# MultiSector Dynamics Community

## Welcome to the newsletter of the MultiSector Dynamics Community

Hello MultiSector Dynamics (MSD) Community! Welcome to our second newsletter. Our community's newsletter will be published on an as-needed basis to communicate items of general interest. In this issue we introduce the newly established Scientific Steering Group (SSG) and Working Groups (WGs).

www.multisectordynamics.org

## Introducing our Scientific Steering Group (SSG)

The MSD community has been emerging over time through projects sponsored by the Department of Energy's MSD program, cross-project collaborations, discussions at scientific meetings, and community development activities. We have established a SSG to accelerate this process and to help generate a vision for MSD as a global research area. The SSG will actively aid the MSD community in the following ways:

- helping to clarify key research questions
- aiding in establishing and fostering synergies across scientific WGs
- shaping a strategy for growing the global MSD community.

The SSG is one of four core elements of the "MSD community leadership", which include the SSG, the Principal Investigators advisory group, the sponsor consultation group, and the MSD community facilitation team. The inaugural SSG members were nominated and selected through consensus by the facilitation team, the sponsor consultation group, and the Principal Investigators advisory group.

The membership is comprised of:

<u>At-large members</u>: The SSG has started with six "at-large" members who will serve for three-years. At-large members will not have direct leadership roles in WGs.

<u>WG representative members</u>: The SSG will have up to four representative members from WGs (one per WG) who will serve for two years and whose terms shall begin as soon as possible after a WG is established. Now that initial WGs have been established by the SSG, their representatives are being added to the SSG.

<u>Leadership</u>: Two members of the SSG will be designated as Co-Chairs who share in leadership and facilitation of SSG activities.

## Current at-large members:

**Nathalie Voisin, Co-Chair, *Pacific Northwest National Lab (PNNL)***

Nathalie's research focuses on better understanding and predicting the inter-dependencies between land-water systems' resilience and power systems' resilience. Her work focuses on improving the representation of hydro-climate constraints and opportunities in power system models, advancing the prediction of climate-water-land processes, and coupling water and power management models across spatial and temporal scales.

**Klaus Keller, Co-Chair; *Penn State University***

Klaus' research addresses two interrelated questions. First, how can we mechanistically understand past and potentially predict future changes in the Earth system? Second, how can we use this information to design defensible risk management strategies? He analyzes these questions by mission-oriented basic research covering a wide range of disciplines such as Earth system science, economics, engineering, philosophy, decision science, and statistics.

**Jordan Macknick; *National Renewable Energy Lab (NREL)***

Jordan's research explores the co-evolution of the energy sector alongside water resource, climate, land-use, and agricultural dynamics. His work analyzes national and regional implications of different energy pathways in the context of water and land resource constraints, evaluates opportunities to improve the energy management and resilience of water infrastructure, and explores innovative approaches to integrating renewable energy and agricultural operations.

**Jennifer Morris; *Massachusetts Institute of Technology (MIT)***

Jennifer's research focuses on uncertainty analysis, energy-economic modeling and coupled human-natural systems. Her uncertainty-related work involves uncertainty quantification, risk assessment and applying different approaches to represent uncertainties in models and explore how they impact near-term decisions. A key focus is investment planning for energy, water and coastal adaptation.

### Robert Link; *Joint Global Change Research Institute (JGCRI)*

Robert's research focuses on how human activities affect Earth systems and how they are in turn affected by changes in climate and other natural systems, using a suite of physical and economic models. He is a computational scientist and applied mathematician with specific interests in parallel programming, high-performance computing, numerical analysis, and Markov chain Monte Carlo methods.

### Megan Konar; *University of Illinois, Urbana-Champaign*

Megan's research focuses on the intersection of water, food, and trade. Her research is interdisciplinary, drawing from hydrology, environmental science, and economics. To pursue her research questions, her group uses a range of quantitative tools, such as data analytics, network analysis, and econometrics.

## Introducing three MSD Working Groups (WGs)

Topically-focused working groups can accelerate collaboration and scientific progress and have been under discussion by researchers working on MSD research themes for a long time. Establishing such groups emerged as a priority in discussions about the formation of a formal MSD community in 2019. Alongside the potential benefits, creating WGs and maturing them into productive activities takes energy, resources, and strategy.

In October 2019, a call for proposals was circulated to MSD community members for WGs. In response, 11 WG proposals were received, representing a strong level of interest and enthusiasm. The proposals were reviewed by the SSG for their: i) scientific priority and merit, ii) the potential for capacity building, and iii) potential for leveraging resources. These criteria were evaluated based on the proposals, including each WG's vision and scientific questions, proposed deliverables, and plans for communication and outreach.

Based on strong interest from the community, another call for WG proposals will be held in 2020, most likely in June. This additional cycle will enable the community to establish 1-2 additional WGs. Those who have already submitted proposals or may have interest in developing new teams are welcome to interact reach out to the SSG and facilitation team for more information. We strongly welcome the groups to submit new or revised proposals. We will share information on this opportunity later this spring, after we have a chance to get additional feedback from the MSD Community.

Three initial WGs were selected and are presented below. More information on each WG can be found on the MSD Community's website.

## Facilitating FAIR data

### Description

Data plays a critical role in the MSD community. It is used for a variety of purposes including model formulation, forcing, and evaluation as well as empirical analyses. One component of an effective community of practice is leveraging shared tools and resources. The purpose of this working group is to facilitate the reuse of datasets across the MSD community by providing mechanisms to inventory currently available datasets, advertise new datasets, and enhance the way datasets are documented and archived. The working group will help the MSD community adapt the FAIR (Findable, Accessible, Interoperable, and Reusable) data standards.

### Co-chairs



**Casey Burleyson, Pacific Northwest National Lab (PNNL)**

**Adam Schlosser, Massachusetts Institute of Technology (MIT)**

## Human system modeling

### Description

The Human System Modeling working group explores state-of-the-art modeling methods that can improve representation of human decision making and adaptation in multisector systems, drawing from advances in economics, social sciences, computer science, and statistics. We investigate a range of modeling techniques (e.g., agent-based, bioeconomic, computable general equilibrium, etc.) and their integration with physical energy-water-land models for capturing human response to both natural and socioeconomic stressors under short-term shocks and long-term change.

### Co-chairs



**Jim Yoon, Pacific Northwest National Lab (PNNL)**

**Nathan Urban, Los Alamos National Laboratory (LANL)**

## Uncertainty quantification and scenario development

**Description**

The Uncertainty Quantification and Scenario Development working group studies the propagation of uncertainties, including deep uncertainties, through multisector systems. We are interested in understanding how uncertainty interacts with complex system dynamics and cross-sectoral feedback mechanisms to affect the robustness and resilience of these systems. We also conduct research into the construction of scenarios to capture the range of uncertainties in outcome space in the presence of deep uncertainty.

**Co-chairs**



**Vivek Srikrishnan, Pennsylvania State University**

**Jonathan Lamontagne, Tufts University**

# Next webinar

We are organizing our third community webinar to take place in the next couple months. The webinar will introduce the SSG to the community, as well as the three selected WGs. In the meantime, you can read about the past webinars and download materials on our website.

This newsletter is composed and distributed by the MSD community facilitation team. If you would like to provide any feedback or be excluded from any future communications, contact us here.