

Climate Change Rooted in Language: Large Language Models Uncover and Amplify Narratives

Solutions Scholars

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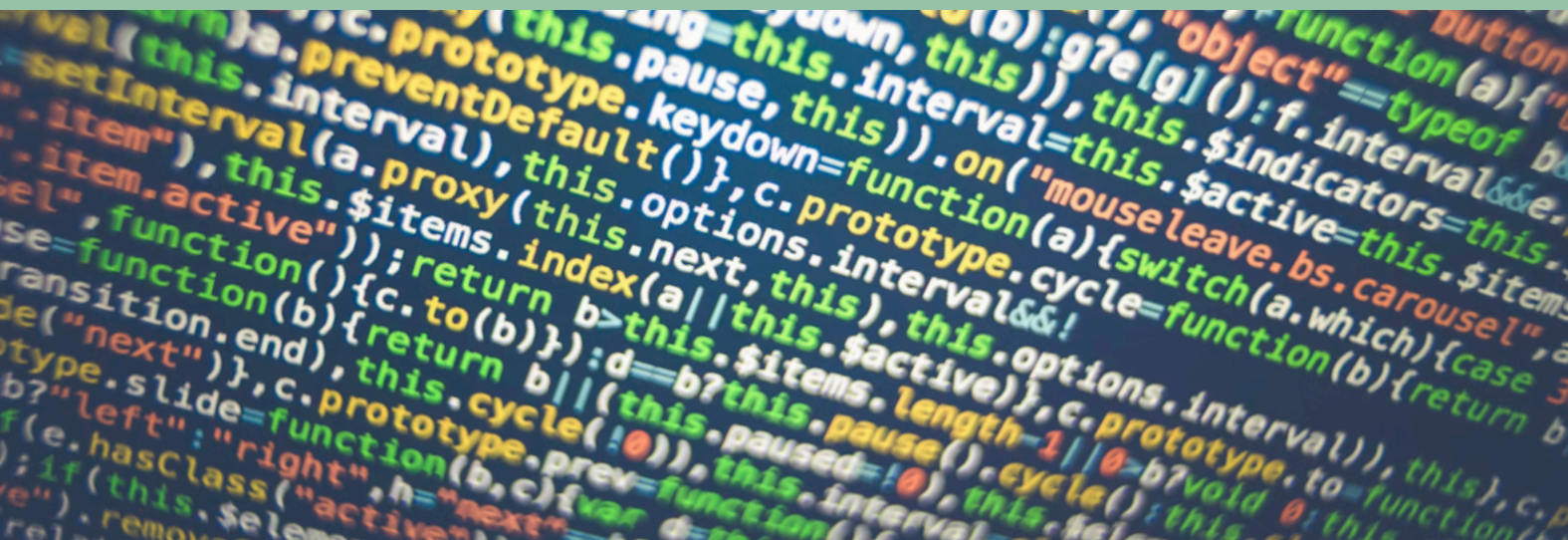
Project Mentors

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“There is an urgent need for adaptable evaluation methods and frameworks that can keep pace with LLM developments, ensuring their responsible use in climate solutions and supporting evidence-based environmental action.”

With AI changing so rapidly, the team’s original direction of exploring the use of Large Language Models (LLM) to ‘chat’ with the IPCC reports shifted. Building on the team’s skills, including their ability to read and write in four unique languages, the team instead explored how the language used in the LLM uncovered different climate narratives, impacting what different users learn about climate change and have submitted a paper for publication.

They queried the tool GPT-4o on how it frames climate discourse in English, German, Hindi and Spanish, assessing how the model communicates causes, issues and proposed solutions to climate change. They found that the language-based responses varied in their tonal phrasing, showing that LLMs are not merely passive translation tools but act as active cultural intermediaries. Additionally, they noted that responses varied in topical foci across languages, in which LLM acts as an amplifier of these narratives, with responses also varying in depth and completeness across languages.



2024-2025 Solutions Scholars

Advancing Climate Mitigation and Adaptation through Agroecological Transitions

Solutions Scholars

Evan Eskilson (IRES), Caitlin Ciampaglia (LFS), Talha Naeem (Economics), Anny Wang (Mathematics), and Sofia Bahmutsky (FoS Interdisciplinary Studies)

Project Mentors

Hannah Wittman (IRES, LFS); Sean Smukler (LFS, UBC Farm) and Khanh Dao Duc (Mathematics)

“Our goal is to reduce the burden of data entry with ‘one entry - many uses’ data management, representing a promising step towards inclusive and sustainable agriculture.”

Transitioning to smaller scale and diversified farming systems has been proposed as a climate solution, but the relationship between farm size, farming practices and greenhouse gas emissions is not well quantified. With the ultimate objective of informing farmers of tools that can support on-farm climate mitigation and sustainability efforts, this team evaluated and compared emissions models and calculators for use by small farms.

The Scholars began by working on developing PyHolos, a Python-based agricultural emissions calculator designed to suit small, diversified farms adapted from the Canadian-based calculator Holos. They then contrasted its performance with that of other mainstream emissions calculators (Comet and Cool Farm), and evaluated the challenges and opportunities presented by these calculators. Finally, they compared PyHolos-estimated emissions with on-farm emissions measurements, using data from the UBC Farm and a research farm in Alberta.



2024-2025 Solutions Scholars

Enhancing Heatwave Forecasting and Public Uptake: A Collaborative Project with Environment and Climate Change Canada

Solutions Scholars

Jing Jiang (Forestry), Vicky Lucas (IRES), and
Emily Kaakyo Rubooga (FASS, Interdisciplinary Studies)

Project Mentors

Rachel White (EOAS), Farrukh A. Chishtie (OSOT)
and partners with ECCC

“By prioritizing accessibility, usability testing, and inclusive design from the start, solutions can bridge the gap between forecasting and public action”

The goals of this collaborative project were to enhance technical heatwave forecasting systems, strengthen public understanding and action related to heatwave forecasts, and design warning tools that are inclusive and user-centered.

Forecasting innovation and technical modelling were evaluated through multiple state of the art AI/Machine Learning (ML) models. Retrospective testing on events like the 2021 BC heat dome was conducted to better understand the integration of AI/ML tools, including the technical feasibility of extending warning lead times and creating impact-based forecasting. Building on possibilities for technical innovations, a needs assessment report was developed to identify ways of increasing the effectiveness and public uptake of such heatwave warnings in BC. Through interviews and focus group discussions with key ECCC stakeholders, the report captures gaps, opportunities and priorities in heatwave warning systems. The insights reflect technical and behavioral dimensions, emphasizing the need for more personalized, accessible and actionable forecast information.



2024-2025 Solutions Scholars

Carbon Offsets: Climate Action or Sustainability Illusion?

Solutions Scholars

Peter McCartney (SCARP), Lucy Binfield (Forestry), and
Isabella Morgante (Institute for Oceans and Fisheries)

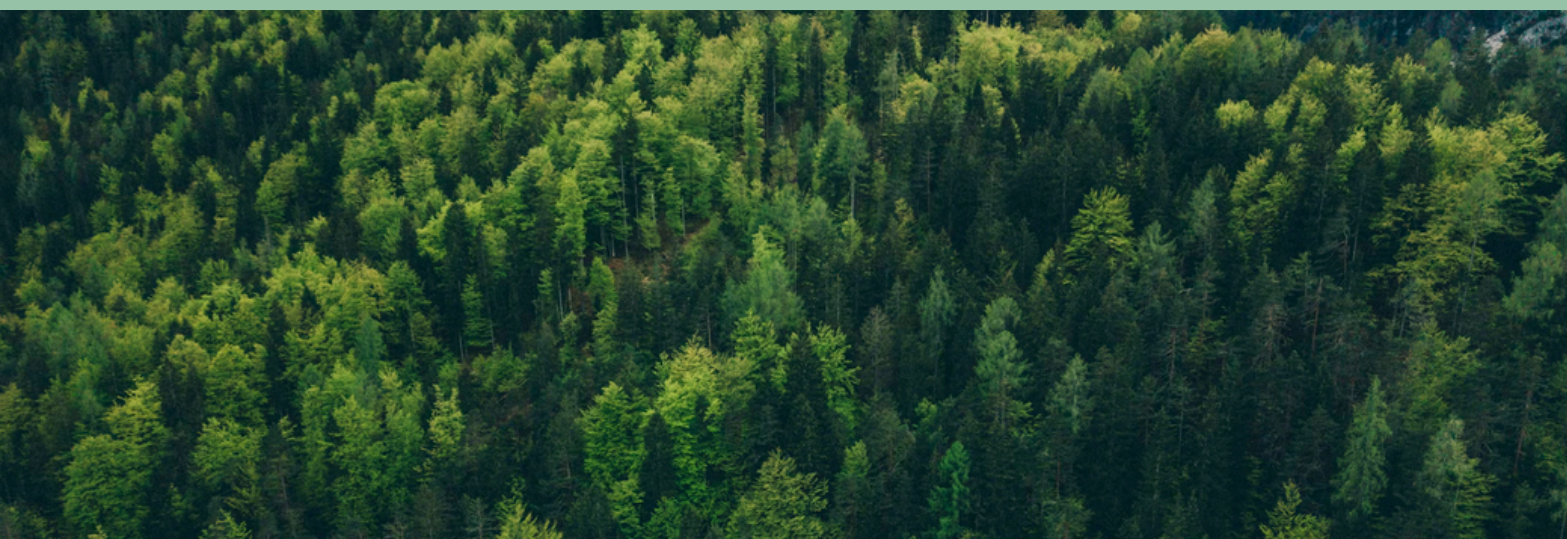
Project Mentors

Hisham Zerriffi (Forestry), Kathryn Harrison (Political Science), Werner
Antweiler (Sauder School of Business), and Gregory Paradis (Forestry)

“Our cross-disciplinary team of faculty and students worked together to uncover the reality behind the controversy on carbon offsets and explored their future in British Columbia and around the world.”

While carbon offsets are seen by industry as cost-saving and by governments as flexible regulatory tools, reforms are needed to improve transparency, strengthen benchmarks and harmonize systems across jurisdictions. This team of Scholars worked on three interconnected projects to provide critical analysis and insights on the use of carbon offsets in the Canadian context. The ultimate objective was to work with the mentors to develop future research projects and multistakeholder dialogues on the future of carbon offsets, particularly in British Columbia where forest-based projects face criticism over their effectiveness and permanence.

In addition to kickstarting a wider conversation around carbon offsets within the mentor group, the Solutions Scholars also organized an interactive workshop at the Institute for Society and Natural Resources Conference, a large multidisciplinary conference held in Vancouver. Their session was well attended with high engagement and was mentioned in the Opening Plenary Session. One Solutions Scholar was selected for an internship in carbon markets analysis after a prospective employer saw the presentation at the Solutions Scholars Summit in April 2025.



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