Overview

Human actions are drastically and irreversibly modifying the Earth system, yet this is the very system upon which our survival as a species depends. Could such actions lead to our own destruction? If so, how? And what should we do about it? This seminar aims to address these questions, integrating perspectives spanning the Earth sciences, social sciences, and philosophy. Topics include nuclear winter, global warming, how to reason about future human welfare and present-day costs, how to do so while considering uncertainty and low-probability catastrophic outcomes, pandemics and Earth system change, and technology as an increasingly autonomous or perhaps even geological phenomenon. We end by discussing physical, social, and dynamical aspects of achieving long-term sustainability on a planetary scale.

Organization

We will meet on Fridays from 2:30–4:00 in Rm. 56-169. The initial meeting on Friday February 4 will be organizational. Interested students with scheduling conflicts should email their schedule to the instructor; we’ll make accommodations if we can.

Participation, format, and expectations

Each week we will discuss the assigned readings. Rather than designating discussion leaders, we will each participate in discussions on an equal basis. No one is expected to have any special expertise in any of the subjects; instead, we will all come prepared to learn from each other. Participation is open to all, including undergraduates. Interested students should register (in advance, if possible) for 12.S597 (graduate) or 12.090 (undergraduate). Grading is P/D/F; continual attendance and active participation is required for P. Postdocs, faculty, and research staff are also welcome. All participants will contribute to discussions.

Syllabus

All material will be available on Canvas or obtainable electronically from the MIT Library.

1. The stakes

2. Natural existential risks and nuclear winter


3. Anthropogenic climate change and its impacts


4. Long-term social welfare: future value and present cost


5. Uncertainty and declining discount rates


6. Heavy tails, long-term welfare, and infinite costs: the dismal theorem


7. Heavy tails, long-term welfare, and infinite costs (2)


8. Humanity and Earth’s biosphere


9. Pandemics, and interactions with other Earth system change


10. Technology and its potential autonomy


11. Long-term global sustainability


12. Dynamics of the collective human system