

# TIES 2023 PLENARY PRESENTATION

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## **Systems Thinking to Break Down Barriers for Actionable Science and Technology**

### **Abstract**

Incredible progress has been made in recent years with the vast quantity of accurate and reliable Earth Observations (EO) data and tools to drive innovation and inform complex environmental problems—from climate and socio-economic modeling for disaster risk reduction (DRR) assessments, to ecosystem accounting (EA) that provides a GDP value frame for environmental services. High resolution satellite data allows temporal tracking of environmental trends with multi-terabyte cloud catalogs and AI-supported statistical cloud computing, providing a greater granularity of natural assets for decision-making. Yet, “despite commitments to build resilience, tackle climate change and create sustainable development pathways, current societal, political and economic choices are doing the reverse” (UN DRR, 2022). Creating system of systems—Systems Thinking—is critical, as more data isn’t necessarily moving the lever sufficiently toward better decision-making, achieving international climate goals, nor toward justice and equity. Systems thinking re-frames the perspective: the biggest modeling unknown is the knowledge systems itself that scientists are working within, and how to constellate to other knowledge systems. Bridging barriers between more than just statistics and environmental sciences, but between western and Indigenous sciences, is proving a critical reorientation to action scientific approaches. Working with communities that experience disproportionate effects of climate change and environmental injustice challenges can offer a radically different perspective; when people’s relationship to the land is about more than an essential part of their survival, but as intrinsic to their identities, this offers a shift in worldview that can accommodate a new set point and flourishing innovation. We live in times that demand more than an EO data infrastructure, but a just and relevant knowledge infrastructure, where community-level knowledge guides research and informs policy and decision support tools. Dr. Caudill will talk about Systems Thinking frameworks for de-siloing western sciences, bridging across sectors in society, and co-design principles that constellate worldviews.

## Biography



Dr. Caudill's research explores the use of Earth Observation (EO) and remote capacity-building and multi-sectoral decision-making processes—issues that intersect culture, climate change vulnerability, and environmental justice and conservation. Dr. Caudill received her PhD in Earth and Space Sciences (Remote Sensing) from Western Ontario. Prior to joining Carleton University as a Research Associate, she was a Visiting Research Scholar at NASA's Jet Propulsion Laboratory. Dr. Caudill's System Engineering work has gained NASA and CSA achievement awards for systems operations in space flight and terrestrial analogue missions. She received her Master's degree at the University of Arizona, where she worked in spacecraft operations at the Lunar and Planetary Laboratory, prior to managing a multi-million dollar DOE-funded geoinformatics grant as Deputy Section Chief at the Arizona Geological Survey. Dr. Caudill is a science policy advocate: an Advisory Board Member of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) Academic Network, as well as a working group member with the Group on Earth Observations Disaster Risk Reduction (GEO DRR) and the EOTEC DevNet (Earth Observation Training, Education, and Capacity Development Network). Dr. Caudill is also currently a Project Scientist on CSA's Lunar Rover Mission (LRM) and a PI on CSA National Community Consultation Reporting grant.