
Education

University of Georgia
Master's of Science in Computer Science

ATHENS, GA
2020

University of Georgia
Bachelor's of Science in Computer Science

ATHENS, GA
2018

Experience

NASA Ames Research Center, National Aeronautics and Space Administration MOUNTAIN VIEW, CA
Project Manager, Distributed Spacecraft Autonomy (DSA) July '20 – present, PM October '22

The DSA project will advance command and control methodologies for controlling a swarm of spacecraft as a single entity, demonstrate autonomous coordination between multiple spacecraft in the swarm, and demonstrate approaches for adaptive reconfiguration of the swarm's plan and distributed decision-making across a swarm of spacecraft. DSA has performed several on-orbit tests to date and will fly as a payload onboard NASA's Starling 1.0 swarm mission.

Principal Investigator, Neural Radiance Methods October '22 – present

The Neural Radiance Methods research project seeks to study potential improvements to traditional photogrammetric methods used to generate Digital Elevation Models of planetary surfaces by utilizing Neural Radiance Fields.

Subtopic Manager, Neuromorphic Computing June '22 – present

Assisting with and managing SBIR and STTR solicitations regarding Neuromorphic computing, processing, and manufacturing.

Autonomous Systems Perception for Urban Air Mobility July '20 – July '21

Developing Computer Vision algorithms for object detection, tracking, autonomous decision making, and 3D reconstruction.

University of Georgia Small Satellite Research Laboratory ATHENS, GA

Thesis: High Performance Computation with Small Satellites and Small Satellite Swarms for 3D Reconstruction

January '18 – May 2020

Here I focus on the design and usage of computer systems in small satellites. The custom computer vision library SSRLCV is developed. The Nvidia TX2i GPU accelerated SoC is modified for use in a Cube Satellite. Results show accurate 3D reconstruction of the surface of Earth feasible within 15 to 100 meters.

Co-Founder, Program Manager, Systems Engineer January '16 – May 2020

The University of Georgia Small Satellite Research Laboratory (UGA SSRL) was founded when I decided to form a team to build a small 1U cube satellite. The UGA SSRL now includes over 40 undergraduate researchers, 5 graduate students, several faculty researchers, a space act agreement with NASA Ames, a partnership with the Air Force Research Laboratory (AFRL), and more.

6U CubeSat - MOCI January '16 – present

The Multiview Onboard Computational Imager (MOCI) is a 6U cube satellite funded by the Air Force Research Laboratory's (AFRL) University Program (UNP) NS-9. The MOCI satellite shall use advanced computer vision algorithms and specialized computational hardware, based off of the Nvidia TX2i GPU/SoC, to generate 3D digital surface models of the earth in real time. The MOCI satellite is scheduled for handoff in Q2 of 2020.

3U CubeSat - SPOC January '16 – present

The Spectral Ocean Color (SPOC) satellite is a 3U cube satellite funded by NASA's Undergraduate Student Instrument Project (USIP) and was selected for NASA's Cube Satellite Launch Initiative (CSLI) for a handoff in Q4 of 2019. The SPOC satellite shall use a custom hyperspectral sensor to analyze the coastal ecosystems of the Georgia coast.

NASA Johnson Space Center, National Aeronautics and Space Administration HOUSTON, TX
Core Flight Software Programmer April '15 – August '15

I helped develop Core Flight Software (CFS) to handle audio telemetry and communication for the Orion spacecraft in a simulated lab setting. I also worked in an audio lab with embedded systems for audio equipment.

Human Systems Integration

April 15 – August 15

While working in the Human Integrated Vehicles and Environments (HIVE) Lab I assisted with internal telemetry systems and general networking systems throughout Johnson Space Center. These systems were needed for future Graphic User Interfaces (GUIs) used while training astronauts.

Hodgson Glass Research Laboratory

ATHENS, GA

Undergraduate Researcher

August 14 – April 15

I assisted Dr. Johnson Turner with technical advice and programmed/designed environments for digital music systems.

Google Glass Development

August 14 – April 15

I helped develop the first [musical score viewing application](#) for Google Glass. This application was used in concert across multiple Google Glass units.

Smart Podium Development

August 14 – April 15

I developed a digital smart podium for the use of a band director. The goal was to allow synchronized music editing and notation.

The Home Depot Innovation Center

ATLANTA, GA

Research & Development Intern

April 14 – August 14

I worked as a software developer intern at The Home Depot's Innovation Center. I was part of the Center's first group of interns and helped to justify its existence within the company.

Google Glass Research & Development

April 14 – August 14

I developed an Augmented Reality Google Glass application using a low level OpenCV libraries and data structures. The goal was to assist with product recognition, allow for barcode scanning, and quick product searches.

Virtual Reality Research & Development

April 14 – August 14

I developed a Virtual Reality application with Google Cardboard using low level OpenCV libraries and data structures. The goal was to display heat maps of various product data over store shelves to assist with product placement.

Research

Thesis:  ; Paper:  ; Conference Presentation:  ; Conference Poster: 

-  Development of a High-Performance, Heterogeneous, Scalable Test-Bed for Distributed Spacecraft
IEEE Aerospace Conference *Big Sky MT, 2023*

Caleb Adams, Brian Kempa, Walter Vaughan, Nicholas Cramer

-  Rapid Spacecraft Payload Development: In-Orbit Demonstration of Flight Software Reuse, Scalability, and Dependability

Flight Software Workshop

Pasadena CA, 2023

Walter Vaughan, Caleb Adams, Sergei Gridnev, Nick Cramer, Alice Anlind, Eric Brune, Oskar Flordal, Fredrik Bruhn, Alan George

-  A Hardware Accelerated Computer Vision Library for 3D Reconstruction Onboard Small Satellites
IEEE Aerospace Conference - Best Paper in Track *Big Sky MT, 2021*

Caleb Adams, Jackson Parker, David Cotten

-  Design and Testing of Autonomous Distributed Space Systems

The AIAA/Utah State Small Satellite Conference - Small Sat

Logan UT, 2021

Nicholas Cramer, Daniel Cellucci, Caleb Adams, Adam Sweet, Mohammad Hejase, Jeremy Frank

-  High Performance Computation with Small Satellites and Small Satellite Swarms for 3D Reconstruction

Master's Thesis - The University of Georgia

Athens GA, 2020

Caleb Adams, Committee: Dr. Ramviyas Parasuraman, Dr. David Cotten, Dr. Michael E. Cotterell, Dr. WenZhan Song

-  The Spectral Ocean Color Imager (SPOC) - An Adjustable Multispectral Imager

The AIAA/Utah State Small Satellite Conference - Small Sat

Logan UT, 2019

David L Cotten, Nicholas Neel, Deepak Mishra, Marguerite Madden, Caleb Adams, Susanne Ullrich, Adrian Burd, Malcolm Adams, Kaitlyn Summey, Casper Versteeg, Jackson Parker, Fred Beyette

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-  Towards an Integrated GPU Accelerated SoC as a Flight Computer for Small Satellites
IEEE Aerospace Conference *Big Sky MT, 2019*
 Caleb Adams, Allen Spain, Jackson Parker, Matthew Hevert, James Roach, David Cotten
 -  Towards an Integrated GPU Accelerated SoC as a Flight Computer for Small Satellites
IEEE Aerospace Conference *Big Sky MT, 2019*
 Caleb Adams, Allen Spain, Jackson Parker, Matthew Hevert, James Roach, David Cotten
 -  Selected Software Demonstrations from the Multiview Onboard Computational Imager Satellite
Space Innovations Symposium *Atlanta GA, 2018*
 Caleb Adams, Jackson Parker
 -  GPU Accelerated SoCs as Flight Computers for Small Satellites
Space Innovations Symposium *Atlanta GA, 2018*
 Caleb Adams, Allen Spain, Jackson Parker, David L. Cotten
 -  What are Cubesats? A look at UGA Space Exploration
UGA Physics and Astronomy Colloquium - Invited Speaker *Athens GA, 2018*
 Caleb Adams, Katie Summey, Nicholas Heavner
 -  A Near Real Time Space Based Computer Vision System for Accurate Terrain Mapping
The AIAA/Utah State Small Satellite Conference - Small Sat *Logan UT, 2018*
 Caleb Adams, David L. Cotten
 -  Batch Analytical Comparisons of on Orbit Multiview Stereo
Space Innovations Symposium *Atlanta GA, 2017*
 Caleb Adams, Nicholas Neel, David L. Cotten
 -  Feature Matching from Orbiting Vehicles
Space Innovations Symposium *Atlanta GA, 2017*
 Nicholas Neel, Caleb Adams, David L. Cotten
 -  Concept of Operations in Small Satellite Functionality
Space Innovations Symposium *Atlanta GA, 2017*
 Bjorn Leicher, Paige Copenhaver, Caleb Adams, James Roach, David L. Cotten, Deepak Mishra
 -  The Feasibility of Structure from Motion over Planetary Bodies with Small Satellites
The AIAA/Utah State Small Satellite Conference - Small Sat *Logan UT, 2017*
 Caleb Adams, Nicholas (Hollis) Neel, David Cotten
 -  Structure from Motion from a Constrained Orbiting Platform
NASA/CASIS ISS Research and Development Conference *Washington D.C., 2017*
 Caleb Adams, Nicholas (Hollis) Neel
 -  (SP)ectral (O)cean (C)olor Satellite,  Video Link
Cubesat Developers Conference - Cal Poly *San Luis Obispo CA, 2017*
 Caleb Adams, David Cotten, Deepak Mishra, Nicholas (Hollis) Neel, Graham Grable, Khoa Ngo
 -  Accuracy of Dense Point Clouds Given Varying Image Quality
UGA CURO Symposium *Athens GA, 2017*
 Nirav Ilango, David Cotten, Caleb Adams, Nicholas (Hollis) Neel, Margerite Madden, Deepak Mishra
 -  The Feasibility of Structure from Motion over Planetary Bodies with Small Satellite Systems
UGA CURO Symposium *Athens GA, 2017*
 Caleb Adams
 -  STEM Opportunities for Undergraduates Building Nanosatellites: the NASA CubeSat Program
Georgia
IGTF/ASPRS *Baltimore MD, 2017*
 D. Cotten, C. Adams, D. Mishra, M. Madden, S. Bernardes, K. Ngo, N. Neel, N. Ilango, M. Le Corre, G. Grable, A. King
 -  Building a Small Satellite Research Program at the University of Georgia: UGA Payload Development for CubeSats
IGTF/ASPRS *Baltimore MD, 2017*
 D. Cotten, C. Adams, D. Mishra, M. Madden, S. Bernardes, K. Ngo, N. Neel, N. Ilango, M. Le Corre, G. Grable, A. King
 -  The SPectral Ocean Color (SPOC) Small Satellite Mission: From Payload to Ground Station Development and Everything in Between
AGU *San Francisco CA, 2016*
 David L. Cotten, Sergio Bernardes, Deepak Mishra, Caleb Adams, Hollis Neel, Khoa Ngo, Megan LeCorre, Paige Copenhaver, Nirav Ilango, Adam King, Graham Grable, Paul Hwang

📖 Enhancing STEM Education through CubeSats: Using Satellite Integration as a Teaching Tool at a Non-Tech School

AGU

San Francisco CA, 2016

David L. Cotten, Sergio Bernardes, Deepak Mishra, Caleb Adams, Hollis Neel, Khoa Ngo, Megan LeCorre, Paige Copenhagen, Nirav Ilango, Adam King, Graham Grable, Paul Hwang

📖 Feasibility of Structure from Motion over Planetary Bodies using Small Satellites

Georgia Scientific Computing Symposium

Athens GA, 2016

Caleb Adams, David L. Cotten, Nicholas (Hollis) Neel, Kyle Hamilton, Jacob Conley, Deepak Mishra

Please visit my [website](#), or click the links above, for more details on my research

Grants Funded

NASA Ames: 2022 CIF

NASA Ames Center Innovation Fund

2022

NASA Ames internal funding awarded via competitive selection.

UNP NS-9: Phase B

University Nanosatellite Program, Nano-Sat 9 Phase B

2018

The Air Force Research Lab's Nano Satellite Program funded the UGA SSRL, as the winner of phase A, \$600,000 to build and operate the MOCI satellite.

UGA: CTL

The Design and Construction of Equipment for Ground to Space Communications

2017

An internally awarded by the Center for Teaching and Learning for the construction of a space ready ground station at UGA.

UGA: Parents Leadership Council

Providing Undergraduate Students Equipment for Ground to Space Communications

2017

An internally awarded by the Parents Leadership Council to help obtain ground support equipment for the Small Satellite Research Lab.

NASA USIP

The NASA Undergraduate Student Instrument Project

2016

The NASA Undergraduate Student Instrument Project funded the UGA SSRL \$200,000 for the design, construction, and launch of the SPOC satellite.

UNP NS-9: Phase A

University Nanosatellite Program, Nano-Sat 9 Phase A

2016

The Air Force Research Lab's Nano Satellite Program funded the UGA SSRL for \$180,000 to design and prove the mission architecture for the MOCI satellite.

*Grants listed above have me listed as an **author**, significant contributor, and/or essential personnel.*

Awards, Honors & Fellowships

IEEE Aerospace Conference

Best Paper Track 5: Observation Systems and Technologies

2021

I received the Best Paper award for Track 5: Observation Systems and Technologies for my paper on [3D reconstruction using small satellites](#).

Georgia Space Grant Consortium

Fellowship

2018

I was selected to receive a fellowship from the Georgia Space Grant Consortium. I was awarded 10k in total funding, this was used to further develop the UGA SSRL's high performance processing units.

UNP Phase B

Phase A Winner

2018

The MOCI satellite was selected as the winner of the 9th iteration of the University Nanosatellite Program, selected first out of 10 competing programs, and awarded over \$600,000 dollars in phase B funding.

TEDx UGA

TEDx UGA Student Idea Showcase

2016

I was selected as a presenter at TEDx UGA's student idea showcase. I spoke about the importance of space exploration, citizen science, and the democratization of space with small satellites.

HackGT

Top 8

2016

I led a team that won top 8 at Georgia Tech's Major League Hacking (MLH) Hackathon. We built a drone from scratch that planted seeds. We were selected among 500 of our peers.

NASA Johnson EV3

Team Excellence

2015

While working at NASA's Johnson Space Center I was awarded for going above and beyond requirements by staying late nights, and over night, to perform thermal vacuum tests on a payload.

VT Hacks

Winner

2015

I led a team that won Virginia Tech's 2015 Major League Hacking (MLH) Hackathon. We built a remote operated telescope and competed with 1000 of our peers.

Leadership Experience

Distributed Spacecraft Autonomy (DSA)

MOUNTAIN VIEW, CA

Project Manager

2022 – present

I manage and direct a group of developers, engineers, researchers, and interns. Work directly with NASA HQ and Ames Leadership to meet milestones and deliverables.

Neural Radiance Methods

MOUNTAIN VIEW, CA

Principal Investigator

2022 – present

I manage and direct a small group of interns and researchers.

UGA Small Satellite Research Laboratory

ATHENS, GA

Co-Founder, Program Manager

2016 – 2020

With two of my friends, I created the foundations of the UGA SSRL. I have since lead it to receive almost a million dollars in funding as it constructs UGA's first satellites.

Space Innovations Symposium

ATLANTA, GA

Session Chair, Organizer

2019

I helped organize the 3rd Space Innovations Symposium in Atlanta Georgia at Georgia Tech, where I chaired a session of the symposium. I also helped by getting students and organizations in the Athens area to attend the symposium.

Head TA - CS 1302 Software Programming

ATHENS, GA

Head TA

2018 – 2020

The CS 1302 class at UGA is when most Computer Science students first experience significant programming. It takes them from simple terminal applications to complex GUI-based applications with large codebases. I manage a team of about 10 other TAs (varies by semester) who help run this class of 300+ students. I manage grading criteria, rubrics, coding projects, auto-grading systems, and hold office hours to help students understand the subject.

Hyve Robotics and AstroVisual

ATHENS, GA

Co-Founder

2015 – 2018

I Co-Founded two companies, Hyve Robotics and AstroVisual. AstroVisual began by selling smart-phone enabled telescopes for astrophotography. AstroVisual ceased operation when its members founded the UGA Small Satellite Research Laboratory. Hyve robotics created food delivery robots and was acquired by Cosmic Delivery in Q1 2018.

UGA Hacks

ATHENS, GA

Co-Founder

2015 – 2016

With two of my friends, I helped to create UGA's official Major League Hacking (MLH) Hackathon program, which still exists today. The organization helps get Computer Science students excited about programming by presenting them with difficult, relevant challenges.

UGA Redcoat Band

ATHENS, GA

Section Leader

2014 – 2015

I led the UGA Redcoat Band's trombone section. I helped organize events, conduit rehearsals, arrange and teach music.