

# NEROC Seminars and Public Outreach– the Potential ....

**Anthea Coster, Haystack Observatory**

**Silas Laycock, UML**

**Patricia Doherty, Boston College**

**Jens Kauffmann, Haystack**





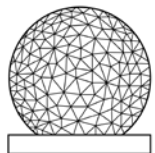
# UML Outreach Programs – Silas Laycock

Potential to increase NEROC outreach



# Open Radar Workshop - April 2017

## Funded by Facility Outreach



**MIT**  
**HAYSTACK**  
**OBSERVATORY**



# Involvement in Schools for Developing Countries



**2014, 30 June – 11 July; African School on Space Science: Related Applications and Awareness for Sustainable Development of the Region, Kigali (Rwanda),** Directors: C. Amory, P. Doherty, B. Nava, S. Radicella and J. Uwamahoro.

**2015, 2-13 March; Workshop on Ionospheric Effects on SBAS and GBAS Applications at Low Latitudes, Trieste,** Directors: S. M. Radicella, P. Doherty, B. Nava.



**2016, 20 June - 24 June; Use of Ionospheric GNSS Satellite Derived Total Electron Content Data for Navigation Ionospheric and Space Weather Research, Trieste.** Directors: S.M. Radicella, P. Doherty, B. Nava.

**2017, 22 May – 2 June; Extended Workshop on Space Weather Effects on GNSS Operations, Trieste,** Directors: S.M. Radicella, P. Doherty, B. Nava.

# Incoherent Scatter Radar Schools



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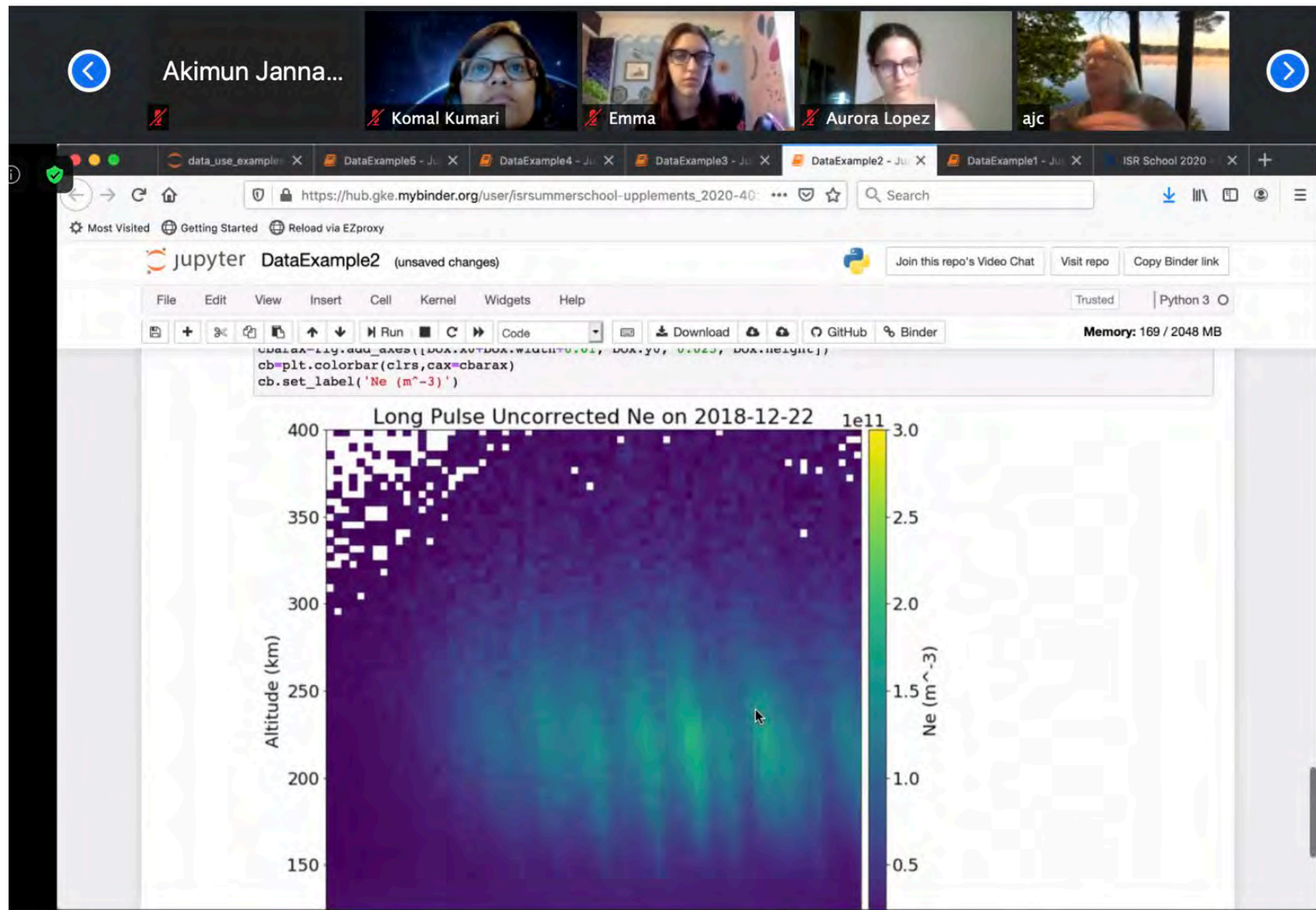
**All of these workshops were held on-line this year**



# On-Line Open Radar Course



# ISR Workshop augmented by Jupyter Notebooks (John Swoboda)



The screenshot displays a Jupyter Notebook interface within a web browser. At the top, a video conference window shows four participants: Komal Kumari, Emma, Aurora Lopez, and ajc. The browser address bar shows the URL [https://hub.gke.mybinder.org/user/isrsummerschool-upplements\\_2020-40...](https://hub.gke.mybinder.org/user/isrsummerschool-upplements_2020-40...). The notebook title is "DataExample2 (unsaved changes)". The code cell contains the following Python code:

```
cb=ax-11y.add_axes([box.ax,box.widht,box.yv, box.hght])  
cb=plt.colorbar(crs,cax=cbarax)  
cb.set_label('Ne (m^-3)')
```

The plot below the code is a heatmap titled "Long Pulse Uncorrected Ne on 2018-12-22". The y-axis is labeled "Altitude (km)" and ranges from 150 to 400. The x-axis is labeled "Ne (m<sup>-3</sup>)" and ranges from 0.5 to 3.0. The plot shows a color gradient from dark purple (low Ne) to yellow (high Ne), with a prominent vertical band of higher Ne values around 250 km altitude.



# ISR Workshop

Speaker View

Elizabeth Kendall

Bill Rideout

Selvaraj

mahith

Teddy Braden

Akimun Jannat Alvina

Jules

Roger Varney

Joshua Semeter

Philip J Erickson

Komal Kumari

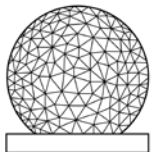
Ashton Reimer

Emma Mirizio

ajc

Aurora Lopez

Gilda González



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OBSERVATORY

# 2020 REU projects

- **The Polar Vortex's Effects on TIDs**  
*Izzi Ariail, University of Oklahoma \*
- **LEGO: Using Dark Clouds in the Milky Way to Understand Distant Galaxies**  
*Amanda Broadmeadow, University of Rochester*
- **Seismo-geodetic Data Processing for Cryospheric Applications in the Arctic and the Antarctic**  
*Emma Chickles, Wellesley College*
- **Small Radio Telescope 2020**  
*Blaine Huey, Rensselaer Polytechnic Institute*
- **MOXIE**  
*Gavin Kohn, University of Maryland (*
- **AERO-VISTA Interactive Spectrogram Display**  
*Andrew Langford, University of Notre Dame*
- **AERO-VISTA Satellite Dashboard**  
*Emily Mattle, Morehead State University*
- **A Multifrequency Collimation Profile Analysis of the 3C279 Jet**  
*Christopher Nadeau, University of Rhode Island*
- **Observing Black Holes with the Event Horizon Telescope**  
*Catherine Petretti, Villanova University*
- **Software Support for GNSS Total Electron Content (TEC)**  
*Brenna Royersmith, University of Colorado–Boulder*



# NEROC can fill a critical gap in hands-on training of astronomers (Jens Kauffmann)

NEROC members build cutting-edge radio research instrumentation (e.g., Haystack, SAO, UMass), they operate world-class interferometers (e.g., SMA), VLBI experiments (e.g., EHT and VGOS), single-dish telescopes (i.e., LMT), and radio experiments (e.g., EDGES). It might be interesting to build a “graduate school for radio astronomy” (e.g., in form of a summer camp) with numerous opportunities for hands-on training with telescopes, instrumentation, and techniques (single-dish, interferometer, VLBI) at the various NEROC institutions.