# Virtual Space Camp: Explore Near Space from the Comfort of Your Home!

Jillian Schmidt, Jill Davis, Yezad Anklesaria, and Henry Pernicka

Missouri University of Science and Technology

# Space: The Final Frontier Camp History

- 4 day on-campus experience for rising 10-12th grade students

  - Construct and fly BalloonSAT in groups of 3-4

  - Tour campus and department laboratories

  - Interact with current students and faculty

- Offered once per year from 2014-2019, 30-50 students per year

- Unable to offer on campus in summer 2020 due to COVID-19 restrictions

# Virtual Space Camp Challenges

- Access to equipment and supplies

- Lesson development

- Launch day experience

- 1 BalloonSAT per individual (vs group)
  - Weight
  - Cost

# BalloonSAT Payload Design

- SparkFun Qwiic Connect shield and sensors for Arduino Uno
  - No at-home soldering required
- Compact size (4.5"x 3"x 2.75", ~190 grams)
  - Fly all 30 campers' BalloonSATs on one flight
- Eliminate heater and camera
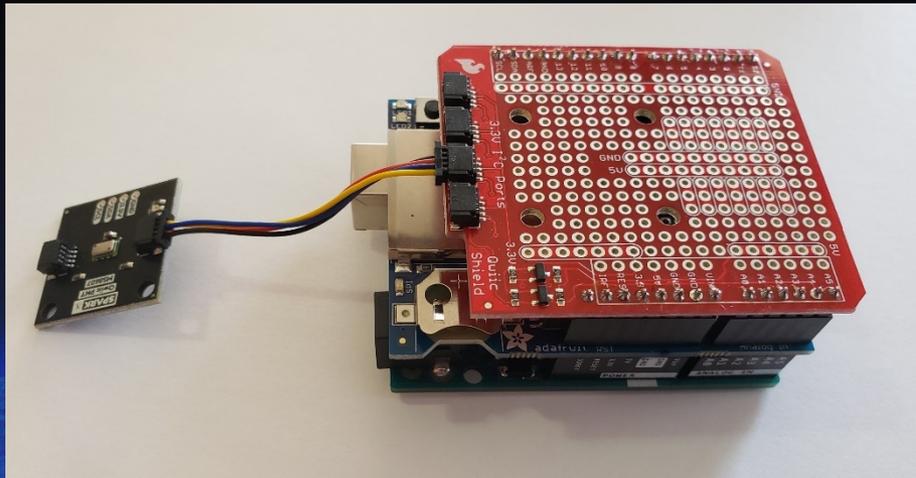
# Camp Timeline

Package and Mail Supplies (Early July) → Virtual Camp (July 12-16) → Deadline to Receive Completed Payloads (Aug 7) → Launch Day (Aug 14)



Welcome to the Tuesday morning meeting!

We'll start at 9 am
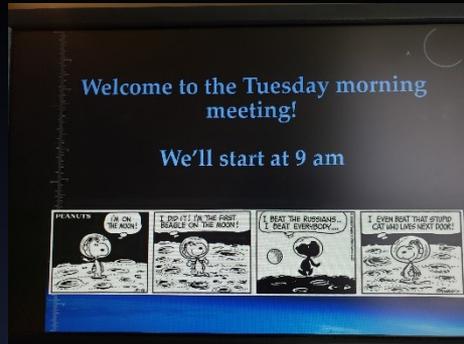
# Virtual Camp Schedule

- Day 1: Arduino 101
- Day 2: BalloonSAT Structures
- Day 3: Ground Testing
- Day 4: Final Preparations and Virtual Tours

Video by camper Julie C.
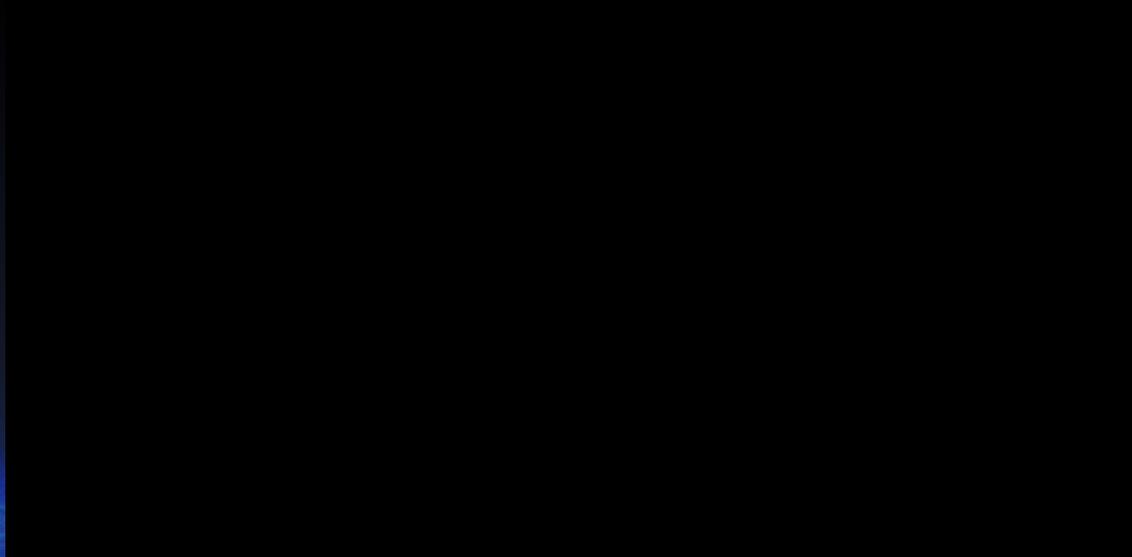
# Camp Reception and Outcome

- Campers participated regularly in the daily lessons and in the live morning sessions
  - Appreciated the freedom to experiment a bit with the Arduino and sensors
  - Enjoyed personalizing their own BalloonSAT boxes
- Still gathering feedback with a post-camp survey (through 9/30)
- Outcome
  - 30/30 BalloonSATs received on campus by posted deadline
  - 27/30 BalloonSATs functional when received
  - 26/30 returned full sets of flight data through ascent and burst

# Launch Day

- 3 kg balloon
  - Main tracking payload
  - Secondary payload with flight termination unit
  - 30 camper payloads
- Livestream launch via Zoom
- "Live" tracking with Spot shared track and Twitter updates
- Post-flight sharing of data and images through Google Drive

# Lessons Learned and Takeaways
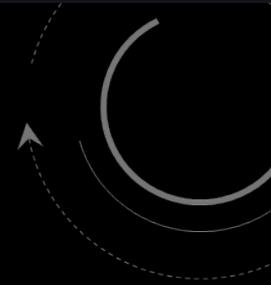
- Closing up camper payloads/doing final preparations was time consuming
  - Have campers do as much as possible at home
  - Add switch (and possibly heater) back into design
- Opportunities for improvement
  - Get campers involved in sensor selection
  - More opportunities for camper-camper interaction
- Development of virtual camp content opens up opportunity to expand our reach
  - Future virtual camps/workshops
  - K-12 teacher training

# Questions?

schmidtjb@mst.edu