Research Location:

Participants in the REU are hosted on the University of Alabama in Huntsville (UAH) campus. Research will primarily be conducted in a joint University-federal agency research facility on campus – the National Space Science and Technology Center (NSSTC). Participants are provided housing in the dorms on the UAH campus. These dormitories are located less than a mile from the NSSTC, 15 minutes walking distance (see figure below), so students are not required to bring a vehicle for transportation. Students are provided a meal plan for the dining facilities on the UAH campus, although they are free to explore the variety of dining options around the city.

Map of the UAH campus, showing locations of: A. student dormitories, B. dining facilities, and C. research facilities (NSSTC & SWIRLL)

Opened in 2000, the NSSTC is a facility focused on cutting-edge research in selected scientific disciplines, including Earth and atmospheric sciences. The primary objective of the NSSTC is to bring together major research universities, private industry, and federal government agencies to solve science and technology problems. NSSTC is located in Cummings Research Park, the second largest research park in the United States, and researchers profit from extensive collaboration opportunities with industry-academia-government co-located in a single research facility. The NSSTC is host to the UAH Earth System Science Center, NASA MSFC Earth Science Branch, and the NOAA NWS Weather Forecast Office, among many other organizations.

contact: remotesensingreu@uah.edu  
web: uah.edu/essc/reu
The UAH Severe Weather Institute - Radar & Lightning Laboratories (SWIRLL) is a state-of-the-art facility that focuses on research operations / field work in the atmospheric sciences with specific foci on ground-based remote sensing of severe convective weather, polarimetric radar, lightning, boundary layer, and atmospheric chemistry. Additionally, SWIRLL houses a fleet of ground-based mobile radars/atmospheric profiling instrumentation allows REU students to get hands-on experience for field data collection during the summer program. The entire SWIRLL Research Operations Center and Severe Weather Computing Lab (shown below) is dedicated for REU intern use during the program.
Partner Organizations:

Taken as a whole there are around 250 active Earth and atmospheric science researchers in the NSSTC. These ranks include academic faculty, research scientists, civil servant scientists, and federal science contractors; and if one includes graduate students and undergraduate students involved in research groups the number increases to around 350. Given the large number of research- and education-focused residents of the NSSTC, this presents an opportunity for students to learn from a wide range of research expertise areas and tie into science and technology development in remote sensing.

UAH ATS/ESSC: The Atmospheric Science Department (ATS) and Earth System Science Center (ESSC) at UAH work in conjunction to provide expertise in many facets of the Earth sciences as well as high end computing. The 16 faculty members in the ATS Department jointly conduct research with scientists and post-docs through the ESSC, which hosts over 60 research staff. The atmospheric and Earth system science programs at UAH are managed by the ATS department and include close to 100 undergraduate students and almost 60 graduate students.

ESSC also provides science and coordination support to the SERVIR project, an initiative led by NASA and the US Agency for International Development (USAID) with international partnering organizations. The SERVIR Science Coordination Office is located at the NASA Marshall Space Flight Center and is co-located with the University of Alabama in Huntsville. Under the guidance of UAH ESSC scientists working with SERVIR, students will have the opportunity to conduct collaborative, applied research in the use of Earth observations and geospatial technologies, with the goal using science for societal benefit in developing regions throughout the world, and thematic focus areas including food security & agriculture, water and water-related disasters, weather & climate, and land cover/land use & ecosystems.

NASA: The Earth Science Branch (ESB) at NASA Marshall Space Flight Center (MSFC) employs 24 NASA civil servant scientists and more than 120 contractors with expertise in satellite remote sensing for Earth science applications. These research areas include total lightning, precipitation, land surface, atmospheric thermodynamics, clouds and aerosols, disaster response, and public health (including air and water quality). Of specific interest to this proposal are the land and atmosphere remote sensing expertise within the MSFC Short-term Prediction Research & Transition (SPoRT) project and SERVIR project, mentioned previously.

SPoRT performs research and transition-to-operations activities related to atmospheric and land-surface remote sensing and modeling. SPoRT uses atmospheric measurements from the NOAA GOES-16 and Joint Polar Satellite System (JPSS) satellite platforms as well as legacy
instruments from NASA to develop value-added products to investigate different aspects of the atmosphere. SPoRT also works with land surface observing (e.g., NASA Soil Moisture Active Passive) and precipitation (e.g., NASA Global Precipitation Measurement) satellite datasets and integration of those products into land surface models to improve representation of soil moisture and evapotranspiration to support flood, drought, and wildfire applications.

Scientists from the MSFC ESB have mentored more than 30 students over the last 5 years as part of the NASA Interns, Fellows, & Scholars Program. These projects have focused on improving atmosphere and cloud remote sensing products and their application in land surface models.

**NOAA NWS:** The National Weather Service forecast office in Huntsville, Alabama is located within the NSSTC on the UAH campus. The office consists of 21 full-time employees, including 15 meteorologists, and is staffed with at least two meteorologists 24 hours a day, 7 days a week. NWS Huntsville became operational in January 2003, and serves as a collaborative research-to-operations hub for radar, satellite, and lightning due to its co-location with the NASA Marshall Space Flight Center and UAH. The office also fosters very close ties with emergency managers and media outlets in its coverage area, which consists of 14 counties in northern Alabama and southern Tennessee. During the nearly 15 years the office has been in operation, the area has experienced a historic tornado outbreak, several smaller tornado outbreaks, significant flood events, and several winter storms. The Weather Forecast Office is active in mentoring students including through the NOAA Hollings Internship Program and as Co-ops.
Baron: Critical Weather Intelligence: A private industry partner located in Huntsville, Baron was founded in 1988 with a mission to deliver critical weather intelligence to its customers. The company has approximately 100 employees, including an in-house team of meteorologists and engineers working on the latest cutting-edge weather technology. Today, the company provides weather radar, visualization software, hydrological and roadway modeling, digital solutions and value-added weather data through multiple distribution channels. Baron designs, develops, installs, upgrades and refurbishes weather radars, including X, C, High S and S-band systems. During the last 20 years, the company has either installed, upgraded, refurbished, or provided 24/7 service and support for over 325 weather radars globally, including the NEXRAD dual-polarization upgrade for NOAA. Baron is recognized as a trusted and complete weather solution by its partners and customers; its weather products are relied upon by hundreds of millions of people globally through the company’s government and commercial partnerships. Organizations using Baron visualization software, modeling and weather data in their own products and services include SiriusXM, ABC, CBS, FOX, NBC, Verizon Network Fleet, Toyota, Honda, AccuWeather, and the Weather Network in Canada. Baron has an active role in mentoring students through a year-long UAH-Baron internship and their summer internship program.