniscalco Memorial Scholarship		Jan. 2018 – May 2018
Albert & Jean Roland Memorial Scholarship		Aug. 2017 – May 2018
New York State Academic Excellence Scholarship		Aug. 2015 – Jan. 2019
New York City Council Merit Scholarship		Aug. 2015 – Jan. 2019

Technical Skills		
	Programming:	Matlab, Python, SageMath
	Markup:	LaTeX, HTML, CSS, Word, Excel
	Operating Systems:	Windows, Linux