



## Participation Call for the [Math for Complex Climate Challenges Workshop](#) (May 1 - 4, 2023)

### Call for short talks, art projects, and Save the Date!

Building on two successful Fields Mathematics for Climate Change (MfCC) workshops held last year, the [Waterloo Institute for Complexity and Innovation \(WICI\)](#) is partnering with the [Fields Institute for Research in Mathematical Sciences](#) to organize a 4-day workshop, “Math for Complex Climate Challenges” at the University of Waterloo, from May 1 - 4<sup>th</sup>, 2023. You are invited to [participate](#) and submit a short talk or interpretive/interactive art project!

The workshop seeks to bring together climate researchers and applied mathematicians (broadly defined) to identify major Canadian climate policy and research challenges for which additional state-of-the-art and emerging mathematical methods would add value - in short, to match mathematicians with skills and interest, and climate researchers with applied problems.

The workshop also aims to:

- Serve as a “soft launch” for the developing Fields Mathematics for Climate Change (MfCC) Network;
- Facilitate interdisciplinary cross-communication and fertilization in select climate research and mathematical methods topics;
- Identify researchable questions where collaboration would add value; and
- Lay the groundwork for one or more large interdisciplinary grant proposals

Our [preliminary program](#) plans to pair instructional sessions on key aspects of climate research and mathematical methods that support them for the mornings of the first three days. Afternoons will include break out sessions with topical 15-minute talks followed by research question brainstorming. Each session will have complementary climate research and math methods talks. The morning of Day 4 will host three research-planning workshops, based on emergent topics from the research brainstorming sessions.

**15-Minute Talk proposals are invited on the following topics, with other suggestions welcome.** The 15-minute talk should highlight previous research on the topic and open research challenges, including challenges at the math-climate interface. We particularly encourage, and can provide travel support for, early-career scholars, indigenous research/scholars, women and those from underrepresented groups.

Climate research:

- Synergies and conflicts between climate adaptation and mitigation
- Mitigation and adaptation co-benefits
- Aquatic ecosystems
- Protected areas / reserve design
- Energy networks / supply chains-design and resilience
- Social networks and social imitation/contagion/norm adoption
- Urban climate challenges

- Complex coupled-human natural systems modelling
- Climate economics and governance
- Carbon pricing and capitalization (including carbon currencies)
- Carbon sequestration
- Thermal energy
- Mapping the network of Canadian climate and policy research
- Suggest a topic / organize a session!

Mathematics:

- Network Science and Topology
- Optimization and Control Theory (Stochastic Optimization, Operations Research and Risk Management)
- Emerging Artificial Intelligence and Machine Learning Approaches
- Integrated Assessment Models
- Agent-Based Modelling
- New Probabilistic and Statistical Tools (Quantifying and characterizing tails and observations of extreme events; Probability Distribution and Stochastic Modelling)
- Financial Mathematics
- Game Theory
- Modelling Cross-scale feedbacks
- Dynamical Systems
- Uncertainty Quantification
- Interpreting and “tuning” models
- Multiscale computations & Multiscale methods
- Data Assimilation
- Monte Carlo Integration
- Suggest a topic / organize a session!

To submit a proposal for a 15-minute talk, **by close of business on April 14, 2023**, when filling out this [registration form](#), on question 1, please also select the “Submit an abstract” option.

**Climate art proposals are also invited.** Art proposals should illustrate complex climate challenges and invite audience members to envision solutions. Accepted art projects will be highlighted at Day 2 late afternoon reception. Any medium that can be presented in person and installed or presented in a lobby area is welcome, including visual, music, spoken word, and dramatic media. To submit a climate art proposal, **by close of business on April 14, 2023**, when filling out this [registration form](#), on question 1, please also select the “Submit a climate art proposal” option.

If you intend to **request travel funding support**, when filling out this [registration form](#), on question 1, please also select the “Apply for funding” option. The deadline for the travel funding application is **April 14, 2023** and you will need to provide a rationale for your approximate cost requests.