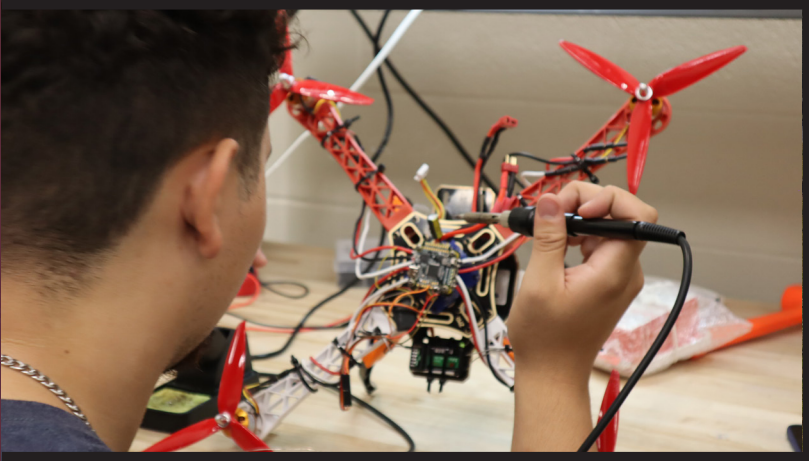
Georgia Space Grant Consortium
2024 Annual Report




GEORGIA Space Grant Consortium

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NASA Partner

BY THE NUMBERS

Direct participation by Georgia students, educators and the community in GSGC programs in the 2023-2024 academic year:

9,184 K-12 Students

4,848 K-12 Educators

2,012 Undergraduate Students

114 Graduate Students

12 Post Doctoral Students

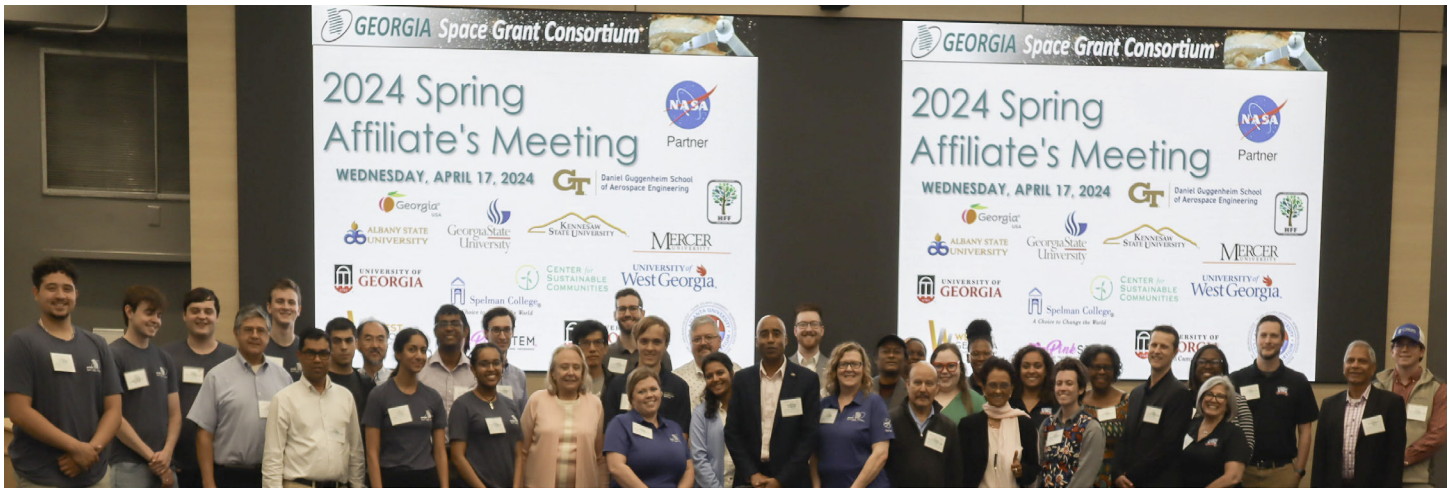
119 Higher Education Faculty

179 Fellowships, Scholarships, & Internships Awarded

23,207 Georgians Engaged via Community Events

39,496

Georgia Residents Impacted



A Program Sponsored through: National Space Grant College and Fellowship Program - Opportunities in NASA STEM FY 2020 – 2024 Cooperative Agreement NASA Announcement Number: 80NSSC20M0094

Who we are:

The Georgia Space Grant Consortium (GSGC) was established in 1989 to develop a statewide network of academic, industry, and non-profit partners dedicated to maximize the number of Georgia students from all backgrounds who are well-prepared in science, technology, engineering, and mathematics (STEM) fields and who are motivated to support space and aeronautics programs vital to this nation.

GSGC is a NASA program and part of the National Space Grant College and Fellowship Program. GSGC has 19 affiliate members and 8 partner organizations serving both metropolitan and rural areas of the state.

Affiliates:

- Agnes Scott College
- Albany State University
- Clark Atlanta University
- Columbus State University
- Georgia Institute of Technology
- GA Southern Univ.-Armstrong
- GA Southern Univ.-Statesboro
- Georgia State University
- Kennesaw State University
- Mercer University
- Morehouse College
- Museum of Aviation
- Savannah State University
- SpaceWorks Enterprises, Inc.
- Spelman College
- University of Georgia- Athens
- University of Georgia- Griffin
- University of North Georgia
- University of West Georgia

Partners:

- Atl. Metropolitan State College
- Center for Sustainable Communities
- Commodore Conyers College and Career Academy
- Center for Space Technology and Research (C-STAR)
- GA Center for Innovation for Aerospace
- Hines Family Foundation
- PinkSTEM
- West Georgia Technical College

GSGC Leadership

Stephen Ruffin, PhD
Director

Lori Skillings
Program Manager

Kelly Griendling, PhD
Outreach Lead

Alysia Watson
Program Coordinator

Student Profiles:

Louisa Houser, Mercer University

Since November of 2023, I have had the privilege of working with and learning from both the NEBP and ML-Bots projects. My time spent on the NEBP project during the Spring of 2024 was incredibly impactful. I had been apprehensive about joining the team considering I knew little about engineering, not to mention high-altitude ballooning, however, the first meeting I attended I was asked what my interests were and was given a choice in what I worked on. Moreover, everyone around me seemed to be in the same boat as me, and yet there was no shortage of people trying to help others learn. It was such a welcoming environment, and I never felt as if NEBP was a project too advanced for me. Following our trip to St. Louis for the 2024 Solar Eclipse, I was able to attend the Stratospheric Ballooning Association's AHAC 2024 Conference in June 2024, where I presented our findings alongside two peers, as well as learned from multiple universities around the country on their approaches and results. The NEBP program challenged me to explore outside of my field as well as welcome intimidating experiences.

My first introduction to GSGC, however, was the ML-Bots program where I was tasked with taking over the development and management of a four-module machine learning curriculum for middle and high school students. As a computer science major, I had been longing to work with artificial intelligence, but was too intimidated by the idea that I would not have the skills to understand it. Joining the ML-Bots project allowed me to not only conceptualize how machine learning works but have the space to program neural networks myself and teach others these fundamental concepts. Moreover, the ML-Bots project has provided me numerous opportunities to expand my skillset professionally as well. Over the past two years I have led workshops teaching the modules to both students and educators alike. I am still striving to get a better understanding and more experience programming machine learning, but the opportunity to teach others what I was too scared to pursue myself, has been incredibly fulfilling. Less than two years ago I would not have been able to tell you what the term machine learning meant, and now I pride myself on the ability to teach others not only how it works, but how they can practice it themselves. I am forever grateful for how this project has impacted not only my education, but where I see myself after my undergraduate studies. Now in the final year of the ML-Bots program, I can proudly reflect on how it challenges me to keep deadlines and meet new people, and how it teaches me to connect with others and has helped me find a passion for teaching. I could not be more grateful for the knowledge this project has granted me, and the opportunity to help shape the future students of America.

Ibukunoluwa Adelekan, University of Georgia Griffin Campus

My name is Ibukunoluwa Adeposi Adelekan, and I am a Master's student at the UGA Griffin Campus, working with Professor Monique Y. Leclerc in Biometeorology. My pursuit of advanced knowledge brought me to UGA in August 2024, where I have been committed to expanding my expertise in measuring atmosphere-earth surface interactions, particularly in agriculture. I have always been passionate about the intersection of agriculture and environmental sustainability, and I aim to apply my knowledge in both my immediate environment and professional network.

My research spans various areas aimed at enhancing agricultural productivity while minimizing environmental impact. One key focus is remote sensing and aerial photography, where I utilize cutting-edge drone technology to detect early scab infestations in pecans. This proactive approach enables timely intervention, mitigating potential crop losses. I also work with eddy covariance systems to measure carbon dioxide and water vapor fluxes in agricultural settings. These measurements are crucial for understanding crop-atmosphere interactions and optimizing resource use efficiency, particularly in irrigation scheduling for pecan orchards.
Throughout my academic and professional journey, I have achieved several milestones, including successfully integrating advanced methodologies such as remote sensing and eddy covariance systems into my research. I have contributed to interdisciplinary studies that bridge soil science and atmospheric science, further expanding my expertise. Additionally, I have been fortunate to receive support from the CAES Student Emergency Fund, which has allowed me to focus on my research without financial concerns.

The Georgia Space Grant Consortium (GSGC) has played a crucial role in my academic growth. Through this program, I have expanded my technical expertise, honing my skills in geospatial analysis, remote sensing, and aerial photography for early disease detection. These advancements have significantly improved my research output and broadened my impact by allowing me to incorporate tools like eddy covariance systems into my work. This has deepened my understanding of ecosystem dynamics and enabled me to contribute meaningfully to sustainable agricultural practices.Looking ahead, I am committed to advancing agricultural sustainability through innovative research and technology. My goal is to continue integrating remote sensing, eddy covariance systems, and other advanced techniques into agricultural science to address global challenges such as food security, climate change, and resource conservation. I look forward to collaborating further with organizations like GSGC to develop solutions that benefit both humanity and the environment.

Erik Geoke, Georgia Institute of Technology

I am an aerospace engineering student from the Georgia Institute of Technology passionate about solving complex problems and sharing the results to inspire others, particularly the next generation. My journey into engineering has been no doubt influenced by the unwavering support of my family. Growing up with a Swedish mother, I am shaped by ideals that highlight the values of education and hard work. Throughout my academic career, she always pushes me to be the best student I can be and showes me the importance of curiosity and always asking questions. My father is a model of selflessness, never thinking twice to go out of his way to help myself or others. His example inspires me to approach my academic and professional career with the same willingness to support others no matter the circumstance. Even my sister who has openly admitted she does not like math and science has always been enthusiastic and attentive when I talk about my work. I talk so much about my family because they are a large part of who I am, and their influence is what has inspires my passion for engineering and making a meaningful impact on the world.

In past year, I have had the privilege of working with the Georgia Space Grant Consortium, and NASA ML Bots, and I have thoroughly enjoyed the work I do. As I have researched and become familiar with artificial intelligence and machine learning, and have shared my knowledge with the local community, an action which deeply reflects my ideals as an engineer. I have applied my knowledge to the maintenance of a fleet of machine learning rovers, with applications for travel on Mars, and this past summer I menotred the STEP Summer Camp for both Albany and Atlanta Georgia, where students seeking to learn more about the field of aerospace engineering. In Albany, students created projects that improved their rural communities, and their innovative ideas were refreshing. As a result of the impact the rest of the team had on their community, they have been able to adopt this camp for themselves to hopefully continue its impact on their community for years. Seeing the enthusiasm that comes as a result of the work I do has been extremely rewarding, and I am thankful to the Georgia Space Grant for providing me with this opportunity.

Throughout my academic and professional career, I have sought opportunities to solve impactful problems while also inspiring the younger generation. I hope to empower students to dream big, teaching them that the sky is the limit. I am extremely grateful for all the students and mentors at the Georgia Space Grant and NASA ML Bots who supported me and provided me with the platform to embody my ideals in action. As I graduate and continue to the next chapter of my career, I carry with me the lessons taught by those around me. I look forward to contributing to groundbreaking projects in aerospace engineering, while also inspiring those around me. For me, engineering is not only about solving problems; it is also about inspiring the younger generation to continue doing the same.

Juan Jose,
Kennesaw State University

My academic and professional journey has been shaped by advanced research and cutting-edge technologies. At Kennesaw State University's Health Research Lab, I spent over three years as an Undergraduate Research Assistant, focusing on cybersecurity, data mining, and malware. I developed and optimized Python-based web-crawling algorithms to analyze dark web data, leading to multiple publications in esteemed journals and conferences.

Expanding my technical skills, I interned at Amazon Web Services (AWS) as a Cloud Support Engineer in the DMV area, where I implemented CI/CD pipelines using AWS CodePipeline, automated deployments, and developed an internal newsletter system with AWS Lambda and SES. This experience deepened my expertise in cloud infrastructure, automation, and system design at scale. I further solidified my cloud security and architecture knowledge by earning AWS Security Specialty and Solutions Architect certifications.

At AIG in Manhattan, NYC, I worked as a Security Analyst Intern, conducting vulnerability assessments, penetration testing, and security reviews to ensure regulatory compliance. I analyzed multi-factor authentication adoption rates and used static analysis tools like MASA, VeraCode, and WhiteHat Sentinel to remediate security weaknesses, strengthening AIG's security posture.

My research contributions have continued to drive my development, including work on quantum cryptography and buffer overflow vulnerability detection using neural networks. These projects reflect my commitment to advancing cybersecurity through innovation.

From research to hands-on internships, these experiences have honed my problem-solving skills and reinforced my passion for cybersecurity and cloud infrastructure. The GSGC program has also enhanced my presentation and public speaking skills, allowing me to engage with students, bridge the gap between youth and professionals, and inspire curiosity in STEM.

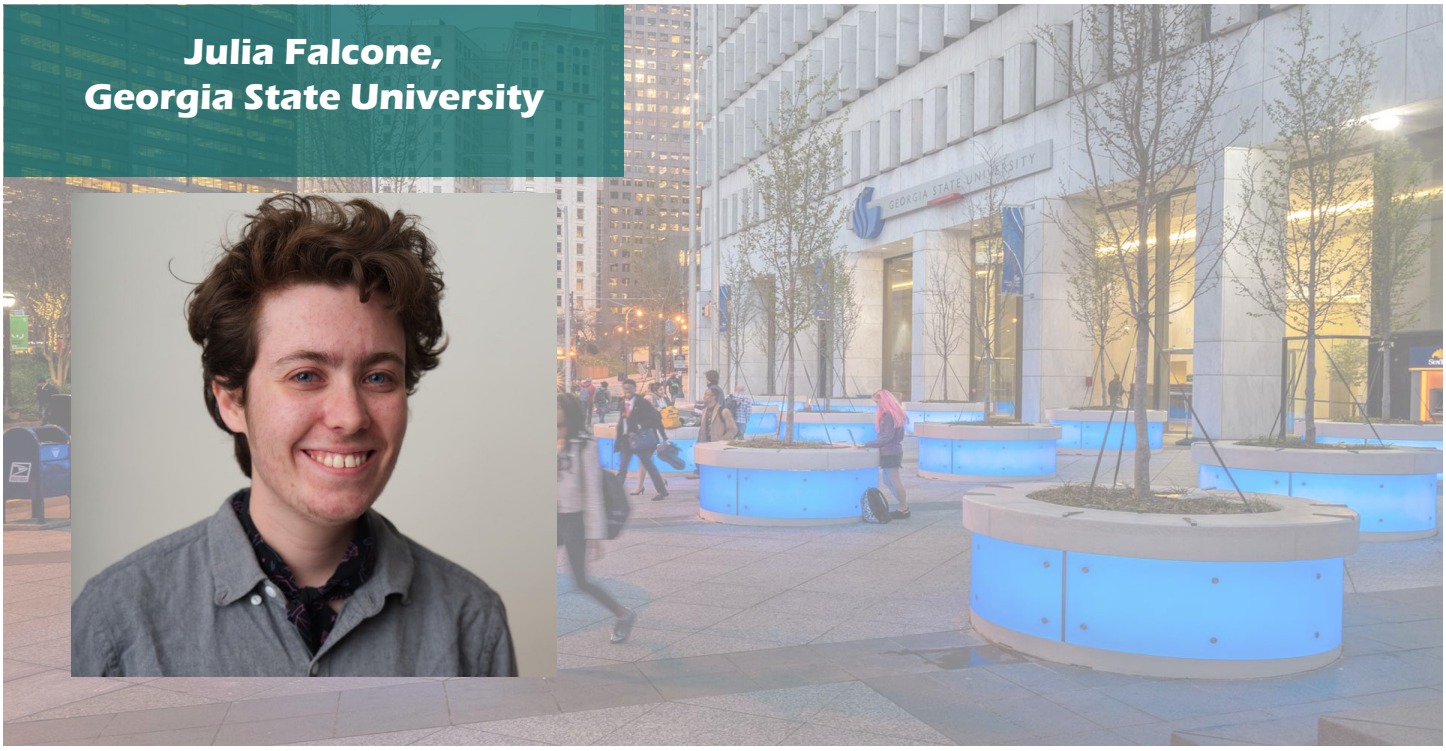
Jaden Causey, Hines Family Foundation

The Hines Family Foundation has been a pivotal influence in shaping my educational and professional trajectory, particularly in the fields of aerospace and space exploration. As a nonprofit organization dedicated to educating and involving K-12 students, secondary education, and educators in space discovery, the Foundation has provided invaluable opportunities for exposure to the world of space technology and engineering. I have gained insights into a broad array of aerospace professions, deepening my passion for science and engineering, while broadening my horizons in ways I never imagined. One of the most impactful aspects of the Foundation's work is its focus on introducing young people to the complexities and excitement of space exploration.

One experience that stands out was a trip to New Mexico, where I participated in an intense, hands-on learning opportunity involving high-altitude balloon tests and glider flights near the famous White Sands. In New Mexico, I had the chance to learn how to create CubeSats—miniaturized satellites used to measure different variables at high altitudes. Working alongside engineers and educators, I was able to understand how these small satellites contribute to space exploration and scientific discovery. The high-altitude balloon test, in particular, was a fascinating experiment to see how CubeSats function in the upper atmosphere, gathering data that could have real-world implications for space missions. These opportunities gave me a deeper understanding of the challenges and rewards of working in aerospace, providing clarity on how engineering skills are applied in the context of space exploration.

Through these experiences, I realized that aerospace is not just about rockets and astronauts—it's a dynamic, multifaceted field that requires innovation, problem-solving, and collaboration. Participating in these programs has been a crucial turning point in my education and professional development. It has opened my eyes to a new avenue in my journey as an engineer, allowing me to see the potential for my skills in the broader context of space exploration. Ultimately, the Hines Family Foundation has played an integral role in shaping my professional trajectory. The exposure to space-related careers, technology, and the innovative educational initiatives has inspired me to pursue a path that blends my engineering interests with a deep desire to contribute to space exploration. As I continue my studies and career, I now have a greater understanding of the exciting possibilities within aerospace, and I am motivated to explore these opportunities further, potentially being part of something as groundbreaking as space exploration itself.

Julia Falcone, Georgia State University



Julia Falcone is a fifth year graduate student in the Astronomy Ph.D. program at Georgia State University. She has been involved in the GSGC program Georgia Outreach Team for Space (GOT Space) since 2021 as a graduate outreach ambassador. GOT Space is an initiative that connects educators in the Atlanta area to free, interactive presentations and activities delivered by enthusiastic undergraduate and graduate student volunteers. These presentations and activities have focuses in astronomy and aerospace engineering, and were developed by students in the graduate Astronomy and Aerospace Engineering programs at GSU and Georgia Tech.

In this role, Julia's responsibilities include doing astronomy-based outreach talks at schools and organizations around Atlanta, coordinating with educators about which presentations and activities work best with their learning goals, training other outreach ambassadors to give effective and fun presentations to children, and overseeing the supply of materials needed for the various hands-on activities GOT Space offers. Her efforts allow GOT Space to reach dozens of schools and hundreds of students per year, with activities facilitated by dozens of students at GSU and Georgia Tech.

GOT Space has had an enormous impact on Julia's trajectory as a graduate student. Although she has participated in astronomy outreach since high school, GOT Space was her first experience in larger-scale management of student volunteers and outreach supplies, as well as her first experience participating in outreach as part of a more structured organization rather than a small club. The last few years as an outreach ambassador have solidified her commitment to engaging with her community in a fun, engaging, and educational way. It's helped her realize that she wants her career after graduation to have a focus on mentorship, which she hopes to foster either formally (such as through a teaching position) or informally (such as through extracurricular outreach). She is extremely grateful for all the opportunities that GOT Space has given her to help introduce kids around Atlanta to the universe they live in.

Maimuna Jammeh, Albany State University

I am Maimuna Jammeh, a junior currently pursuing a degree in Computer Science at Albany State University. I am looking forward to exploring all areas of my major, specifically Cybersecurity. I also have an interest in constructing and this has been something that I have been exploring more lately. I had the privilege of working with Dr. Arun Saha on a project titled Band Pass Filter at Microwave Frequencies. This opportunity arose while I was enrolled in Dr. Saha's Engineering Graphics class. The class involved creating various artistic and technical designs, which significantly enhanced my performance in the project. My primary role was focused on printed circuit board (PCB) designs, particularly creating circuit connectivity diagrams. This work required considerable time and dedication, especially when crafting the I-shaped metal patterns. These patterns, with specific dimensions and periodic arrangement, were printed on an FR4 substrate to demonstrate signal suppression properties at particular frequencies.

Through this project, I achieved significant milestones. I gained valuable knowledge in PCB design, a deeper understanding of microwave frequencies, and a newfound interest in circuit board development. This opportunity not only enhanced my technical expertise but also helped clarify my career aspirations as an engineering major. My contributions, particularly the design of library parts, served as the foundation for the project. The remaining tasks were carried out by fellow students who, like me, were eager to broaden their experience in STEM fields. Our collective work culminated in a presentation at the 12th ASU Undergraduate Research Symposium in April 2024, where images of the I-shaped metal patterns I created were prominently featured on the poster.

This program profoundly impacted my professional growth. From a young age, I had been drawn to engineering and building things, but I was uncertain about my specific interests. Participating in this project clarified my passion for construction-related design. I thoroughly enjoyed calculating dimensions, managing spacing, and assembling thedesigns—a process that became deeply fulfilling. Although construction in its traditional sense isn't my sole focus, this experience helped me recognize its importance in my aspirations.

Wyatt Ackerman, University of West Georgia

Nothing beats the satisfying feeling of being wrong because it brings us one step closer to discovering what is right. In science, perseverance is paramount, and patience is key—never give up.

My name is Wyatt Ackerman, a sophomore at the University of West Georgia majoring in physics. From a young age, my curiosity drove me to ask endless questions. While my parents answered as many as they could, I soon encountered questions beyond their knowledge. Rather than accepting limits, I set out to find answers myself. This insatiable desire to learn has led me to incredible opportunities I never imagined possible.

My research project directors, Dr. Ajith DeSilva and Dr. Javier Hasbun, recognized my passion and, with the assistance of GSGC, gave me the opportunity to conduct undergraduate research with a team equally driven as I am. Material science fascinates me, as it forms the foundation of modern technology. My primary task is collecting data on doped-germanium semiconductor samples to develop a unifying Hall-Effect theory for both n-type and p-type semiconductors. With a unified theory, we can use more elegant formulas for electron and hole charge carriers. Despite occasional setbacks, my determination never wavers. This hands-on experience has strengthened my problem-solving skills and deepened my understanding of complex concepts.

Programs like GSGC and the NASA Space Grant, along with dedicated academic researchers, provide invaluable resources for aspiring scientists. These opportunities allow me to gain professional expertise while also supporting my education. With this assistance, I will surpass expectations and contribute to humanity's progress in understanding and harnessing the universe's potential.

Though still early in my education, I take immense pride in being a researcher. Actively contributing to ongoing science has been a dream come true. I sincerely thank my mentors, Dr. DeSilva and Dr. Hasbun, the University of West Georgia, and GSGC for solidifying my passion for answering life's biggest mysteries.

Delta Flowers, Columbus State University

The research I conducted under Dr. Williams for the Georgia Space Grant Consortium has been an invaluable opportunity, providing hands-on experience and insight into astrophysics and scientific research. I worked with raw and processed optical data from the Cerro Tololo Inter-American Observatory's four-meter Blanco Telescope, using the Dark Energy Camera (DECam). This data focused on hydrogen-alpha and sulfur II emissions in the Large Magellanic Cloud, a satellite galaxy of the Milky Way, with the goal of detecting and confirming possible supernova remnants (SNRs).

Supernovae mark the explosive end of a massive star's life cycle. When a star collapses, its core rebounds, triggering a shockwave that rips apart its outer layers. This explosion generates extreme heat, ionizing surrounding gas and emitting electromagnetic radiation detectable across various wavelengths, including optical light. Studying supernova remnants helps scientists understand galaxy evolution, the distribution of heavy elements, and the sources of cosmic ray acceleration. These remnants also serve as cosmic laboratories, offering insights into high-energy physics and matter under extreme conditions.

My colleagues and I identified the optical counterparts of potential SNRs in the Large Magellanic Cloud, using a catalog of suggested candidates. My role involved analyzing emission line ratios of sulfur II to hydrogen-alpha, a key indicator of shock conditions. By comparing these ratios and other diagnostic criteria, I confirmed or ruled out the presence of supernova remnants in candidate regions. This project provided a comprehensive understanding of the scientific process, from data collection to analysis and interpretation. I learned to process astronomical data, extract meaningful information, and collaborate with a research team. Additionally, I presented our findings at a statewide conference, enhancing my ability to communicate complex scientific concepts.

Participating in this project deepened my passion for scientific research and reinforced my commitment to this career path. The hands-on experience prepared me for future internships, research projects, and careers in earth and space science, giving me a strong foundation in data analysis and scientific reasoning. I am incredibly grateful for the mentorship of Dr. Williams and my colleagues. The knowledge and skills I have gained will undoubtedly benefit my academic and professional pursuits, and I look forward to applying them to future projects that contribute to scientific advancement.

Matthew Olson, University of Georgia Athens Campus

The project that I worked on was the development and testing of a thermal vacuum chamber using thermoelectric coolers for cubesatellite environmental testing. Any spacecraft requires rigorous environmental testing to ensure full functionality in space environments. Traditional liquid nitrogen based TVAC systems employ costly and complex methods for temperature regulation, which are less practical for small-scale applications. By using thermoelectric coolers (TEC), temperature control is much more easily achievable, precise, and compact, making them ideal for cubesatellite testing. During the project I developed the thermal controls for heating and cooling, designed the mechanical structure for TEC coolers and the cubesatellite, designed a printed circuit board (PCB) to house all the electronics, and wrote a closed loop feedback system to precisely regulate the temperature of the spacecraft during the testing.

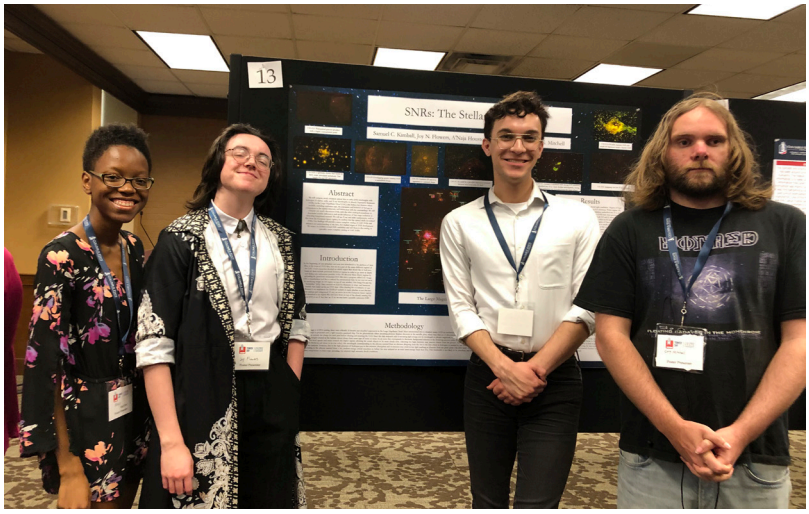
This project was incredibly impactful and beneficial for my education and my career. With the support from the Georgia Space Grant Consortium (GSGC), I was given the opportunity to learn about specifications of thermal vacuum requirements for space and to contribute my electrical engineering knowledge to create useful equipment for our research laboratory. I'm addition, the grant helped fund my time as a graduate student, allowing me to learn even more about electrical engineering and how to create designs for space applications.

The GSGC Grant was incredibly impactful in setting me up for a successful career in an industry in which I really wanted to work too. With additional experience designing and completing projects, and deeper knowledge in electrical engineering, I began to work at BAE Systems (formerly Ball Aerospace) and am currently heading a internal research development project for space applications. Overall, I'm so grateful to have had support from the GSGC, allowing me to pursue an education and career in the aerospace field.

What we do:

Columbus State University

This program is designed as a set of semester-long observing projects and/or research projects for higher education students. Most of these, as with the cadre this cycle, are undergraduate students working toward an Earth and Space Sciences B.S., with a concentration in Astrophysics and Planetary Geology. These students are interested in careers in astronomical fields such as employment with NASA or its contractors; graduate school followed by research, teaching, instrumental design and/or outreach careers; and careers in secondary education. The students benefit strongly from having experience with hands-on telescope operation and professional-level research involvement. These provide career-ready experiences for the students as they pursue those careers and give them a practical background they may pass on to their own students and the public in general.

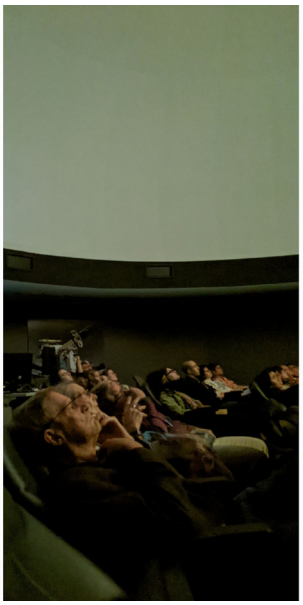


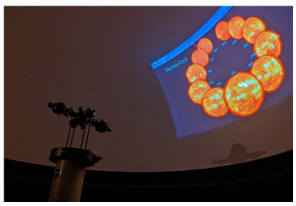
In the Hands-On Observation portion of this program, students were indroduced to CSU Space Science Center's WestRock Observatory, including its 24-inch primary optical telescope, solar telescope, and other instruments. Students worked under direct supervision from faculty and staff to optimize the observing setup, take solar images and monitor solar activity, select appropriate targets, take night-time optical images in various filters, obtain calibration observations, process the images with the calibration, and analyze the resulting images. The results were presented in-house at the end of Spring 2024.

In the Mentored Research portion, students worked with faculty member Dr. Rosa Williams on data taken by her collaborators using the Blanco 4m telescope and Dark Energy Camera at Cerro-Tololo Observatory. Students analyzed emission-line images to find the telltale signatures of the remains of exploded stars (supernova remnants) and compare these to findings at other wavelengths. This included learning about the shock physics that produces these signatures, and direct measurement of line ratios from images. These students presented their results at the Georgia Regional Astronomers Meeting in November 2023.

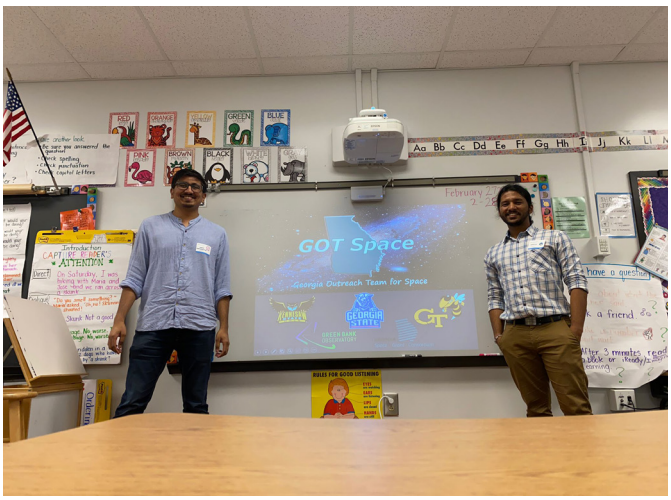
Georgia State University

Georgia State University (GSU) boasts several outreach programs that have brought interactive STEM presentations/ demonstrations and cutting-edge research to K-12 classrooms, the general public of Atlanta, and the broader metro area. Our flagship program is the Georgia Outreach Team for Space (GOT Space), a K-12 STEM outreach program that, as of August of 2024, has impacted over 10,000 students in 40 unique schools covering 6 congressional districts. The GSU branch of GOT Space is led by astronomy PhD students Julia Falcone and Fallon Konow. Under their exemplary leadership, the 2023-2024 academic year has included 16 outreach events, impacting approximately 400 elementary school students, approximately 50 middle students, and approximately 50 high school students. 13 GSU graduate students and 3 undergraduate students served as our outreach ambassadors.





In the fall of 2023, GSU Affiliate Director Dr. Justin Robinson piloted the Three Taverns Brewery Astrophysics Lecture Series, an ongoing monthly series, free to the public, that showcases current astronomy and astrophysics research conducted by faculty and graduate students of GSU, Georgia Institute of Technology, and Agnes Scott College. Since then, the program has grew into the official Atlanta chapter of Astronomy on Tap. In the 2023-2024 academic year, Astronomy on Tap Atlanta held 10 events featuring 7 GSU astronomy graduate students and 4 GSU faculty, each easily averaging approximately 50-100 attendees from the general public at each event.



Georgia Southern University - Armstrong Campus

The Eagle Engineering Ambassadors (EEA) Program is a mentorship program involving Georgia Southern University's Armstrong Campus and local high schools. The program exposes a diverse group of students and teachers to engineering concepts and careers through engineering projects. The 2023-2024 academic year was the second year that the program was offered and based on requests, the program was expanded to include middle schools. The teachers selected the student teams and coordinated the visits with the engineering students who served as the ambassadors and mentored the students. The teams completed one or more engineering projects. Projects included: design prototyping using CAD and 3D printing, LED lighting, DC motor control, Arduino programming and autonomous robots.

The ambassadors supervised and visited the teams weekly while projects were being performed. One of the highlights of the program was three visits to STEM Academy at Bartlett, a middle school in Savannah that serves as a feeder school for several engineering programs. At each visit the program directors worked with the engineering teacher and two classes of 25 students. The students worked on building and testing a circuit on TinkerCAD and on a physical protoboard for a LED lighting circuit and a DC motor control circuit. It was observed that by the 3rd visit the students and the teacher were able to work indepenently on these projects, which is one of the goals of the program.The EEA Program successfully helped build partnerships between Georgia Southern University and local high and middle schools. Two middle schools and five high schools participated in the program with a total of 10 K-12 STEM teachers, 46 high school students, 55 middle school students and 7 engineering students. Fall 2024 saw the first group of students who participated in the EEA program enrolling at Georgia Southern University.

Hines Family Foundation

The SILVA 2024 (SILVA24) Development, Demonstration, Delivery efforts continued and expanded upon prior SILVA tasks and integrated ongoing efforts with the HFF STEM Education and Training Alliance (H-SETA). SILVA24 specifically focused on HFF STEM Capability Learning Area Life Health-Biotech: Space Biology and Life Sciences, as well as demonstrated the feasibility and applicability of these learning tools and packages with World Space Week 2023 events in cooperation with Atlanta University Center HBCUs

The AttoLab-4C system is planned to be provided as a hands-on project-based-learning kit for students and teachers from middle school thru academic undergraduate and graduate levels. The collaborative program, Space Biology Science, Technology, and Engineering Studies Program (SBSTEPS), integrates Space and Student Classroom/Laboratory lessons, experiences, and products, at undergraduate/graduate academic levels, with onramps for pre-college STEM student involvement. A primary goal is to provide ISS Space Mission Experiences for Graduate Students, with on-ramp involvement for Undergraduate and pre-college students, and transition strategies for early career and returning professional workforce.

A-MASST Development, Demonstration, Delivery efforts continued and expanded upon prior tasks and integrated ongoing efforts. Specific emphasis was placed on SmallSat and Space Exploration Science and Technology Missions and space product development programs to Facilitate Student and Teacher Hands on Learning and Project Experiences. A-MASST24 focuses on two task elements: 1) expanding the AMASST Experiential Smallsat Workgroup (ESW) team development and operations capability to deployand demonstrate an Integrated, modular 3U/6U nanosatellite subsystem components, and 2) Student and Teacher Cubesat training, capability development, and hands-on learning experience participation with the Teachers-in-Space (TIS) Professional Development for K-12 Teachers & Informal Educators Workshop.

Additionally, A-MASST products and technologies and outreach activities were displayed and presented at Space Day Atlanta in the AUC 2023 during World Space Week. HFF Sponsored three HFF Fellows and Interns (Wanda Harding-Atlanta Public Schools Carver Early Academy HS Math/Physics Teacher; Jaden Causey-Kennesaw State rising 3rd year Mechatronics Engineering Student and HFF Facilitator; and Alonzo Bradford-San Jose State (CA) 1st year BioTech/Mechanical Engineering Student). The TIS CubeSat Workshop covered three areas: 1) in-person workshop providing educators with a step-by-step program to introduce them to working with CubeSats in the classroom ; 2) Hands-on Flight Training providing participants the as well as providing access to weekly office hours and email, video, and telephone support from Teachers in Space in order to ensure that participants and students to have all the assistance needed to build a flight-ready CubeSat.

PinkSTEM

Pink STEM Inc. had an extraordinary year, marked by impactful programs, transformative partnerships, and a steadfast commitment to empowering youth and educators through STEM education. Here are the highlights of our achievements for this year. In partnership with the Motherless Daughters Foundation and Hartsfield-Jackson Airport, Pink STEM gave over 50 students the life-changing gift of flight. Through Discovery Flights, students experienced their first taste of aviation, sparking dreams of becoming pilots. Additionally, scholarships for flight hours were awarded to students aspiring to pursue their Private Pilot Licenses (PPL), furthering their aviation goals. Students from the Youth in Aviation Program explored indoor and outdoor drone piloting under the expert guidance of Dr. LaQuanta Sumter of STEAM thru Drones, in collaboration with professors from Central Georgia Technical College and Albany Technical College, expanding their knowledge of cutting-edge drone technology. In collaboration with Code-Y-Tech-Savvy Researcher Yakira West and Air & Space STEM Outreach from Robins Air Force Base, Pink STEM launched a groundbreaking Computer Science Apprenticeship.

This program introduces students as young as six to the fundamentals of computer science, offering a pathway to graduate with a Security+ Certification, empowering students with skills for high-demand careers. Led by Dr. Tamika Head, Pink STEM partnered with 4-H and Fort Valley State University to teach students the basics of aquaponics and hydroponics through the Plant the Moon Challenge. This innovative program integrates technology and agriculture to combat food insecurity in marginalized communities. Pink STEM partnered with Middle Georgia State University to develop a teacher certification program in computer science. Additionally, through Module 2, educators learned to program robotic arms to water plants, combining classroom robotics with sustainable agriculture solutions. Pink STEM Inc. remains dedicated to transforming STEM education and providing opportunities for students and educators to thrive in the 21st century. Together with our partners, we are building a brighter future.

Savannah State University

The SSU NASA GA Space Grant Scholars Program provided stipends ranging from $400 -$500 to 24 students at Savannah State University (SSU) to assist in continuing their study in STEM areas of interest to NASA. Over 40% of the total undergraduate student body at SSU comprises first-generation college students, and the overwhelming majority, more than three-quarters, of Savannah State University students receive some form of financial aid to support the cost of attendance at college. This stipend has helped reduce the economic burden to some extent for the students selected for this program. A number of the stipend recipients participated in internships in the Summer of 2024, and some of them graduated in the Spring of 2024.

University of Georgia- Athens Campus

System for a Thermal Vacuum Chamber for Cube Satellite In-House Thermal Testing: Before sending a satellite into space, it is necessary to subject all of its components to testing to make sure they can survive the space environment. In low Earth orbit, a satellite will experience almost complete vacuum conditions, which make it very difficult for the satellite to cool off when it is in direct sunlight or warm up when it is on the opposite side of the Earth. Consequently, all of its components have to function in extreme heat and cold. We test whether they will survive the trip in a thermal vacuum chamber. This is basically a chamber where we pump the air out and cycle between heat and cold to see how the satellite components respond.

This program was intended to give one Master's student the opportunity to complete a project that would radically improve the function of our thermal vacuum chamber, or TVAC. The student, Matthew Olson, had an idea to design a new heating and cooling system using a device called a Peltier cooler. For roughly a year, Matthew worked on designing and building the new system. It went rather well – Matthew was able to get the new system working effectively, making a whole range of new experiments and tests possible for the Small Satellite Research Laboratory. The system still does not reach the temperature extremes of a state-of-the-art vacuum chamber in a major laboratory, but it works much better than before. Additionally, Matthew successfully achieved a Master's degree in Electrical Engineering from this project!

Developing a hyperspectral sensor platform for toxic algae monitoring: Have you noticed more scummy algae than usual on your local lake? Do you live near a body of water that has been recently under a water quality advisory? The reason may be cyanobacterial harmful algal blooms, or cyanoHABs. These algal blooms can threaten people as well as wild and domestic animals. However, new ways are being developed to use space-based data transmission to give us better information quicker about where action is needed to combat CyanoHABs.

This program was designed to enable one or more students to develop CyanoSense 2.0, a sensor system that can tell us where and how big these cyanoHABs are, and to connect it to a data transmission network that uses space-based communication via the Iridium satellite network. CyanoSense 2.0 is the newest improvement on CyanoSense 1.0. It was initially tested at Lake Herrick at the UGA campus, and has since been deployed all over the United States in six different locations. When data is collected via a light-sensing device called a spectroradiometer, it is transmitted by satellite back to the University of Georgia in Athens.

The new sensor system is, as Dr. Mishra said, a "roaring success" – it is more efficient, less expensive, and more effective than the original version. Additionally, Keshav Raviprakash, an M.S. student at the University of Georgia, successfully defended his thesis on the development of the new version of CyanoSense.

University of Georgia - Griffin Campus

This study provided an invaluable opportunity for graduate student Kriti Poudel to gain early scientific experience in fieldwork and career development. Kriti collected drone-based multi-spectral imagery alongside ground-based eddy-covariance and micro-lysimeter measurements to assess plant water use and stress. Her research is yielding three high-impact manuscripts integrating environmental monitoring with agricultural hydrology. She has presented her findings at major conferences, including the American Society of Horticultural Science (ASHS) and the American Geophysical Union, while also honing communication skills through events like the Three Minute Thesis competition and Scholars Ignite.

The GSGC program led to a breakthrough in optimizing water supplementation for Southern hedged pecan trees using robust, scientifically tested methods. By integrating UAV imagery, eddy-covariance, micro-lysimeter, and weather station data, Kriti developed evidence-based guidelines to optimize irrigation recommendations for growers.

With NASA GSGC support, Kriti is gaining expertise in Earth (vegetation)-atmosphere exchange, evapotranspiration evaluation, and remote sensing applications. This funding enabled her to present at the 2023 American Meteorological Society conference, the 2024 GSGC annual meeting, and the Georgia Pecan Growers Association Annual Field Day. She also served as a moderator at the ASHS international conference, where she presented her NASA-funded research through oral and poster sessions. These experiences have expanded her national exposure and strengthened her academic and industry prospects.

One peer-reviewed paper has been conditionally accepted, with two more in development, advancing environmental monitoring and crop science integration. The UGA BioMet Lab on the Griffin Campus is deeply grateful for GSGC's impact on graduate training, and NASA GSGC is formally acknowledged in all research activities.

West Georgia Technical College: Engineering Technology Internships

The Engineering Technology Internship Program at West Georgia Technical College (WGTC) connects students with local manufacturing companies for hands-on, paid internship experiences. Using NASA grant funding, the program compensates participating students, providing valuable industry exposure and skill development.

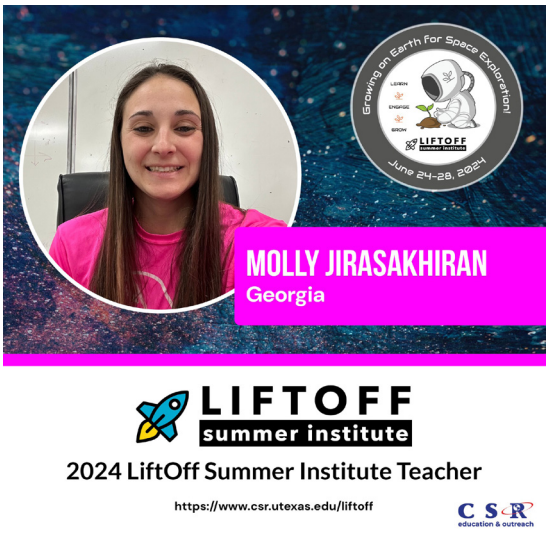
Many partner companies have hired WGTC interns following their internship, demonstrating the program's success in bridging the gap between education and employment. The program emphasizes inclusivity by actively engaging underrepresented groups, helping students gain critical engineering and STEM skills essential for professional success.

The internship program offers WGTC's 2-year college students a unique opportunity to compete with 4-year college graduates by developing real-world expertise. This initiative helps break down barriers, supports degree completion, and enhances career readiness.

In the current program cycle (June 6, 2023 - June 5, 2024), four students participated, including two males and two females from minority backgrounds. These internships provided valuable STEM learning experiences, reinforcing WGTC's commitment to fostering strong industry partnerships and supporting a diverse student body.

2024 LiftOff Summer Institute

Beginning in the summer of 1990, UT Austin Center for Space Research (UTCSR) and NASA's Texas Space Grant Consortium initiated a weeklong professional development training workshop for teachers. This program, called LiftOff, migrated to UTCSR in 2023 and emphasizes science, technology, engineering, and mathematics (STEM) learning experiences by incorporating a space science theme supported by NASA missions. Teacher participants from across the country are provided with information and experiences through speakers, hands-on activities, and field investigations that promote space science and enrichment activities for themselves and others.



The LiftOff 2024, "Growing beyond Earth for Space Exploration" professional development institute had 50 educators selected to participate. One Georgia high school educator was selected for the cohort and was sponsored by the Georgia Space Grant Consortium. Educators completed 40 hours of engagement with subject matter experts, hands-on activities, and teaching features. Educators learned from 12 NASA Subject Matter Experts, received 16 NASA hands-on activities, shared 50 Teacher Features, and 44 NASA resources were disseminated. Evaluation results show that LiftOff continues to be a premiere professional development for teachers.

K-12 Outreach Programs

Georgia Space Grant Consortium is committed to serving the Georgia community by engaging in high-impact outreach programs that create opportunities for Georgia students. We have several large-scale outreach programs in addition to supporting numerous K-12 STEM events in our community. Our goal is to uplift our future workforce and our future leaders and build a culture where everyone has an equal opportunity to join and succeed in the aerospace industry.

STEP Summer Camp Atlanta, students are presented with a 2-week, open-ended design challenge to imagine a future mission to the Moon or Mars to create the first colony and identify a task that a rover could do to support your mission. Within the two weeks, students must design and build a prototype rover to perform the task and present their design experience to industry sponsors. Historically, STEP has primarily served students in the Atlanta area across 49 schools.

STEP Summer Camp Albany, students are presented with a 2-week, open-ended design challenge to imagine a way in which small, autonomous, vertical lift aircraft can benefit their local community, and then design, build, and test their vehicle concept. This camp is hosted at the 4C Academy in Albany Georgia.

NASA SG KIDS Award, ML-Bots is a multi-institution, multi-state effort with the mission to create a sustainable and diverse workforce in AI/ML for robotic systems, necessary to achieving NASA's future exploration goals for the moon, Mars, and beyond. The program is an interactive STEM learning experience designed to teach coding and Artificial Intelligence (AI) and Machine Learning (ML) basics to students in grades 6-12 using NASA-inspired applications, providing opportunities for students to develop foundational skills in AI/ML to help them excel in the future STEM workforce.

Plant the Moon Challenge (PTMC) is a global science experiment and research competition where students examine how crops can grow in lunar or Martian regolith. Led by the Institute of Competition Sciences, participants use lunar soil simulant to design and conduct experiments over eight weeks. During the 23-24 academic year, the Georgia Space Grant Consortium sponsored 25 PTMC kits for teams from 12 Georgia K-12 schools and 1 Georgia HBCU university, engaging 228 students.

GSGC supports two outreach teams that are lead by university students:

GOT (Georgia Outreach Team for) Space is a partnership with Georgia State University that focuses on classroom visits to local area K-12 schools that blend Astrophysics and Aerospace Engineering. **AE Outreach Team** that coordinates with student clubs at Georgia Tech to provide hands on activities at STEM events and after school programs at K-12 schools. Some examples include:

- Blackwell Elementary STEM days
- Belmont Hills Elementary School, supporting 3rd-5th grade afterschool STEM Club every 2 weeks with new project
- Middle Grades Discovers Georgia Tech (GSGC supports, run by GT Community Relations)
- Atlanta Science Festival Events
- Space Day at Grant Park

GSGC Sponsored NASA Center Internships

Sarah Yandell
Savannah College of Art and Design
Johnson Space Center, Fall 2023

Emily Piper
Georgia Institute of Technology
NASA Headquarters, Fall 2023

Trinity Smith
Columbus State University
Ames Research Center, Fall 2023

Corey Chianello
Georgia Institute of Technology
Ames Research Center, Fall 2023

Diya Kerjriwal
Johns Creek High School
NASA Headquarters, Fall 2023

Alan Yeung
Georgia Institute of Technology
Jet Propulsion Lab, Spring 2024

Audrey Smiles
Georgia Southern University
Stennis Space Center, Summer 2024

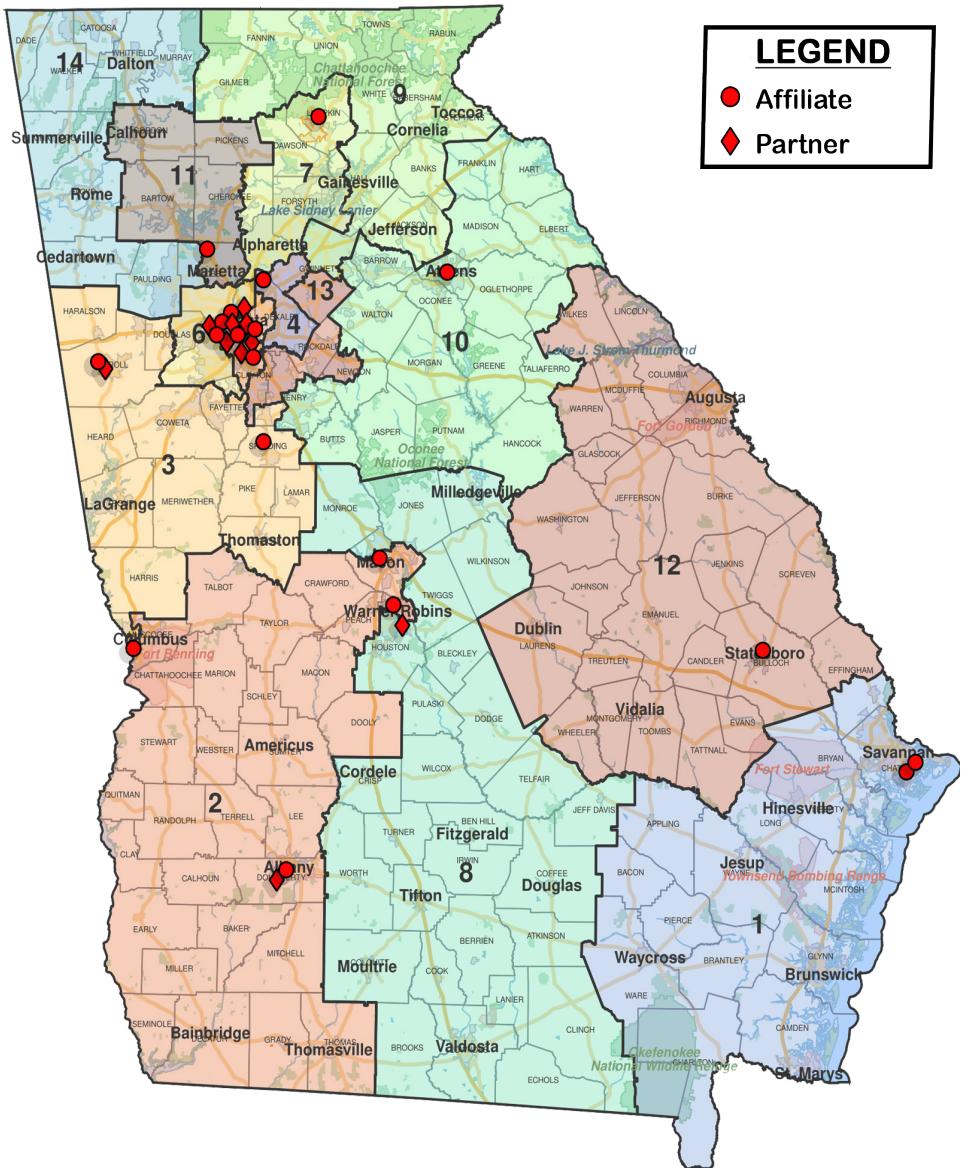
Isaac Garon
University of Georgia
Goddard Space Flight Center, Summer 2024

Joseph Durante
Georgia Institute of Technology
Goddard Space Flight Center, Summer 2024

Cory Chianello
Georgia Institute of Technology
Ames Research Center, Summer 2024

BY THE NETWORK

GSGC has an large network of Affiliates and Partners throughout the state. GSGC continually stives to expand the network to reach more Georgia Residents each year.



GSGC strengthens Georgia's STEM education to build a high-quality workforce essential for state and national competitiveness

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