

AHAC August 2022 Abstracts

250-500 Words

30 minutes (20 minutes with 10 minutes questions)

September 15, 2022 Revision

Overview Talk

Title: Overview of the Nationwide Eclipse Ballooning Project (NEBP)

The focus of the Nationwide Eclipse Ballooning Project (NEBP) is to broaden participation of STEM learners by immersing teams from a wide range of higher education institutions in an innovative NASA-mission-like adventure in data acquisition and analysis through scientific ballooning during the 10/14/2023 annular and 4/8/2024 total solar eclipses. NEBP will engage 85 teams in equitable, inclusive learning on two primary tracks – 1) atmospheric science and 2) engineering. Engaging 85 teams spread across the country will be a challenge. The teams will be from a variety of college types, the students will have different background knowledge levels, and the available mentoring will vary. To meet these challenges, the teams will be divided into ten geographic pods, five for each track. Each pod has a Pod Lead who will create a cohesive community with their 8-10 teams.

The atmospheric science track will launch small standardized commercial off-the-shelf radiosondes of less than 190 grams that are used to measure atmospheric parameters through the stratosphere. At sites along the path of totality, NEBP participants will make frequent observations by launching hourly radiosondes on weather balloons to 100,000 - 110,000 feet. In addition, they will collect high-temporal resolution surface-site data. This design will provide surface, lower, and middle atmospheric observations with enough spatial and temporal sampling to contrast the meteorological differences before, during, and after the eclipse. The surface stations will provide independent measurements of solar irradiance at the surface. Data analysis will be done after the eclipses.

The engineering track balloon platforms are capable of lifting up to 12 pounds of student-built payloads into the stratosphere during the eclipse. Typical engineering platform experiments include atmospheric measurements, photography, cosmic radiation measurements, and space technology proofs of concept. The learners will generate real-time video that will be streamed to the planned NASA eclipse website, make-high resolution precision GPS measurements to compliment the radiosonde data, and conduct other applicable individually designed experiments. The FAA and other stakeholders will use near real-time balloon location on the NEBP flight tracker website.