2024 Workshop: CEDAR Maker's Club

Long title
CEDAR Maker's Club - Exchanging designs, code, operating procedures, and hacks useful for CEDAR experimental science
Conveners
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Description

This workshop will be devoted to exchanging ideas for in-house designs/builds/hacks of CEDAR-relevant equipment and technology – instruments or instrument components, optical designs, circuit designs, micro-controllers, antenna designs, 3D printable parts, analysis codes, cloud sensors, etc. Student designs and student builds are especially encouraged. We anticipate presentations that showcase technology developed by CEDAR experimenters, and that may be useful to others in the community. Where appropriate, presenters could bring along physical examples of devices they've built for a CEDAR application. Presenters would be encouraged to submit their designs and application notes to a shared repository that other CEDAR users can access.

Zoom Link: https://alaska.zoom.us/j/9977790550

Agenda

1. Mark Conde: Intro; Discussion of intellectual property considerations regarding Maker's Club designs.
2. Austen Cohen: Space Weather Underground Project - low cost magnetometer and all-sky camera instruments.
3. Kristina Lynch: Use of Arduinos as a platform for multiply-replicable sensor base.
4. Kylee Branning: Redesign of interferometer optical components to exploit new possibilities enabled by 3D printing.

5. Jeff Baumgardner: Removal of Vignetting in All-Sky Camera Images
6. Gareth Perry: HamSCI’s magnetometer project.
7. Alexander Papadopoulos (student): Using Narrowband Chirps Transmitted through Convention HF Amateur Radios to Measure Changes in Ionospheric Reflection Height
8. Gerard Piccini (student): A Low-Cost Low-Power Chirp Ionosonde for Studying Eclipse Ionospheric Impacts
9. John Swoboda: SDR resources & tools, and a small radio telescope at MIT Haystack observatory.
10. Cuong Nguyen (student): Hardware and Software Development of the HamSCI Grape 2 HF Ionospheric Doppler Receiver
11. Nathaniel Frissell: Multi-Band GNSS-Disciplined WSPR and HF Doppler Ionospheric Observations Using the RX-888, KA9Q-Radio, WSPRDaemon, and the WSPRSonde

Justification

CEDAR has a long tradition of observational and experimental science, which this workshop aims to strengthen by fostering collaboration between experimental groups. Modern techniques like 3D printing make it easy to share designs between groups, allowing for higher levels of collaboration and, ultimately, for more science to be done. A second (but equally important) objective is to provide another forum where students can showcase their skills. Students working on observational programs often acquire the type of mixed science and engineering skills that are much sought after in the job market. The CEDAR Maker's Club would be an ideal way for students to learn these skills (by constructing components from existing shared designs) and to advertise their ability to create new solutions.

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