

# Reflection of the NRAO's Exploring the Electromagnetic Spectrum program

Erin McDonald<sup>1</sup>, Abigail Swanberg<sup>1</sup>, Nejon McBride-Stubbs<sup>2</sup>

<sup>1</sup> William & Mary, <sup>2</sup>Prarie View A&M University

## Abstract

Exploring the Electromagnetic Spectrum is a two-semester-long program hosted by the National Radio Astronomy Observatory (NRAO) designed to promote diversity in amateur radio. Through this program, two cohorts of young adults, totaling thirty people, are working towards the goal of receiving their technician's and/or general class license. For the second cohort of students, three students also became peer mentors. To complete the program, students complete lessons on an online platform, attend weekly Zoom classes, and listen to presentations given by guest speakers. The students are also building lasting relationships with their peers and mentors. The ultimate goal of the program is to develop a curriculum for amateur radio clubs, schools, and other interested individuals. In this presentation, three of the students will share their personal experiences with the program.

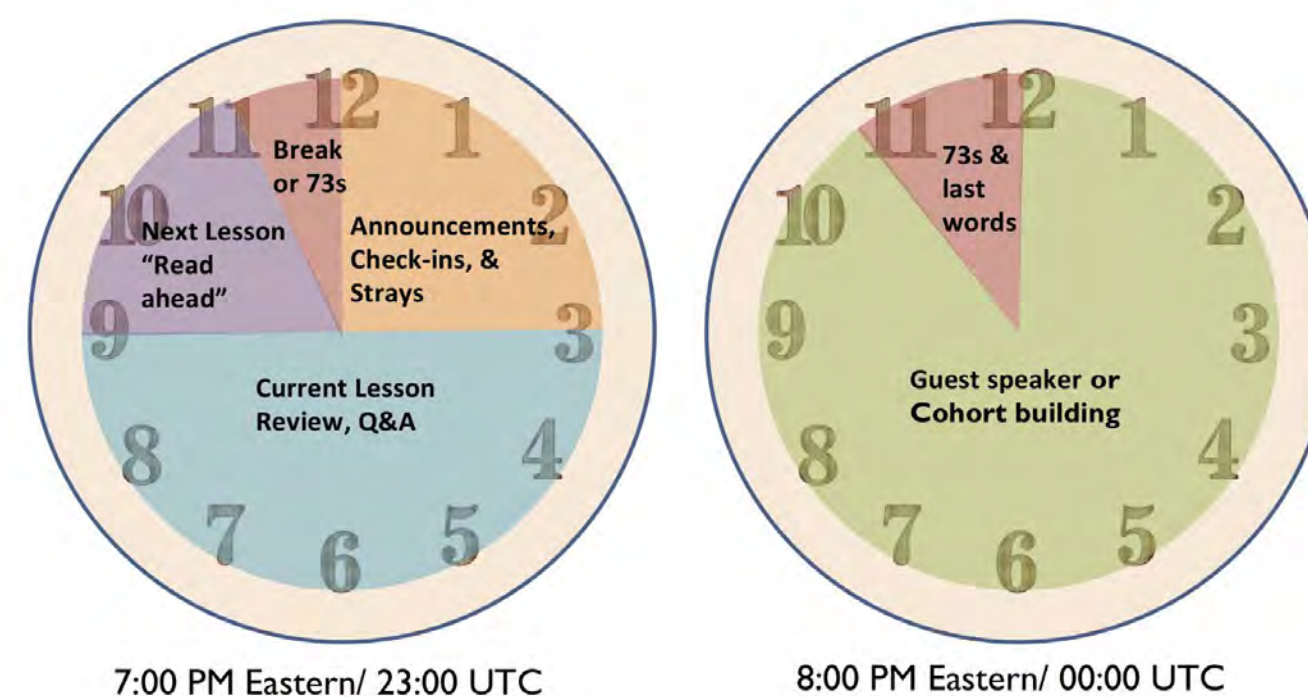
## Introduction

The 'Exploring the Electromagnetic Spectrum (EMS)' program is a class run by the National Radio Astronomy Observatory (NRAO) meant to increase the number of LGBTQ+ and racial minority youth with Ham radio licenses. The goal of the program is to develop a comprehensive curriculum that will then be made available to anyone interested in ham radio. Two cohorts of students have gone through the program to test and develop the curriculum.

The program was led by Jesse Alexander and Danielle Rowland. These NRAO employees helped develop the curriculum and run weekly meetings with the cohorts of students. These meetings consisted of many lessons which taught students how to operate radios and be on the air. The students of the second cohort additionally received peer mentorship from select students who were in the first cohort. This program and its curriculum have and will continue to serve as an introduction to amateur radio and the electromagnetic spectrum for many young adults and lifelong learners.

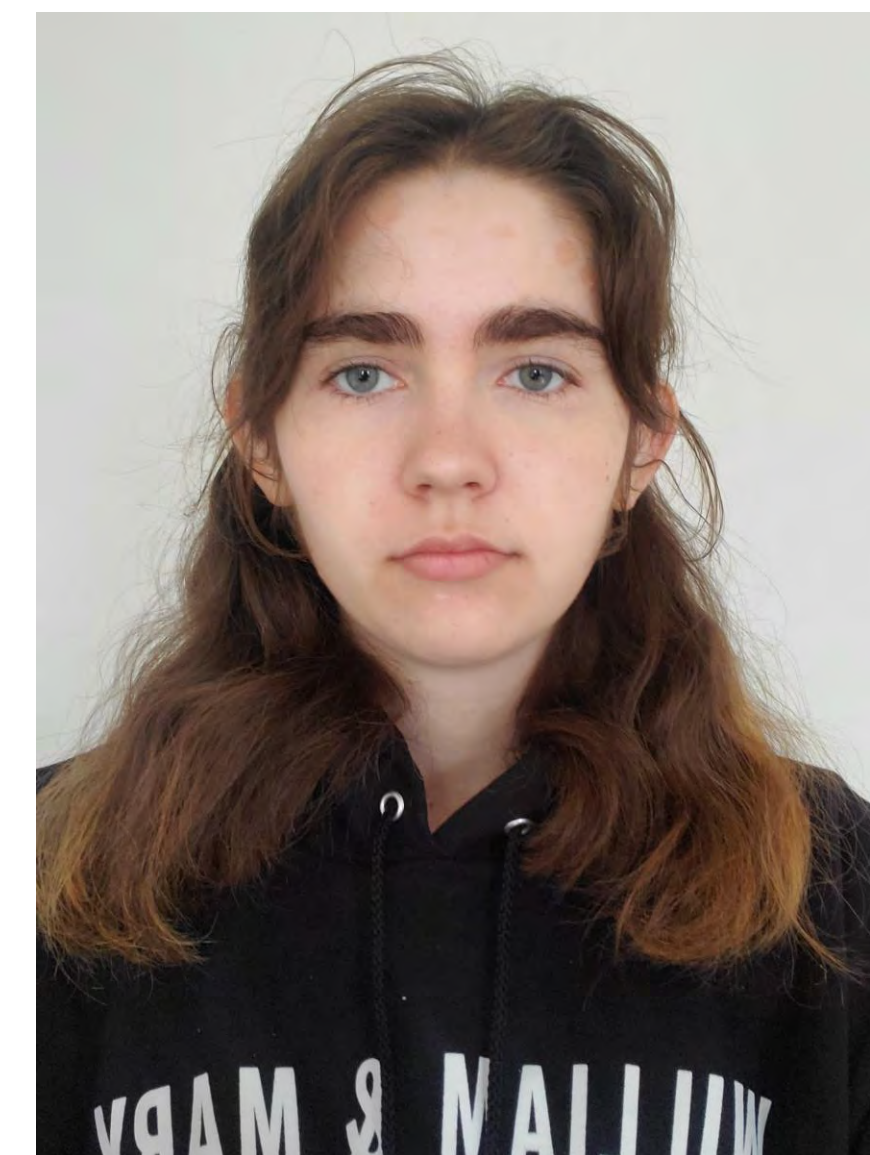
## Course format

The program's weekly meetings are held virtually on Zoom (Monday nights, from 7-9 EST), where the first hour is dedicated to reviewing the online coursework and learning about current amateur radio events and projects. The second hour of the meetings is dedicated to professional development and cohort building. During these sessions, students are introduced to various guest speakers which have previously included Arthur Clemons (N8BLK) from GLAARG, Brenda Muhammad (KD2UCQ), and Dan Romanchik (KB6NU). Also, during the second hour of the program, peer mentors led cohort-building exercises, which included small group discussions on the students' interest in amateur radio and future goals.



In addition to virtual meetings, every week students completed readings from the ARRL manual and online assignments. These assignments ranged from programming radios to safety training in the context of amateur radio. Throughout the coursework, students were given interactive materials to aid in their studies and acquire hands-on experience. These materials included an introductory electronics kit, a Morse code key, a multimeter, soldering equipment, among other supplies.

## Student Experience



Erin McDonald (KQ4IES)  
Junior, William & Mary

Despite knowing practically nothing about amateur radio prior to starting the Exploring the Electromagnetic Spectrum program, Erin has since acquired their Technician's and General class licenses. Erin is currently working on taking the exam for the Extra license. They were part of the first cohort of students and are now working as a peer mentor for the second cohort. They didn't expect to end college with an amateur radio license, but they are very happy that they have. They have particularly benefited from this program because much of the information important for amateur radio is relevant to their physics major and personal interest in astronomy.

Majoring in Business Management with a minor in dance, Nejon was a member of the first cohort of Exploring the Electromagnetic Spectrum. Prior to joining the cohort, he had no experience in ham radio and limited experience in the electromagnetic spectrum. Since joining, Nejon has learned more about the importance of community, gained much insight on the electromagnetic spectrum, and is a General Class licensee. Nejon plans to spread more word about the program in the future, and encourage more students to become hams.



Nejon McBride-Stubbs (KJAXD)  
Senior, Prairie View A&M University



Abigail Swanberg (KQ4MHA)  
Junior, William & Mary

Abigail is a part of the second cohort of the program which they were introduced to by Erin McDonald. Abigail's first experience with Amateur Radio was with her grandfather as a young child. Although she studies history and has not studied physics beyond one class in high school, this program has still been easy to comprehend and learn from. She received her Technician class license last November and now plans to test for her General class license in April. "I love that through this program I am meeting other people my age who are interested in Ham Radio. Before this program, I did not know anyone close to my age who shared my identities and was also interested in Amateur Radio."

## Future of the program and lasting impact

The Exploring the EMS program helped several students achieve their licenses and in accordance with their goal of promoting marginalized identities in radio. Eight students in the first cohort were a part of the LGBTQIA community, seven of the participants were racial or ethnic minorities. Roughly half of the students in the second cohort are LGBTQ and the overwhelming majority are racial or ethnic minorities. At this point, most of the students in the second cohort of the program have received their technician's license and are about to test for the general license. From the first cohort, two students continued on and achieved their general license.

The goal of this program is to develop a curriculum that can be widely used by other clubs as well as being particularly targeted for colleges and universities. While there are many existing online resources for those hoping to pass the radio certification exam, there are few resources that take as holistic of an approach as this program. In addition to teaching about the material on the certification exam, this program details the various ways that hams actually use their licenses, youth involvement in radio, how to stay safe on the air, and different ways to get involved within our local communities.



## Acknowledgements

There were several organizations that made this program possible.

