Research Experience for Undergraduates During COVID-19
NSF REU Team Experience in Summer 2020
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M. Ilhan Akbas, Ph.D.
Assistant Professor of Electrical and Computer Engineering
Embry-Riddle Aeronautical University
NSF REU Program

NSF Research Experiences for Undergraduates

• Supports active research participation by undergraduates
• Students get compensated to learn about research by doing research on problems with practical applications
• REU sites recruit half of students from other institutions
• Students work in groups in a scholarly community
• Students participate in a series of field trips and workshops
• Students are closely mentored on research process

70% of previous computer science REU students ended up in graduate programs
Due to COVID-19, most of the research and team activities are moved to online efforts.

NSF REU Site at ERAU

- 8-week intensive research on cyber security of UAS
- Stipend for each participant and travel expenses
- On-campus housing and meals provided as needed
- Activities for students such as seminars, workshops, field trips
- Students make two presentations and prepare one paper
Project Team

Team with 3 Students
• Computer Engineering Junior from California
• Computer Engineering Junior from NY
• Computer Science Junior from Puerto Rico

Related Experience
• No previous research experience
• No cyber-security specific experience
• No simulation coursework/experience

The goal was to complete literature survey, research proposal and research results during the peak time of COVID-19.
Challenges

- Student expectations based on NSF REU history
- Student expectations based on previous years
- Faculty/mentor expectations
- 100% online interaction
  - Time difference
  - Connection quality
  - Hurricane
- Integration with the whole REU site teams
Overcoming the Challenges

Interaction
• REU Site and PI organized activities
• “Being available” was crucial
• Various online tools (MS Teams, Zoom, etc.)

Project Management
• Scrum-like approach
• Specific, short-term tasks and reviews
• Meetings twice a week and as needed

Technical
• Moved to simulation
• Separated meetings acc. to topics
The report is being converted into a publication.

Video and code is available for future students.
Student Feedback

Student 1: “Having never participated in any sort of research before, this REU really opened my eyes to how research is conducted and how much freedom one has when conducting research. **Even during this pandemic**, I felt as though I was still able to grasp my research topic through thorough readings of papers and with the help of my mentor who was always there to help us out and answer questions about our research and even general school questions. *I really enjoyed participating in this REU and making so many meaningful connections, this has inspired me to apply for another one next summer!*”

Student 2: “For me, REU was a magnificent and remarkable experience. I **learned more about teamwork and communication than any past research experiences** I have participated. My team and I **communicated in a timely, professional, and organized manner** thanks to the guidance of our mentors and program coordinators. Also, I gained a substantial amount of knowledge about Unmanned Aerial Systems, and how to simulate UAS in a 3D surveillance mission”
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- akbasm@erau.edu
- https://sites.google.com/site/miakbas/
- https://www.linkedin.com/in/miakbas/