2021 Workshop: Model software engineering

Long title
Model software engineering
Conveners
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Description

This session discusses results and tutorials connecting open-source and black-box models together for science closure, data analysis and instrument design. Sessions will demonstrate:

- compiled languages working together with scripted languages
- platform-agnostic build systems
- transitioning models from PI team to general science public users
- success stories from recently funded projects (e.g. NASA ROSES HDEE, E.7)

Agenda

- brief introduction
- Kamodo (R. Ringuette, NASA GSFC)
- portable library development (J. Haiducek, NRL)
- Fortran to Python porting: EmmPy (G. Stephens, JHU-APL)
- flipchem: An ion density calculator via Python wrapped C and Fortran (pdf) (A. Reimer, SRI)
- modern Fortran: stdlib, IDE, packaging (Ondřej Čertík, LANL)
- Tutorial: Version control (Git) and CI (GitHub Actions) for multi-institutional teams
- Group discussion

Justification

ST #5: Fuse the Knowledge Base across Disciplines

Bridge the gap between software engineering and physics to help make models more accessible. Show how to integrate restricted license software in an open-

source package. Metrics include increased number of modelers sharing core functionality of their model, and enhancing model connections to CEDAR and the Python Heliophysics community.

ST #6: Manage, Mine, Manipulate Geoscience Data and Models

When users don't have to rely on the PI team to get started with a model, this accelerates science discovery. Encourage example gallery codes and videos for the models. Metrics include mining papers for citations / keywords used such as links to software repos used, which can themselves be mined for use of continuous integration tools, build system type and specific software libraries.

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