MultiSector Dynamics Community

Welcome to the newsletter of the **MultiSector Dynamics Community**

INSIDE THIS ISSUE

Hello MultiSector Dynamics (MSD) Community!

In this issue, we are focusing on the MSD sessions in the 2022 AGU Fall Meeting where the August 3rd abstract submission deadline is approaching quickly! Check out our feature profile on Travis Thurber, a software engineer at Pacific Northwest National Lab (PNNL). You will also find some recent publications, job postings, and information about upcoming key events being organized by the MSD Community of Practice.

www.multisectordynamics.org

2022 Request for Proposals for new Multisector Dynamics Working Groups- Deadline Extended

Working Groups are a central component of the MSD Community of Practice, where researchers from different disciplines, projects and institutions coordinate and innovate MSD research around various science questions, themes, and methodological approaches as well as support community activities to grow the MSD CoP in a diverse, equitable and inclusive way. For more information on the current WGs, please visit the MSD CoP website (**https://multisectordynamics.org/working-groups/**). In this new RFP round, we expect to initiate 3 new Working Groups.

We are extending the deadline to submit proposals to Monday, August 15, 2022, 11:59 pm Pacific Time Zone. Proposals must be submitted through the MSD Working Group proposal 2022 online form (https://forms.gle/h4fU9jgKWkbJQDkn8)

To ensure coordination between proposals, and to avoid multiple proposals for similar WGs, we ask that you identify your new WG idea on the **Spring 2022 MSD WG proposals database** ahead of the

submission of your letter of intent. If you see that a similar WG proposal is already in development, please coordinate with that group.

Questions regarding MSD WG renewal proposals should be addressed to Erwan Monier (**emonier@ucdavis.edu**).

Key Upcoming Events

The MSD CoP is currently coordinating and planning a variety of 2022 calendar of community events for this upcoming fall.

August 2022: The MSD-LIVE team is excited for the v1.0 release of MSD-LIVE on August 15th. MSD-LIVE is a cloud-based data and computational platform that will enable MSD researchers to document and archive their data, run their models and analysis tools, and share their data, software, and multi-model workflows within the MSD Community of Practice. v1.0 of MSD-LIVE focuses on the data repository capabilities of the platform. Stay tuned for the announcement of a community-wide webinar in late August during which the team will demonstrate how to use the MSD-LIVE data repository.

September 2022: The Working Group on Uncertainty Quantification and Scenario Development will be hosting an uncertainty-focused webinar that will draw on their currently in revision Earth's Future MSD special issue review of challenges, needs, and opportunities for better addressing uncertainty in MSD research. The webinar will also announce free Fall online training sessions building on the recently released open-access eBook, '*Addressing Uncertainty in MultiSector Dynamics Research*', which includes cloud-supported Jupyter notebook tutorials.

October 2022: The Working Group on Human Systems Modeling will be hosting a webinar discussion of their human systems typology that is now published in Earth's Future MSD special issue. The webinar will discuss how the proposed typology lays an intellectual foundation for human systems modeling in MSD, helping cohere human systems modeling research across the MSD project portfolio and establishing a roadmap for future MSD research.

MSD Research Spotlight: **Travis Thurber**

As a software engineer in the MSD community, Travis focuses on enabling efficient, scalable, and reproducible modeling workflows for a broad range of research teams and experiments. This can range from writing highly parallelizable code for pre- and post-processing large unwieldly datasets to updating existing models with modern tools for portability and ease of use and creating websites that facilitate science communication and reproducible methodology.

Travis Thurber is a software engineer in the Earth Systems Predictability and Resilience group at Pacific Northwest National Laboratory. Prior to this role, Travis worked on medical record software at Epic Systems, provider- and patient-facing healthcare applications at Seattle Children's Hospital, and various technology startups. Travis earned a master's degree from the King Abdullah University of Science and Technology and a bachelor's degree from Columbia University, both in Mechanical Engineering with a focus on computational fluid dynamics.

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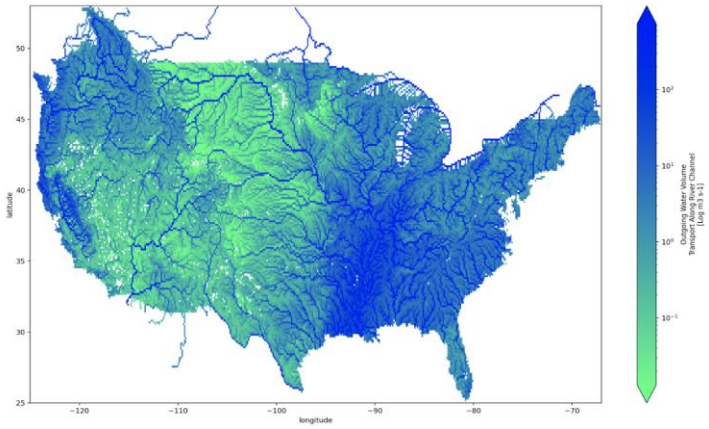
code for pre- and post-processing large unwieldly datasets, to updating existing models with modern tools for portability and ease of use, to creating websites that facilitate science communication and reproducible methodology. Any given day can see Travis pulled in multiple directions for tasks big and small; read on for a few examples!



As the current technical leader of the *mosartwmpy* large-scale water routing and management model, Travis is responsible for ensuring the model is performative, documented, and easy to use. Such considerations are critical in enabling a research team to consider thousands of model runs in an uncertainty quantification experiment. To facilitate ease-of-use and enable early career data scientists to contribute more easily, Travis translated *mosartwmpy* from the Fortran language into Python. During this translation, it was important not to lose out on the speed and performance offered by Fortran. To accomplish this, Travis implemented the *numba* library for harnessing the power of fast math in C within Python computational loops.

Access the eBook here

In an ongoing exploratory analysis experiment studying water availability in the Colorado basin, Travis developed a data transformation tool to reformat StateMod model outputs from a schema-less raw text format to a highly compressible, columnar data format known as *parquet*. The *parquet* schema is designed to enable running complex queries over multi-file datasets quickly and in parallel. While such a transformation is not particularly novel in the software engineering community, applying these techniques to a large ensemble exploratory analysis experiment enabled the research team to efficiently mine insights from the immense dataset; a task that would be nearly intractable with the original data format.

Finally, since he has a background in web app development, Travis is often called upon to assist in efforts of science communication. A recent example is the creation of an automated deployment pipeline using GitHub Actions for the *Addressing Uncertainty* eBook. This pipeline enables the authors to focus solely on developing and updating content, instead of spending time compiling restructured text or manually updating web servers. Instead, just click a button and moments later a new version of the book is minted, published, and live!

Highlighted Articles:

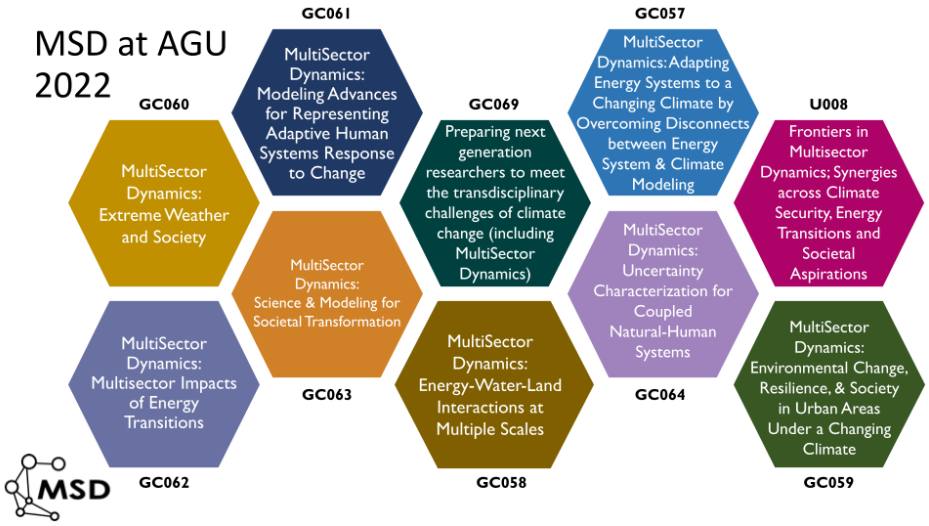
Thurber, T., Vernon, C., Sun, N., Turner, S., Yoon, J., & Voisin, N. (2021). mosartwmpy: A Python implementation of the MOSART-WM coupled hydrologic routing and water management model. Journal of Open Source Software, 6(PNNL-SA-161232).

Smith, A. D., Stürmer, B., Thurber, T., & Vernon, C. R. (2021). diyepw: A Python package for Do-It-Yourself EnergyPlus weather file generation. Journal of Open Source Software, 6(64), 3313.

Reed, P.M., Hadjimichael, A., Malek, K., Karimi, T., Vernon, C.R., Srikrishnan, V., Gupta, R.S., Gold, D.F., Lee, B., Keller, K., Thurber, T.B, & Rice, J.S. (2022). Addressing Uncertainty in Multisector Dynamics Research [Book]. Zenodo. https://doi.org/10.5281/zenodo.6110623

MSD Sessions at the AGU Fall 2022 Meeting

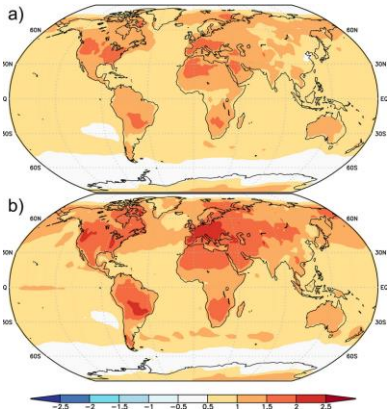
MSD will once again have a large footprint at the 2022 AGU Fall Meeting. We will be convening 1 Union Session and 9 Global Environmental Change Sessions shown in the table below. Links to submit an abstract are provided as well.



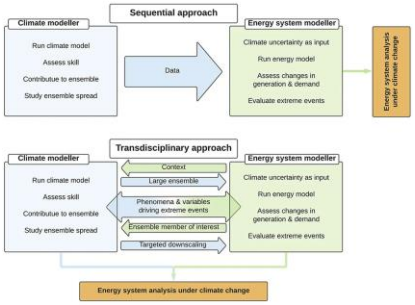
Session Title	Conveners	Link to Submit Abstract
U008 - Frontiers in Multisector Dynamics; Synergies across Climate Security, Energy Transitions and Societal Aspirations	Nathalie Voisin, Klaus Keller, Yoshihide Wada, Jan H. Kwakkel	https://agu.confex.com/agu/fm22/prelim.cgi/Session/158410
GC059 - MultiSector Dynamics: Environmental Change, Resilience, and Society in Urban Areas Under a Changing Climate	Bhartendu Pandey, Pouya Vahmani, Christa Brelsford, Deeksha Rastogi	https://agu.confex.com/agu/fm22/prelim.cgi/Session/160615
GC058 - MultiSector Dynamics: Energy-Water-Land Interactions at Multiple Scales	Zarrar Khan, Thomas Bernard Wild, Makoto Taniguchi, Edward Byers	https://agu.confex.com/agu/fm22/prelim.cgi/Session/157386
GC064 - MultiSector Dynamics: Uncertainty Characterization for Coupled Natural-Human Systems	Vivek Srikrishnan, Jonathan Lamontagne, Stefano Galelli, Riddhi Singh	https://agu.confex.com/agu/fm22/prelim.cgi/Session/157271
GC069 - Preparing next generation researchers to meet the transdisciplinary challenges of climate change (MultiSector Dynamics)	Ana Dyreson, Yiyun Ryna Cui, Morgan Edwards, Thomas Bernard Wild	https://agu.confex.com/agu/fm22/prelim.cgi/Session/159149
GC057 - MultiSector Dynamics: Adapting Energy Systems to a Changing Climate by Overcoming Disconnects between Energy System and Climate Modeling	Michael Craig, Ana Dyreson, Oriana Chegwidden, Julie K Lundquist	https://agu.confex.com/agu/fm22/prelim.cgi/Session/160453
GC061 - MultiSector Dynamics: Modeling Advances for Representing Adaptive Human Systems Response to Change	Jim Yoon, Patricia Romero-Lankao, Evelina Trutnevyte, Christian J. A. Klassert	https://agu.confex.com/agu/fm22/prelim.cgi/Session/159069
GC063 - MultiSector Dynamics: Science & Modeling for Societal Transformation	Patrick M. Reed, Jennifer F. Morris, Jan H. Kwakkel, Enayat Moallemi	https://agu.confex.com/agu/fm22/prelim.cgi/Session/156711
GC060 - MultiSector Dynamics: Extreme Weather and Society	Erwan Monier, Deeksha Rastogi, Gabriele Messori	https://agu.confex.com/agu/fm22/prelim.cgi/Session/156711
GC062 - MultiSector Dynamics: MultiSector Impacts of Energy Transitions	Stuart Michael Cohen, Michael Craig, Ana Dryeson, Jochen Markard	https://agu.confex.com/agu/fm22/prelim.cgi/Session/161607

MSD Publications

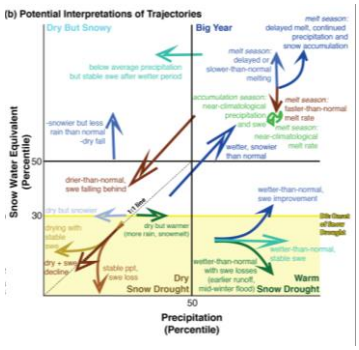
We have been posting and will be regularly updating select MSD publications on the website, under the Publications page. If you have any publications you would like us to highlight, please email contact@multisectordynamics.org.
Below you can find some of the publications posted most recently:



Attributing and Projecting Heatwaves Is Hard: We Can Do Better



Overcoming the disconnect between energy system and climate modeling



Monitoring the daily evolution and extent of snow drought

MSD Job Listings

Our website features a **careers page** that lists available MSD-focused positions at all levels. If you'd like to post a position to be featured in this page, please email us at: contact@multisectordynamics.org. Here are some of our latest postings:

Multiple engineer positions for the Bureau of Reclamation, a water and power management agency in the western U.S.

This posting is to fill multiple positions on the Colorado River Basin Research and Modeling Team stationed in Boulder, CO. Our team works on modeling and analysis to support near- and mid-term decisions as well as long-term planning for major Colorado River policies. We work with researchers to study climate change, forecasting, and decision science that can improve our tools and processes, ultimately supporting sound decisions and stakeholder needs.

Two Postdoc Positions in Climate Risk Management – Thayer School of Engineering, Dartmouth College

Two full-time postdoc positions are available at the Thayer School of Engineering at Dartmouth College to join the Keller research group. The successful candidates will become part of a transdisciplinary research group in the area of climate risk management.

This newsletter has been edited by Rohini Gupta and the Community of Practice Facilitation Team. This and all previous newsletters can be accessed at the Newsletters page of our website. If you have any suggestions, concerns or other feedback about this newsletter or the MSD website, please email contact@multisectordynamics.org.