Justin Yirka

Candidate for B.S. in Computer Science and B.S. in Mathematical Sciences
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Research Interests

Quantum computing, Complexity theory, Algorithms

Education

B.S. in Computer Science 2014 - 2018
B.S. in Mathematical Sciences - concentration in Pure Math
Dual degree program
Virginia Commonwealth University (VCU), Richmond, VA
- Minor in Physics
- Candidate for University Honors
- GPA: 3.97

International Baccalaureate Diploma 2014
Gar-Field Senior High School, Woodbridge, VA
- IB Diploma score: 37 out of possible 45 (88th percentile globally).

Research

Research Internships

Quantum Computing Lab, Virginia Commonwealth University Fall 2017 – current
Supervisor: Sevag Gharibian, Ph.D. 2015 – 2016
Topic: Computational complexity of local physical problems, quantum oracle classes, quantum variant of Polynomial Hierarchy

Joint Center for Quantum Information and Computer Science (QuICS), Summer 2017
University of Maryland (UMD)
Supervisor: Andrew Childs, Ph.D.
Topic: Pure-state tomography with Pauli observables

Research Papers

S. Gharibian and J. Yirka. The complexity of simulating local measurements on quantum systems.
Available at https://arxiv.org/abs/1606.05626

To appear in:
Proceedings of 12th Conference on the Theory of Quantum Computation, Communication, and Cryptography (TQC 2017).

Contributed talk:
12th Conference on the Theory of Quantum Computation, Communication, and Cryptography (TQC 2017). Presented by S. Gharibian. 2017

Poster presentation:
20th conference on Quantum Information Processing (QIP 2017). 2017
Presented under a different title.

Invited talk:

Weekly department seminar, Department of Computer Science, VCU 2016
Only undergraduate to be invited within previous 5 years.

J. Yirka. Evaluation of TCP header fields for data overhead efficiency.
Available at http://scholarscompass.vcu.edu/uresposters/148/

Poster presentations:

- 30th National Conference on Undergraduate Research (NCUR 2016) 2016
- VCU Symposium for Undergraduate Research and Creativity 2015
  Awarded "Launch Award" for Outstanding Research Poster.

Independent Studies

Convex Optimization (CMSC 601), Virginia Commonwealth University Fall 2017
Received permission to study graduate material as an independent study.
Only undergraduate to receive independent study approval in Computer Science in Fall 2017.

Funding and Scholarships

Presidential Scholarship 2014 - 2018
Virginia Commonwealth University. Approx. $110,000 USD.
Details: Top scholarship offered. Full cost of 4-year tuition, room, and board.

Event Funding for RamDev software club talks (see below) 2016 - current
Student Government Association, VCU. Approx $1,400 USD to date.

NSF Research Experience for Undergraduates (REU). 2017
Combinatorics and Algorithms for Real Problems REU, UMD. Apprx. $6,000 USD.
P.I.: William Gasarch, Ph.D.
Details: Stipend and housing to fund summer research internship with UMD QuICS.

Travel grant for poster presentation at QIP 2017 2017
VCU Honors College. $500 USD.

Travel grant for poster presentation at NCUR 2016 2016
VCU Honors College. Approx. $550 USD.

Presidential Scholarship *[declined]* 2014
Worcester Polytechnic Institute. Approx. $80,000 USD.

Rensselaer Medal Merit Scholarship *[declined]* 2014
Rensselaer Polytechnic Institute. Approx. $100,000 USD.

Teaching Experience

Instructor

Lifeguard, first aid, and management certification courses, 2016 - current
Prince William County Department of Parks and Recreation, Woodbridge, VA
Planned, lead, and co-taught critical, non-traditional classes of up to 40 students.

Teaching Assistant

Algebra with Applications (MATH 141), Virginia Commonwealth University 2016 - current
Assist with in-class exercises, offer weekly tutoring sessions, grade assignments.
Details: First-year mathematics course. Up to 28 students.
Average student evaluation scores - Fall 2016: 4.78 / 5.0, Spring 2017: 4.36 / 5.0

Honors Rhetoric (HONR 200), Honors College, Virginia Commonwealth University 2015
Critiqued student papers, assisted with in-class work, advised on proper research practices.
Details: First-year honors writing and composition course. 17 students.

Mentor

1st year student, Virginia Commonwealth University 2016
Details: Part of VCU Honors freshman mentorship program.

Awards and Honors

Dean's List – ten-time recipient 2014 - 2017
VCU School of Engineering, VCU College of Humanities & Sciences

University Student Scholar Award 2015
Virginia Commonwealth University

Launch Award for Outstanding Research Poster 2015
VCU Poster Symposium for Undergraduate Research and Creativity

Volunteer of the Year 2014
Prince William County Schools, VA
Details: Awarded for commitment to grade school robotics program.

Service

Organization Service

Founder and President 2016 - current
RamDev: Software Development at VCU
Details:
- Secured and managed over $2000 in funding and resources.
- Coordinate weekly meetings featuring industry, faculty, and student speakers.
- Increased attendance to 30 students weekly – *now largest C.S. organization at VCU.*

University Service

Student Advisory Board member 2016 - current
Department of Computer Science, Virginia Commonwealth University
Details:
- Work with professors to address student concerns.
- Engage undergraduate and recruit high school students.
- Invited to School of Engineering Strategic Planning Retreat, 2017.
- Participated in hiring interviews for new faculty and instructors.

Senior Reader, Senior Honors graduation dossiers 2016 - current
Honors College, Virginia Commonwealth University
Details: Review final papers submitted in fulfillment of University Honors. Coordinate other readers.

Panelist (representing research careers), Career Workshop for freshman mentorship program 2017
Computer Science Department, Virginia Commonwealth University

Panelist, Undergraduate conference preparation sessions 2017
Honors College, Virginia Commonwealth University

Organizer, Local Hack Day of Richmond, VA hosted at VCU 2016
Hosted through RamDev software club (see above).
Details: Planned and hosted an event for over 30 students including 12 high school students.

Judge, Launch award for Outstanding Research Poster 2016
VCU Symposium for Undergraduate Research and Creativity

Community Service

Volunteer, FIRST and Vex robotics competitions 2011 - 2015
Prince William County Schools, VA

Mentor, FIRST Tech Challenge robotics team 2014
Wilder Middle School, Richmond, VA

Courses, Skills, and Additional Projects

Selected Courses:

- Theory of Computation – 2016
- Computer Architecture – 2016
- Algorithms and Data Structures – 2016
- Operating Systems – 2016
- Software Engineering – 2016
- Intro to Artificial Intelligence – 2016
- Intro to Data Science – 2016
- Programming Languages – 2017
- Intro to Natural Language Processing – 2017
- Convex Optimization – 2017
- Multivariate Calculus – 2015
- Differential Equations – 2015
- Linear Algebra – 2015
- Mathematical Reasoning / Proofs – 2015
- Intro to Statistics - 2016
- Graphs and Algorithms – 2016
- Abstract Algebra – 2016
- Real Analysis – 2017
- Topology – 2017
- Physics Visualization w/ *Mathematica* – 2017

Technical Skills

LaTeX, Git, Java, C++, C, Python, Perl (with NLP applications), Android development, Mathematica, Weka (Data Science), Lua

Selected Software Projects:

Senior Project: Campus Bluetooth tag network 2017 - current
Two-semester capstone project for VCU Computer Science degree.
Group project developing system for VCU campus implementing Crowd GPS model to locate users' tagged items. Implementing iOS and Android, applying security considerations from literature.

Course Project: "GeoViewer" Android app 2016
Semester project for VCU CMSC 355: Software Engineering.
Group project in Agile development. Enables users to visit geocached photos shared by other users.
Implemented in Java with Android Studio, using AWS and Google Maps APIs.

Hackathon Project: Run planning program implemented in Mathematica 2016
Developed at RamHacks 2016 hackathon.
Utilizes GPS data to calculate and plot jogging route of a given distance along city road network.

Hackathon Project: "GroupMe Stats" Android app 2016
Developed at VT Hacks 2016 hackathon.
Uses *GroupMe* API to provide users with interesting statistics on Android platform.

Zero Robotics International Space Station Programming Challenge 2012 – 2014
Competed in MIT sponsored robotics competition controlling SPHERES satellites aboard ISS.
Implemented in C++.
Team qualified for international finals two years in a row. Served as Code Lead 2013 - 2014.