Justin Yirka

B.S. in Computer Science and B.S. in Mathematics YirkaJk@vcu.edu (703) 229-7956 www.linkedin.com/in/yirkajk

Education

Virginia Commonwealth University (VCU)

Richmond, VA

B.S. in Computer Science

(Dual degree program) 2018

B.S. in Mathematical Sciences, GPA: 3.98 out of 4.0 Specialization in Data Science, Minor in Physics Supported by VCU Presidential Scholarship

Research

Experience.....

Graph Theory Computational Discovery Lab, VCU

Research Assistant

Summer 2018

Supervisor: Craig Larson, Ph.D.

Topic: Use of automated conjecturing software (Python) to find conditions for graph hamiltonicity.

Joint Center for Quantum Information and Computer Science (QuICS),

University of Maryland (UMD)

NSF REU Undergraduate Researcher

Summer 2017

Supervisor: Andrew Childs, Ph.D.

Topic: Quantum tomography. Pure-state tomography with Pauli observables.

Support: NSF Research Experience for Undergraduates (REU). P.I.: William Gasarch, Ph.D.

Quantum Computing Lab, VCU

Undergraduate Research Assistant

2015–2016

 $Supervisor: Sevag\ Gharibian,\ Ph.D.$

Topics: Quantum computational complexity. Complexity of local physical problems, quantum oracle classes (e.g. PQMA[log]), quantum variants of the polynomial hierarchy.

Preprints.....

Sevag Gharibian, Stephen Piddock, and **Justin Yirka**. "Local measurements on physical Hamiltonians and oracle complexity classes". Preprint available soon.

Sevag Gharibian, Miklos Santha, Aarthi Sundaram, and **Justin Yirka**. "Quantum generalizations of the polynomial hiearchy with applications to QMA(2)". Preprint available soon.

Sevag Gharibian and **Justin Yirka**. "The complexity of simulating local measurements on quantum systems". Available at https://arxiv.org/abs/1606.05626 [quant-ph]. 2016.

Conference presentations.

Sevag Gharibian and **Justin Yirka**. *The complexity of simulating local measurements on quantum systems*. Contributed talk by S. Gharibian at 12th Conference on the Theory of Quantum Computation, Communication, and Cryptography (TQC). 2017.

Sevag Gharibian and **Justin Yirka**. *The complexity of estimating local physical quantities*. Poster at 20th Conference on Quantum Information Processing (QIP). 2017.

Justin Yirka. Evaluation of TCP header fields for data overhead efficiency. Poster at 30th National Conference on Undergraduate Research (NCUR). 2016.

Justin Yirka. Evaluation of TCP header fields for data overhead efficiency. Poster at VCU Symposium for Undergraduate Research and Creativity. 2015. — Awarded "Launch Award for Outstanding Research Poster".

May 30, 2018 1/3

Department seminars.....

Pure state tomography with Pauli observables. QuICS, University of Maryland. 2017.

Quantum complexity of estimating local physical quantities. Department of Computer Science, VCU. 2016. — Only undergraduate invited in previous 5 years.

Public-audience talks.....

Computer Science theory is fun. VCU RamDev software development club. 2018.

Quantum programming (e.g. IBM Q, LIQUi)). VCU RamDev software development club. 2017.

Programming Experience

Languages: Java, C, Python, Sage, Perl, Wolfram Language, Lua

Software: LaTeX, git, Unix, Android & mobile apps, Mathematica, Weka, AutoCAD

Software Engineering coursework: Software Engineering (Agile, Android), Algorithm Analysis, Programming Languages (C, Python, Racket), Introduction to Operating Systems, Object Oriented Programming (Java)

Applications coursework: Convex Optimization (graduate course), Introduction to Natural Language Processing (assignments in Perl), Introduction to Data Science (Weka), Artificial Intelligence (neural networks), Graphs and Algorithms, Visualization of Physics with Mathematica

Graph Brains Project — Graph Theory Computational Discovery Lab, VCU

Python

Summer 2018

Implement functions for calculating graph properties. Manage known examples and properties in Python and SQL. Improve project structure, documentation, and usability.

Campus Bluetooth tag network — Senior project

Java, Swift, Python, Android, iOS, Raspberry Pi / Unix, Google Firebase

(2 semesters) 2017–2018

Team project developing campus item-tracking system implementing Android, iOS, and Raspberry Pi programs to locate users' items tagged with BLE beacons.

GeoViewer Android app — Software Engineering course project

Java, Android, Amazon AWS

Fall 2016

Team project with focus on Agile development. Implemented Android app enabling users to share and discover geocached photos.

Run Planner Mathematica program — RamHacks hackathon

Wolfram Language, Mathematica

2016

Developed program utilizing opensource GPS data to take as input a starting location and a distance goal and output a jogging route of that distance along the city road network.

GroupMe Stats Android app — VTHacks hackathon

Java, Android

2016

Team project developing app to use GroupMe API to retrieve information about user's GroupMe conversations and provide interesting statistics to the user.

Vex, FIRST, and Zero (Interational Space Station) robotics competitions

2010-2014

After-school student manager and Padlock database Java programs

Iava

2012-2013, 2013-2014

Course projects with emphasis on software life cycle and OOP. Evaluated requirements and implemented database programs with GUI for real-world use by the school.

VA Governor's Cybersecurity Cup

Networking fundamentals (e.g. TCP/IP, OSI model)

Fall 2012

Learned and competively demonstrated cybersecurity fundamentals with a focus on network security. Qualified for invitation to 2013 VA Governor's Cybersecurity Conference and CTF.

iOS game

Lua, iOS

2011-2012

Designed and implemented an iPhone game, including graphics, in fulfillment of academic project.

Extracurricular Experience

Founder and President

RamDev: Software Development at VCU

2016-2018

- o Coordinated 46 weekly seminars including 9 corporate speakers.
- o Secured and managed \$2400 in funding and resources.
- o Increased weekly attendance to 20 students, becoming largest C.S. organization at VCU.

Awards and Honors

Presidential Scholarship	2014 2010
\$110,000, Virginia Commonwealth University Top scholarship offered. Full cost of 4-year tuition, room, and board.	2014–2018
Awarded to 0.6% of students	
Mark A. Sternheimer Capstone Design Award	
VCU School of Engineering	2017
For "innovation and entrepreneurship" of senior project developing mobile app. Included grant of \$660.	
Launch Award for Outstanding Research Poster	
VCU Symposium for Undergraduate Research and Creativity	2015
Presidential Scholarship [unable to accept]	
\$80,000, Worcester Polytechnic Institute	2014
Rensselaer Medal Merit Scholarship [unable to accept]	
\$100,000, Rensselaer Polytechnic Institute	2014