

# Robert John Quarles

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Department of Mathematics  
Louisiana State University  
Baton Rouge, LA 70803

## Education

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### Louisiana State University

Baton Rouge, LA

PhD in Mathematics

(In Progress)

Advisors: Oliver Dasbach and David Shea Vela-Vick

Masters in Mathematics

2018

### Berry College

Rome, GA

Bachelor of Science in Mathematics and Chemistry

2016

Advisor: Ron Taylor

## Professional Research Experience

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- Director's Summer Program (May 2015 - August 2015) National Security Agency  
Held TS//SI//TK clearance with full scope polygraph and Agency Special Background Investigation  
Collaborated with students and multiple agency researchers to characterize various stream ciphers/symmetric key cryptographic schemes  
Used advanced mathematical techniques to analyze stream ciphers/symmetric key cryptographic algorithms  
Developed and implemented algorithm for finding various arbitrarily large stream ciphers/symmetric key cryptographic schemes  
Presented results to the Institute for Defense Analysis at Princeton (CCR-P)  
Prepared brief for the Director of National Security Agency on the results  
Detailed findings in an internal refereed technical paper

## Awards and Grants

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- GAANN, Louisiana State University, 2017
- Barton Mathematics Award, Berry College, 2016
- Richards Grant, Berry College, 2014

## Publications

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- Director's Summer Program 2015  
Published a reviewed technical paper for internal use

## Software

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- Lucas Meyers, Robert John Quarles, Brandon Roberts, David Shea Vela-Vick, and C.-M. Michael Wong, *transverse-hfk-revision*, available at <https://github.com/albenzo/transverse-hfk-revision/>, 2019.

Developed and implemented the lifted invariant algorithm.

## Supervised Research Projects

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- Vertically Integrated Research: Invariants in Low-Dimensional Topology, dual role teaching and supervising undergraduate research in low dimensional knot invariants, Louisiana State University, 2019 F - 2021 S
- Vertically Integrated Research, dual role teaching and supervising undergraduate research in Legendrian knot invariants, Louisiana State University, 2018 F - 2019 S

## Invited Talks

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- *A new perspective on a polynomial time knot polynomial*, Developments in Knot Theory and Low-dimensional Topology, AMS Fall Central Sectional Meeting, virtual (formerly at Creighton University), October 2021.
- Presentation, Institute for Defense Analysis at Princeton (CCR-P), 2015.

## General Talks

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- *A new perspective on a polynomial time knot polynomial*, Informal Geometry and Topology Seminar, Louisiana State University, September 2021
- *Fun with chord diagrams*, Informal Geometry and Topology Seminar, Louisiana State University, March 2021
- *The conjectured relationship between the colored Jones polynomial and a polynomial time knot polynomial*, Informal Geometry and Topology Seminar, Louisiana State University, September 2020
- *A polynomial time knot polynomial*, Informal Geometry and Topology Seminar, Louisiana State University, November 2019
- *A Brief Introduction to the Hodge Star*, SUSY and Morse Theory Seminar, Louisiana State University, January 2019
- *The Alexander module*, Informal Geometry and Topology Seminar, Louisiana State University, January 2018
- *The positive triangle game*, Paper Presentation, Symposium on Student Scholarship, Berry College, Rome, GA, April 2014.

## Synergistic Activities

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- AMS Fall Central Sectional Meeting, virtual (formerly at Creighton University), October 2021.
- Tech Topology Conference, Georgia Institute of Technology, Online, December 2020
- Knot Theory (bi)Weekly Seminar, Roger Fenn (Sussex) and Lou Kauffman (Chicago), Online, 2020-2021
- Tech Topology Conference, Georgia Institute of Technology, Atlanta, Ga, December 2019
- New Developments in Quantum Topology, University of California Berkeley, Berkeley, CA, June 2019
- Moab Topology Conference, Utah State University, Moab, UT, May 2019
- Tech Topology Conference, Georgia Institute of Technology, Atlanta, Ga, December 2018
- Topology Students Workshop, Georgia Institute of Technology, Atlanta, Ga, June 2018
- MAA Southeastern Section Meeting, University of Alabama at Birmingham, Birmingham, AL, March 2016
- Leader of the Berry College chapter of the Dead Poets Society (math club) 2015 - 2016
- Southeast Regional Meeting of the American Chemical Society, Nashville, GA, October 2015
- MAA Southeastern Section Meeting, Tennessee Technological University, Cookeville, TN, March 2014.
- Southeast Regional Meeting of the American Chemical Society, Atlanta, GA, November 2013

## Teaching

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- MATH 1550, *Calculus 1*, Instructor 2021 F
- Supplemental Instructor of Mathematics 2019 F - 2021 S  
(Louisiana State University - Engineering Residential College)
- MATH 1550, *Calculus 1*, Instructor 2019 S
- MATH 1550, *Calculus 1*, Teaching Assistant 2018 F
- MATH 1021, *College Algebra*, Instructor 2017 F
- MATH 1431, *Business Calculus*, Lab Instructor 2016 F - 2017 S

## Technical Skills

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### Programming Languages

Mathematica, C++, Python, Sage, Godot 3.0

### Operating Systems

Windows XP, 7, 8, 10

Linux (redhat, ubuntu/mint, arch)