



# CCAI Virtual Summer School 2024

## Compiled Lecture Q&A

### Introduction to Climate Change and AI

**Q:** Is it possible for students to work with professors/professionals after the summer school on research projects?

**A:** I'd encourage posting or looking at posts in our community platform: [community.climatechange.ai](https://community.climatechange.ai) You can also look at opportunities that may be listed in the Climate Change AI newsletter.

**Q:** Can the [TCCML] paper be linked? Or provided free of charge?

**A:** The paper is available here free of charge! <https://dl.acm.org/doi/10.1145/3485128>

**Q:** What are some examples of using NLP to distill raw data into actionable information?

**A:** As an example from NLP, there is a lot of information in corporate financial disclosures that can be useful in informing climate policy decisions - for example, what risks companies anticipate from climate change. Training topic-modeling algorithms to pick out relevant passages has sped up the process of finding this information.

**Q:** Are we going to discuss the potential of quantum computer for these climate calculations?

**A:** Quantum computing is generally a different area from machine learning so it's outside of scope. Here's an overview paper in this area though: <https://arxiv.org/pdf/2107.05362>

**Q:** Are some of these 'sophisticated algorithms' available on open sources? Links would be helpful, thanks!

**A:** The machine learning research community is often good about releasing algorithms in open source code. That doesn't necessarily make it accessible to relevant users, but it's a good first step. Hard to give links without specific algorithms, but feel free to post in the Summer School forum with specific questions.

**Q:** In your experience, how can making research and using data/resources of countries in development be improved to really have an effect in the problem mitigation of developing countries? How to close this gap between research and decision-making?



**A:** Thank you for this question! I think the most important point is doing research \*with\* relevant parties (e.g., ensuring you have collaborators from all regions of study from early on, and ensuring e.g. funding and capacity-building is actually going towards those collaborators) rather than doing research “on” people (that is, analyzing data from afar).

**Q:** Considering the frame of climate justice, would it not be important to disaggregate the “stakeholders” to clearly identify Rights Holders (e.g., Indigenous peoples, First Nations, Inuit, etc.) who are closest to the impacts AND solutions?

**A:** This is a great point - thank you for raising it. Agreed, Rights Holders are a very important group.

**Q:** How were these emissions computed?

**A:** You can see more details in the following paper, which the figure is from: Dodge, J., Prewitt, T., Tachet des Combes, R., Odmark, E., Schwartz, R., Strubell, E., ... & Buchanan, W. (2022, June). Measuring the Carbon Intensity of AI in Cloud Instances. In 2022 ACM Conference on Fairness, Accountability, and Transparency (pp. 1877-1894). <https://arxiv.org/abs/2206.05229>

**Q:** There was an interesting statement in David Rolnick's part of the presentation that Gen AI models do not necessarily help with solving CC ML problems. I think the same authors proposed developing Foundational models for remote data a few years ago, so are current foundational model for satellite data not helpful in CC problems yet?

**A:** Good question. First, I was talking about LLMs, not generative AI as a whole. Second, most foundation models are not generative AI - these are very different terms. There are definitely roles for foundation models in cases like some remote sensing applications.

**Q:** We usually assess risk as function of hazard, exposure and vulnerability. So, how to link this with risk=impact x probability?

**A:** Thanks for sharing! In that framework, impact is made up of exposure and vulnerability (if a disaster happens, what is exposed and what damage would be incurred) and hazard is probability (how likely the disaster is to happen). But of course, there are multiple ways to conceptualize assessment of disaster risk, the risk=impact x probability calculation is only one way :)

**Q:** Any real life examples of ml/ai being used to address climate stuff, having a net positive feedback (attributable)?

**A:** See for example the cases studies in this Climate Change AI report:  
<https://www.gpai.ai/projects/climate-change-and-ai.pdf>

**Q:** Can you share the final doc of the EU AI act?

**A:** I find this website very helpful, which has the interactive version:  
<https://artificialintelligenceact.eu>



**Q:** Is there a methodology or a set of practices you have applied to estimate collateral impacts of the use of ML to tackle CC? (as the example you mentioned about carbon-based energy generation, when ML can also help to reduce its cost and makes it cheaper than cleaner options)

**A:** This paper might be helpful for a framework:  
<https://www.nature.com/articles/s41558-022-01377-7>

**Q:** Is there any work done to reduce the computational emission by large models? and incorporating different data following the paris climate act?

**A:** There is quite a lot of work on energy efficient ML, for example the work of Prof. Emma Strubell at CMU

**Q:** What are the major limitations and challenges we have so far in application of ML to climate change?

**A:** This is an important and large question! Some of the limitations and challenges are detailed here  
(<https://gpai.ai/projects/responsible-ai/environment/climate-change-and-ai.pdf>). We will also discuss this in the context of various sectors throughout the summer school!

**Q:** How AI can be crucial in grid modernization and economics?

**A:** I would encourage you to check out this review paper  
(<https://dl.acm.org/doi/10.1145/3485128>) as well as to attend the AI for energy systems lecture during the week of July 29!

**Q:** How to find topics and papers in Carbon Capture and Sotarge as petroleum engineer?

**A:** See here: [https://www.climatechange.ai/subject\\_areas/carbon\\_capture\\_sequestration :\)](https://www.climatechange.ai/subject_areas/carbon_capture_sequestration :))

**Q:** I would like to know if the cloud computing now contributes to significantly reduce carbon footprint in AI.

**A:** Cloud computing usually deploys more efficient servers because they can be larger, more modern, and optimize utilization. However, the energy consumption tends to be quite high still and the computing demand keeps growing. We will discuss about this in more detail on day 10.

**Q:** Will you be able to share the two frameworks (climate justice and climate co-benefits) mentioned during the lecture?

**A:** I am not aware of one definitive resource on either of those topics, but as a start - climate justice has its roots in enviornmental justice, and there are some great resources on environmental justice here (<https://ejnet.org/ej/>) as well as via the books of Dr. Robert Bullard (<https://drrobertbullard.com/books/>). This is also a great question to ask on the



Community Platform, as some of your fellow summer school participants work directly on these topics and may have good pointers to share!

**Q:** Can ML be used to forecast the impact of wildfire smoke on solar panels?

**A:** I am not aware of such an application but see a number of papers on wildfires here:

<https://www.climatechange.ai/papers?search=wildfire>