

# 2020 Workshop: Model systems engineering

Long title

Model systems engineering: connecting models for discovery

Conveners

Michael Hirsch

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Description

This session seeks to connect the power of models that may have limited public access to the broader community. This increases the rate of science discovery and value to the funding agencies. Sessions will demonstrate:

- connecting models to modern scripting languages such as Python
- improving build systems so it takes minutes instead of a day to do first model setup
- calls for community involvement to help make a model more ready for public consumption

Justification ST #5: Fuse the Knowledge Base across Disciplines

- Encourage modelers who straddle the gap between software engineering and physics to make their models more accessible by joining forces with Python veterans
- Demonstrate ways to make models that are used in non-public applications modular enough to be publicly shared, while able to plug in non-public modules
- Progress is measured over the next year or so by increased number of modelers sharing core functionality of their model, and enhancing model connections to the Python data scientists

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

- For many models, not having to rely on the PI or their delegate accelerates science discovery
- Junior scientists can help develop example codes and videos for the models, greatly raising awareness, science output and value to funding agencies

- Progress might be measured by 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

## Agenda

- 3:00 - 4:05: Applications
  - 3:00 - 3:05: brief introduction
  - 3:05 - 3:20: [Resen: REproductive Software ENvironment](#) (pdf) (Pablo Reyes)
  - 3:20 - 3:35: Melding ISR data into GITM (Doga Ozturk)
  - 3:35 - 3:50: 3D Matlab visualization techniques for modeled atmospheric dynamics (Jaime Aguilar)
  - 3:50 - 4:05: [Modeling Voltage Level Data for Geospace Sensors](#) (pdf) (John Swoboda)
- 4:05 - 4:45: Tutorials (Michael Hirsch, Matthew Zettergren)
  - 4:05 - 4:15: Using Git and CI to connect, collaborate, integrate and test disparate geospace models
  - 4:15 - 4:25: Using CMake to connect multi-language and multi-repo models across computing platforms
  - 4:25 - 4:35: PyGemini examples and status update
  - 4:35 - 4:45: Managing Development of a Large Physics-Based Geospace Model
- 4:45 - 5:00: Community discussion and next steps

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