# Community Planning

NASA Heliophysics is starting a series of discussions around Python software development for heliophysics, space physics, and planetary science, in order to coordinate our efforts, identify potential collaborations, establish software standards and conventions, ensure interoperability, and so on. We'll be holding a telecon in the next few weeks to start discussing topics such as establishing development standards and a standard set of Python libraries, and to begin planning for a conference to be held at CU-Boulder this October.

If you're interested in joining this effort, please email **alex.dewolfe@lasp.colorado.edu** to be added to the mailing list.

AGU 100 ADVANCING EARTH AND SPACE SCIENCE | FALL MEETING Washington, D.C. | 10–14 Dec 2018

SESSION PROPOSAL

## IN005: Application Development in Python for Solar and Space Physics

Submit an Abstract to this Session

Numerous software projects in various branches of astronomy are being developed in or converted to the Python programming language. The solar and space physics communities have begun coordinating related software development efforts. We are working to establish standards and processes, share lessons learned, reduce the incidence of duplicated efforts, identify opportunities for future collaboration, and ensure that existing software tools are interoperable and widely available. This session invites contributions from Python software projects across the Heliophysics and Space Science communities, discussing all aspects of software development for these fields.

AGU On-Demand

**SWIRL Theme**: Data & Emerging Technologies

### Primary Convener

Alexandria W DeWolfe
*University of Colorado at Boulder*

### Conveners

D Aaron Roberts
*NASA Goddard SFC*

Stuart Mumford
*University of Sheffield*

Alexa Jean Halford
*Aerospace Corporation Chantilly*

### View Related Events

**Section:** Earth and Space Science Informatics

**Neighborhoods:** 1. Science Nexus

**AGU On-Demand:** Yes

**SWIRL Themes:** Data & Emerging Technologies

**Cross-Listed:** SM - SPA-Magnetospheric Physics

**Cross-Listed:** SH - SPA-Solar and Heliospheric Physics

**Cross-Listed:** SA - SPA-Aeronomy

**Co-Organized:** SH - SPA-Solar and Heliospheric Physics

# Data Access and Analysis

## Models

- amiepy
- OvationPyme
- pyglow
- analysator
- pyAMPS

## Observations

- DaViTpy/pyDARN
- GeoData
- HelioPy
- MadrigalWeb
- pySat
- signal-chain

## Analysis

- pyLTR

## Files

- pysatCDF
- digital_rf

## Coordinates

- AACGMV2
- apexpy
- OCBpy
- python-magnetosphere

## Multipurpose

- AstroPy
- SpacePy
- SunPy
- geospacepy
- PlasmaPy

## Orbits

- SpiceyPy
- PyEphem
- sgp4
- skyfield and jplephem

## Heliophysics Field Key

- Sun/Solar Wind
- Magnetosphere
- Ionosphere/Thermosphere/Mesosphere
- Other

# Challenges (opportunities) for data-driven approach to multi-scale studies



## Data `wrangling'

- Often the most time consuming portion of research
- 'Re-inventing the wheel' and a lack of re-usability of analysis tools and prepared data

## Handling the diversity of data

- Uncertainties need to be robustly incorporated into analyses
- Requirement to perform robust multi-observation studies and for model-data fusion

## Available and transparent analysis tools

- Critical to facilitate interdisciplinary collaboration
- Conducive to more rapid progress

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SESSION PROPOSAL

# SM022: The Application Usability Level (AUL) framework: a standard measure of progress to benefit heliophysics research, and the needs of our society.

Submit an Abstract to this Session

This session will report on the ongoing efforts from the International Forum for Space Weather Capabilities Assessment and other groups, as well as bring research communities together to discuss current efforts, successful approaches, and lessons learned in building and applying validations and metrics. We invite papers which utilize the recently developed Application Usability Level (AUL) framework to measure a project's progress towards specific applications, including metrics, and verification processes implemented, and how they address the needs of the identified user. A panel session will be held to showcase examples of projects utilizing the AUL framework, followed by a discussion the importance of communication and having the effort directed by an user's needs. The session will highlight efforts in research to operation and operation to research, and demonstrate how this is a two-way street which advances knowledge for research and increases the efficiency and effectiveness of efforts to directly benefit society.

AGU On-Demand

## Primary Convener

Adam C Kellerman
*University of California Los Angeles*

## Conveners

Jeffrey Klenzing
*NASA Goddard Space Flight Center*

Alexa Jean Halford
*Aerospace Corporation Chantilly*

## View Related Events

**Section:** SPA-Magnetospheric Physics

**Neighborhoods:** 4. Beyond Earth

**Alternate Session Format:** Panel Format

**AGU On-Demand:** Yes

**Cross-Listed:** SH - SPA-Solar and Heliospheric Physics

**Cross-Listed:** SA - SPA-Aeronomy

**Cross-Listed:** IN - Earth and Space Science Informatics

**Co-Organized:** SA - SPA-Aeronomy

# Upcoming Sessions

Tuesday 12:00, Zia/Eldorado: student boxed lunches w panel
- Michael Hirsch will talk about Git, data curation, and continuous integration

Tuesday 1:30, Zia/Eldorado: Next generation CEDAR science

Thursday 1:30, Zia/Eldorado: Exploring the challenges related to "Big Data" in CEDAR science