2025 Workshop: Snakes on a Spaceship

Long title
Snakes on a Spaceship: The Menagerie
CEDAR-GEM
Conveners
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Description

The pursuit of system science requires integrating measurements from multiple platforms into a coherent system for analysis. The variety of instrument types and data formats makes this challenging. Typically these challenges are solved separately by different research teams, leading to duplicated efforts. The reproducibility of scientific results are also affected, since most journal articles do not include complete analysis descriptions. The study of the magnetosphere and the ionosphere as a system would be enhanced if solutions to these problems were made broadly available to the community.

This year, 'Snakes on a Spaceship' will focus on Python packages developed by and for the CEDAR and GEM communities and a tutorial on unit tests.

Agenda

1. Introduction
2. Tutorial
3. GCMprocpy
4. RBinvarientslib
5. kaipy
6. pyDARNio updates
7. pyAuroraX and more

8. Discussion

Join us in person or virtually

Topic: Snakes on a Spaceship 2025
Time: Jun 23, 2025 04:00 PM Central Time (US and Canada)
Join from PC, Mac, Linux, iOS or Android:
https://asu.zoom.us/j/82104854913?pwd=8emIX9UiFDBV3UdkfngqNqqBs50ru9.1
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US: +1 971 247 1195 or +1 213 338 8477 or +1 253 215 8782 or +1 346 248 7799 or +1 602 753 0140 or +1 669 219 2599 or +1 669 900 6833 or +1 720 928 9299 or +1 267 831 0333 or +1 301 715 8592 or +1 312 626 6799 or +1 470 250 9358 or +1 470 381 2552 or +1 646 518 9805 or +1 646 876 9923 or +1 651 372 8299 or +1 786 635 1003
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International numbers available: https://asu.zoom.us/u/klpm8ZOdk
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File upload
2. Python Tutorial - Leslie Lamarche (1.27 MB)
3. GMCprocpy - Nikhil Rao (4.55 MB)
4. rbinvarientslib - Daniel da Silva (1.96 MB)
5. Kaipy - Mike Wiltberger (7.04 MB)
6. Accelerating SuperDARN File I/O with Rust - Remington Rohel (763.31 KB)
7. PyAuroraX, and more - D. Chaddock (5.85 MB)
8. Slides of individual packages shown during discussion. (4.87 MB)
All: Transcript from Online Interface. (234.38 KB)
Justification

This workshop addresses the CEDAR strategic thrust #6: manage, mine, and manipulate geoscience data and models. This will be the 11th annual CEDAR Snakes on a Spaceship workshop, and provides a meeting place for researchers of different career levels and programming experience to meet, learn from each other, and build collaborations around the data methods and analysis tools they develop to tackle

scientific problems. The tutorial (hosted in the workshop session) addresses the topic brought up most in last year's discussion portion of the session, where the importance of unit tests (and barriers for their development) were discussed at length.

Summary

CEDAR 2025 Snakes on a Spaceship Summary

1. Introduction
2. Tutorial - Production Software and Git
3. GCMprocpy
4. RBinvarientslib
5. kaipy
6. pyDARNio updates
7. pyAuroraX and more
8. Discussion

This was a joint session with the GEM Modeling, Methods, and Validation (MMV) focus group. It included a tutorial on using git and transitioning from writing software for your own personal research to more production codes that are required to be more robust. It included five presentations introducing specific python packages to the community that are generally useful to the CEDAR-GEM community. Following this, there was a discussion of strategies for using limited datasets for validating modeling, particularly of extreme events. We also discussed general open source software issues in the community, including institutional barriers and how making software projects open source early in development is often easier than transitioning them later.

Related to CEDAR Science Thrusts:
Manage, mine, and manipulate geoscience/geospace data and models
Workshop format
Short Presentations
Round Table Discussion
Other
Keywords

Reproducibility, data access, data analysis, software
Focus Group and Group Leader

Modeling Methods and Validation - Alexa Halford (discussed joint session), Liemohn, Lutz Rastaetter, and Josh Rigler

List GEM Focus Groups (if any) you wish to avoid being in concurrent sessions with (due to overlapping research interests)
Machine Learning
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