

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.dewolf@lasp.colorado.edu to be added to the mailing list.

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

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Cross-Listed: [SM - SPA-Magnetospheric Physics](#)






Cross-Listed: [SH - SPA-Solar and Heliospheric Physics](#)

Cross-Listed: [SA - SPA-Aeronomy](#)







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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

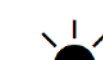


Multipurpose

- 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



Multi-scale geospace - Data-driven approach - GC from the data perspective

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

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