2013 Workshop: Systems theoretical approach

Long title
System-Theoretic approach to CEDAR science
Conveners
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Description

This workshop will address the need, raised in CEDAR/NewDimension strategic thrusts #1 and #6, for the integration of "systems science" approaches in order to meet the future challenges of the CEDAR community. A tutorial followed by a few brief application presentations will prepare attendees to understand and participate in a panel discussion and forum on the potentials, challenges and effective application of system theory and systematic inference methodologies. The goal is to entice and inspire scientists in the CEDAR community to bring this new perspective to their own science questions, and to share processes of formulating questions and approaches that incorporate system theory.

The session will begin with an introduction to terms and methodologies of system theory and inference approaches (Part I). Three short talks will then cover examples of specific applications to demonstrate the potential and bottleneck issues of applying system science approaches to CEDAR science questions (Part II). Finally, an open discussion will be a forum on the potential and effective application of systems science approaches to address outstanding CEDAR science questions (Part III).

Agenda

Part I

-- Overview of system theory fundamentals and relevance to geospace science -- by Farzad Kamalabadi

Part II

-- System science with stochastic differential equations -- by David Hysell

-- Data assimilation and ensemble modeling for system science -- by Tomoko Matsuo

-- Selected topics in geospace systems science(1) -- by Josh Semeter

Part III

-- Open Discussion

(1) Examples related to geospace plasma circulation and solar wind energy transfer are used to illustrate the need for distributed sensing, long-term data collection, and a systems theoretic approach.

Justification

CEDAR/NewDimension emphasizes the need of a systems approach to meet the future challenges of the CEDAR community. This workshop particularly addresses concerns raised in CEDAR/NewDimension strategic thrust #1 and #6. The aim of the tutorial/panel discussion format workshop is to create a place of forum to discuss the potential and challenges of applying systems theory and inference methodologies (such as data assimilation and inverse methods) to address outstanding CEDAR science questions. We hope to somehow inspire and entice the CEDAR community into casting their own science questions in new perspectives by sharing processes of identifying questions and formulating systems theoretical approaches.

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