Tahseen W. Rabbani

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Objective

- Exposure to a variety of applied and pure fields in mathematics through a wide breadth of coursework and research. Software proficiencies include MUMPS, Visual Basic 6.0, Java, Javascript, C♯, ASP.NET, CSS/HTML, Mathematica, and R.

Education

University of Virginia Charlottesville, VA, U.S.A. • Bachelor of Arts in Mathematics, Class of 2015
Concentration: Graduate Preparatory
GPA: 3.81/4.00 (Major), 3.64/4.00 (Cumulative)
Awards & Grants

- Distinguished Majors Program (**High Distinction**). Thesis: *p-adic Numbers and the Hasse-Minkowski Theorem.*
- Echols Scholar.
- Spring 2015. Small Research and Travel Grant (**$636**, College of Arts & Sciences). **Purpose**: To attend and present a poster at the 2015 Joint Mathematics Meeting in San Antonio, TX.
- Fall 2014. Research Grant (**$2500**, Provost's Office and Dept. of Mathematics). **Purpose**: To pursue research on quadratic forms, especially minimal unique forcing sets and support on-grounds living expenses.
- Fall 2013. Small Research and Travel Grant (**$480**, College of Arts & Sciences). **Purpose**: To pursue research on the existence criterion of (256, 120, 56) Hadamard difference sets and present a poster at the 2014 Joint Mathematics Meeting in Baltimore, MD.

Publications

1. Unique minimal forcing sets and forced representation of integers by quadratic forms. *Rose-Hulman Undergraduate Journal of Mathematics*, Vol. 17, **1** (2016).
2. Improving the Error-Correcting Code Used in 3-G Communication. *SIAM Undergrad. Research Online (SIURO)*, **8** (2015), 126-137.

Work & Research Experience

Epic Systems (Sep. 2015-Present)
Research and Software Development

- Development primarily concerns the preservation of database pointers during digital exchange of medical records between hospitals. Most development done in MUMPS and Visual Basic 6, but trained for web development as well.

University of Virginia - Department of Mathematics (Spring 2015)
Researcher
Supervisor: Dr. Weiqiang Wang (University of Virginia)

- Studied representations of the symmetric group. Through computational analysis I conducted, Dr. Wang and I were able to jointly develop theorem 7.3 in the following preprint, *Positivity vs negativity of canonical bases*, arXiv:1501.00688v3

University of Virginia - Department of Mathematics (Fall 2014)
Grader
Supervisor: Dr. Peter Abramenko (University of Virginia)

- Graded homework assignments for MATH 3351: Elementary Linear Algebra.

University of Virginia - Department of Mathematics (Summer-Fall 2014)
Researcher
Supervisor: Dr. Andrew Obus (University of Virginia)

- Studied quadratic forms, especially the topic of unique minimal forcing sets. Designed an algorithm to determine whether a positive integer has a unique minimal forcing set within a given superset.
- Established several infinite families of positive integers without unique minimal forcing sets in $T = \{1, 2, 3, 5, 6, 7, 10, 14, 15\}$, which is Manjul Bhargava's minimal forcing set of the natural numbers.

Independent Research (Summer 2014)
Researcher
Supervisor: Dr. James Davis (University of Richmond)

- Studied the properties of a [30,10,10] error-correcting code at the center of a 2011 patent infringement lawsuit between Samsung group and Apple Inc. Patent No: US7706348.

University of Richmond - Department of Mathematics and Computer Science (Summer 2013)
Researcher
Supervisor: Dr. James Davis (University of Richmond)

- Studied difference set theory and error-correction theory. Independently and collaboratively confirmed the (previously unknown) existence of $(256, 120, 56)$ Hadamard difference sets in 6 groups (out of 81 open cases) by the end of the summer. My team was able extend this number to 30+ groups by the winter of 2013.