

EDUCATION

University of North Carolina, Chapel Hill, North Carolina

Ph.D. Computer Science

Expected Dec 2026

Dissertation: Formal Methods for Safety and Robustness Verification of AI Models for Medical Imaging

M.S. Computer Science

Dec 2023**University of Tennessee**, Knoxville, Tennessee

B.S., Mathematics, Computer Science, Physics

August 2017RESEARCH
POSITIONS**University of North Carolina**, Chapel Hill, North Carolina*Research Assistant with the UNC Formal Methods Group***August 2019 - present**

Developed methods for verifying robustness of deep neural networks used in 3D medical image segmentation. Proposed tensorstar representations to quantify segmentation robustness (FMCAD 2025).

*Research Assistant with MIDAG***August 2018 - May 2019**

Developed statistical methods for analysis of the relationship between shapes of nearby pairs of anatomical structures in the head and neck under the direction of Dr. Stephen Pizer. Modeled organs using skeletal representations producing data on a manifold consisting of products of spheres.

Accuray, Durham, North Carolina*Research Scientist***May 2021 - December 2025***Intern***May 2019 - August 2019; January 2021 - May 2021**

Led work to develop and improve data management systems for regulatory compliance and developed data science best practices to ensure safe and effective medical treatment for all. Developed and deployed deep learning models within an algorithms R&D team for real-time analysis of high-dimensional sensor data in safety-critical systems, such as 3D image segmentation, deformation modeling, and multi-sensor data fusion for clinical deployment.

University of Tennessee, Knoxville, Tennessee*Research Assistant with the University of Tennessee Relativistic Heavy Ion Physics Group**At The European Org. for Nuclear Research (CERN), Switzerland* **May 2015 - January 2016**

Installed and commissioned over 300 custom embedded systems as part of a small hardware team supporting the ALICE Time Projection Chamber. Trained in confined spaces and at-heights. Co-developed a freeRTOS-based operating system for embedded control of ALICE TPC data acquisition. Analyzed sensor data following commissioning, contributing to multiple peer-reviewed publications.

*At Oak Ridge National Lab, Oak Ridge, Tennessee***October 2013 - May 2016**

Developed software implementing a background subtraction method for measurements of di-hadron and jet-hadron correlations in energy deposited in ALICE EMCal detector during heavy ion collisions under the guidance of Dr. Christine Nattrass and Dr. Soren Sorensen.

*Undergraduate Researcher in Path Finding Algorithms***August 2016 - August 2017**

Developed methods of motion planning for large flocks of autonomous agents under Dr. Bruce MacLennan.

RIPS Program, Institute for Pure and Applied Mathematics, Los Angeles, California*Intern***June 2016 - August 2016**

Managed a four-person team developing a scheduling algorithm for railroad maintenance optimization for CSX Transportation.

HONORS AND
FELLOWSHIPS

Fulbright Program, Budapest, Hungary

Student Grant Recipient

August 2017 - June 2018

Studied algebraic and low dimensional topology at the Rényi Institute and through Budapest Semesters in Mathematics.

Women and Mathematics Program, Institute for Advanced Study, Princeton, New Jersey

Student

May 2016

Attended the intensive two week lecture program titled “Words, Loops, and Curves in Geometry”.

TEACHING
POSITIONS

University of North Carolina, Chapel Hill, North Carolina

Tutor, Chancellor’s Science Scholars

February 2019 - December 2024

Tutored undergraduate members of the Chancellor’s Science Scholars program majoring in computer science. The program is intended for students with an interest in pursuing careers in STEM research.

Art of Problem Solving, San Diego, California

Teaching Assistant

April 2018 - July 2019

Was the teaching assistant to 4-5 online proof-based math and programming classes per semester for students in the 5th through 12th grades.

University of Tennessee, Knoxville, TN

Teaching Assistant

August 2014 - May 2017

Assisted in classes in the Computer Science and the Physics departments, including Computational Cognitive Neuroscience, Biologically Inspired Computation, Elements of Physics I and II.

Tutor

January 2014 - June 2015

Worked in the Department of Physics and Astronomy tutorial center.

PUBLICATIONS

Meghan Stuart and Parasara Sridhar Duggirala. Quantifying robustness of medical image segmentation networks using tensorstars. *Conference on formal methods in computer-aided design – FMCAD*, page 54, 2025

Meghan Stuart, Juan Garcia, Sahin Olut, Taksir Hasan, Mahmood Ahsan, Kipp Williams, and Parasara Duggirala. A machine learning approach to water velocity estimation for better navigation of marine gliders. *IEEE OCEANS*, Apr 2021

Meghan Stuart and Parasara Sridhar Duggirala. Comparison of Two Approaches for Robustness Verification of Deep Neural Networks. In *Workshop on the Design and Analysis of Robust Systems*, July 2019

Christine Nattrass, Natasha Sharma, Joel Mazer, Meghan Stuart, and Aram Bejnood. Disappearance of the mach cone in heavy-ion collisions. *Phys. Rev. C*, 94:011901, Jul 2016

Natasha Sharma, Joel Mazer, Meghan Stuart, and Christine Nattrass. Background subtraction methods for precision measurements of di-hadron and jet-hadron correlations in heavy ion collisions. *Phys. Rev. C*, 93:044915, Apr 2016

C. Zhao, J. Alme, T. Alt, H. Appelshäuser, L. Bratrud, A. Castro, F. Costa, E. David, T. Gunji, S. Kirsch, T. Kiss, R. Langøy, J. Lien, C. Lippmann, A. Oskarsson, A. Ur Rehman, K. Røed, D. Röhrich, Y. Sekiguchi, M. Stuart, K. Ullaland, A. Velure, S. Yang, and L. Österman. First performance results of the ALICE TPC readout control unit 2. *Journal of Instrumentation*, 11, Jan 2016