

Global Priorities Research: Ethics and the (Very Far) Future

This syllabus grew out of an 8-week graduate course run at Oxford in Trinity 2019, led by [William MacAskill](#) and Christian Tarsney—the original course can be found [here](#). It has been revised and expanded to fill a 12-week semester.

About this course:

This is a 12-week course on Global Priorities Research, which asks what we should do with a limited amount of resources if our goal is to do the most good. That is an enormous question, so as a starting point we investigate one prominent view: *longtermism* (the thesis that our acts' long-term effects are typically decisive in working out what to do now). Many of us make many of our decisions in light of their short-term and foreseeable consequences; so, if longtermism is true, a radical shift in our moral focus might be required, away from ourselves and towards the vast number of people who may one day exist.

We investigate both arguments for and against longtermism as well as its practical implications. This requires us to engage with active debates in normative ethics, epistemology, decision theory, and political philosophy. Since longtermism is a setting in which many common commitments in those areas clash, it will also serve as a useful testing ground for a range of widely endorsed theories and intuitions.

Target Audience:

The course is aimed at graduate students. It could also be used as upper-undergraduate course, especially for students enrolled in a PPE program or who show an interest in ethics (especially population ethics or formal ethics), decision theory, formal epistemology, or philosophy of public policy.

The course presupposes the ability to read and interpret basic formal material. Most weeks require no more formal ability than is required for, say, a standard introduction to logic or decision theory. The only topic whose core readings go somewhat beyond that is 'Fanaticism and Paradoxes of Tiny Probabilities' (Week 5).

How Should I Use This Material?

Short answer:

You're welcome to use this material however you like.

Longer answer:

We think that Global Priorities Research is important, underexplored, and academically interesting. Our hope is that by having this material online, graduate students will have the chance to engage with this area and consider working on it themselves. What works will vary from context to context, so please feel free to use this material however you think best. You are welcome to teach through the entire syllabus, incorporate individual topics into your own materials, or just use the reading lists for ideas and inspiration. It could also be used for self-guided study.

Since the target audience is graduate students (or students with an interest in research), we have erred on the side of including more optional readings rather than fewer. We hope that will give students plenty of material to engage with, but of course you may wish to cut down on material.

Giving feedback:

We'd love to hear your feedback! This is a young research area, so we plan to revise this teaching material reasonably regularly (about once a year). We'd welcome all feedback on everything from the small (Did you spot a typo? Did we miss a key reading?) to the big (Did we miss a topic? Have we underrepresented a view?). You can submit feedback [here](#).

Topic 1: Introducing and Defending Longtermism

This topic introduces longtermism and the motivation for taking it seriously.

Core:

[The Future is Vast: Longtermism's Perspective on Humanity's Past, Present, and Future](#), *Our World in Data*.

Hilary Greaves and William MacAskill (2021), [The Case for Strong Longtermism](#), *Global Priorities Working Paper*, no. 5.

*Optional:*¹

Toby Ord (2020), Chapters 1-2 in [The Precipice](#), Bloomsbury.

William MacAskill (2022), Chapters 1-2 in [What We Owe The Future](#), *Basic Books*.

Tyler Cowen (2018), Chapter 4 in [Stubborn Attachments](#), Stripe Press.

Nick Beckstead (2019), [A Brief Argument for the Overwhelming Importance of Shaping the Far Future](#), in *Effective Altruism: Philosophical Issues* (Hilary Greaves and Theron Pummer, eds).

Chapters 1-3 of [The Long View: Essays on Policy, Philanthropy, and the Long-Term Future](#) (Natalie Cargill and Tyler M John. Eds). FIRST Strategic Insight, London.

David Thorstad, [The Scope of Longtermism](#), *GPI Working Paper*, no. 6-2021.

¹ The optional readings for this topic are organized loosely from easier to harder—other topics are organized chronologically.

Topic 2: Epistemic Challenges to Longtermism

This week outlines an important challenge to longtermism: perhaps we cannot know enough about the distant future to sensibly make decisions aimed at promoting the long-term good.

Core:

James Lenman (2000), [Consequentialism and Cluelessness](#), *Philosophy and Public Affairs*, vol. 29, no. 4, pp. 342-370.

Christian Tarsney (2022), [The Epistemic Challenge to Longtermism](#), *GPI Working Papers*, No. 3-2022.

Optional:

Tyler Cowen (2006), [The Epistemic Problem Does Not Refute Consequentialism](#), *Utilitas*, vol. 18, no. 4, pp. 383-399.

Johanna Burch-Brown (2014), [Clues for Consequentialists](#), *Utilitas*, vol. 26, no. 1, pp. 105-119.

Hilary Greaves (2016), [Cluelessness](#), *Proceedings of the Aristotelian Society*, vol. 116, no. 3, pp. 311-339.

David Thorstad and Andreas Mogensen (2020), [Heuristics for Clueless Agents: How to Get Away With Ignoring What Matters Most in Ordinary Decision-Making](#), *GPI Working Papers*, No. 2-2020.

Andreas Mogensen (2020), [Maximal Cluelessness](#), *GPI Working Papers*, No. 2-2020.

Various disciplines grapple with the question of whether we can predict or influence the far future. For those wanting to explore those issues, some good starting points are:

Paul Pierson (2000), [Increasing Returns, Path Dependence, and the Study of Politics](#), *The American Political Science Review*, vol. 94, no. 2, pp. 251-267.

Clive Granger and Yongil Jeon (2007), [Long-term Forecasting and Evaluation](#), *International Journal of Forecasting* vol. 23, no. 4, pp. 539-551.

Diego Comin, William Easterly and Erik Gong (2010), [Was the Wealth of Nations Determined in 1000 BC?](#), *American Economic Journal: Macroeconomics*, vol. 2, no. 3, pp. 65-97.

Luke Muehlhauser (2019), [How Feasible is Long-range Forecasting?](#), *Open Philanthropy*.

Antony Millner and Daniel Heyen (2021), [Prediction: The Long and the Short of It](#), *American Economic Journal: Microeconomics*, vol. 13, no. 1, pp. 374-398.

Topic 3: Fanaticism and the Paradoxes of Tiny Probabilities

When we consider ways to influence the long-term future, our acts may have a very small probability of achieving an enormous impact. If so, the case for longtermism (and its implications) depends crucially on what is morally and rationally required when we are faced with tiny probabilities of astronomical payoffs.

Note that Christian Tarsney has run an 8-week course on this topic—the reading list can be found [here](#).

Core:

Nick Bostrom (2009), [Pascal's Mugging](#), *Analysis*, vol. 69, no. 3, pp. 443-445.

Larry Temkin (2022), Appendix A in [Being Good in a World of Need](#)

Bradley Monton (2019), [How to Avoid Maximising Expected Utility](#), *Philosophers' Imprint*, vol. 19, no. 18., pp. 1-25.

Hayden Wilkinson (2022), [In Defense of Fanaticism](#), *Ethics*, vol. 132, no. 2, pp. 445-477.

Optional:

Lara Buchak (2013), Sections 2.1-2.3 in [Risk and Rationality](#), Oxford University Press.

Björn Lundgren and H. Orri Stefansson (2020), [Against the De Minimis Principle](#), *Risk Analysis*, vol. 40, no. 5, pp. 908-914.

Christian Tarsney (2020), [Exceeding Expectations](#), *GPI Working Paper*, no. 3-2020.

Dylan Balfour (2021), [Pascal's Mugger Strikes Again](#), *Utilitas*, vol. 33, no. 1, pp. 118-124.

Nick Beckstead and Teruji Thomas (2021), [A Paradox for Tiny Probabilities and Enormous Values](#), *GPI Working Paper*, no. 7-2021.

Jeffrey Sanford Russell (2021), [On Two Arguments for Fanaticism](#), *GPI Working Paper*, no. 17-2021.

Topic 4: Discounting

We consider another important challenge to longtermism: perhaps we can (or should) care less about our acts' effects if they are a long way in the future. This topic touches on important issues in ethics, but it's also one that economists and policymakers grapple with on a regular basis.

Core:

Toby Ord (2020), Appendix A in [The Precipice](#).

John Broome (1994), [Discounting the Future](#), *Philosophy and Public Affairs*, vol. 23, no. 2, pp. 128-156.

Andreas Mogensen (2022), [The Only Ethical Argument for Positive 'Delta'? Partiality and Pure Time Preference](#), *Philosophical Studies*.

Optional:

Derek Parfit (1984), Appendix F in *Reasons and Persons*, Oxford University Press.

Tyler Cowen (2004), [Policy Implications of Zero Discounting: An Exploration in Politics and Morality](#), *Social Philosophy & Policy*, vol. 21, no. 1, pp. 121-140.

Geoffrey Brennan (2007), [Discounting the Future, Yet Again](#), *Politics, Philosophy & Economics*, vol. 6, no. 3, pp. 259-284.

Simon Caney (2014), [Climate Change, Intergenerational Equity, and the Social Discount Rate](#), *Politics, Philosophy & Economics*, vol. 13, no. 4, pp. 320-340.

Christian Gollier and James K Hammit (2014), [The Long-Run Discount Rate Controversy](#), *Annual Review of Resource Economics* vol. 6, pp. 273-295.

Hilary Greaves (2017), [Discounting for Public Policy: A Survey](#), *Economics and Philosophy*, vol. 33, no. 3, pp. 391-439.

Matthew Rendall (2019), [Discounting, Climate Change, and the Ecological Fallacy](#), *Ethics*, vol. 129, no. 3.

David Thorstad (2022), [Existential Risk Pessimism and the Time of Perils](#), *GPI Working Paper*, no. 1-2022.

Topic 5: Population Ethics I, Duties to Future (Possible) People

What do we owe to someone who does not currently exist? And can we have duties to people whose very existence depends on what we do now? This topic explores our duties to possible future people and what could ground such duties.

Core:

Derek Parfit (1984), Chapter 16 in *Reasons and Persons*, Oxford University Press.

Elizabeth Finneron-Burns (2017), [What's Wrong with Human Extinction?](#), *Canadian Journal of Philosophy*, vol. 47, no. 2-3, pp. 327-343.

Optional:

John Rawls (1971), Sections 44-45 in *A Theory of Justice* (2nd Edition), Oxford University Press.

James Woodward (1986), [The Non-Identity Problem](#), *Ethics*, vol. 96, no. 4, pp. 804-831.

Luke Meyer (2003), [Intergenerational Justice](#), *Stanford Encyclopedia of Philosophy*

Simon Caney (2005), [Cosmopolitan Justice, Responsibility, and Global Climate Change](#), *Leiden Journal of International Law*, vol. 18, no. 4, pp. 747-775.

Rahul Kumar (2018), [Risking Future Generations](#), *Ethical Theory and Moral Practice*, vol. 21, pp. 245-257.

Simon Beard and Patrick Kaczmarek (2019), [On the Wrongness of Human Extinction](#), *Argumenta*, vol. 5, no. 1, pp. 85-97.

Jeff McMahan (2021), [Climate Change, War, and the Non-Identity Problem](#), *Journal of Moral Philosophy*, vol. 18, pp. 211-238.

Charlotte Unruh (2021), [The Strings Attached to Bringing Future Generations into Existence](#), *Journal of Applied Philosophy*, vol. 38, no. 5, pp. 857-869.

Topic 6: Population Ethics II, Axiology

If we care about the future, then we need to consider the vast number of people, with lives of very different qualities, who might one day exist. This topic explores how the value of the future relates to the value of the individual lives that people may live.

Core:

Hilary Greaves (2017), [Population Axiology](#), *Philosophy Compass*, vol. 12, no. 11, pp. 1-15.

Johann Frick (2017), [On the Survival of Humanity](#), *Canadian Journal of Philosophy* vol. 47, no. 2-3, pp. 344-367.

Optional:

Jan Narveson (1967), [Utilitarianism and New Generations](#), *Mind*, vol. 76, no. 301, pp. 62-72.

Derek Parfit (1984), Chapters 17-19 in [Reasons and Persons](#), Oxford University Press.

Nick Bostrom (2003), [Astronomical Waste](#), *Utilitas*, vol. 15, no. 3, pp. 308-314.

John Broome (2004), [Should We Value Population?](#), *The Journal of Political Philosophy* vol. 13, no. 4, pp. 399-413.

Hilary Greaves and Toby Ord (2017), [Moral Uncertainty About Population Axiology](#), *Journal of Ethics & Social Philosophy*, vol. 12, no. 2, pp. 135-167.

Andreas Mogensen (2022), [The Weight of Suffering](#), *GPI Working Paper*, no. 4-2022.

Teruji Thomas (Forthcoming), [The Asymmetry, Uncertainty, and the Long Term](#), *Philosophy and Phenomenological Research*.

Topic 7: Concern for the Future Across Worldviews

This topic asks how and whether we might motivate a concern for future generations from a range of cultural and religious perspectives—clearly this list is not comprehensive, but we hope it serves as a starting point for further thinking.²

Roy Perrett (2003), [Future Generations and the Metaphysics of the Self: Western and Indian Philosophical Perspectives](#), *Asian Philosophy*, vol. 13, no. 1, pp. 29-37.

Christopher Groves (2009), [Future Ethics: Risk, Care and Non-Reciprocal Responsibility](#), *Global Ethics*, vol. 5, no. 1, pp. 17-31.

Kevin Gary Behrens (2012), [Moral Obligations Towards Future Generations in African Thought](#), *Global Ethics*, vol. 8, no. 2-3, pp. 179-191.

Samuel Scheffler (2018), Chapters 3 and 4 in *Why Worry About Future Generations?*, Oxford University Press.

Peter Herschock (2021), [What Do We Owe Future Generations? Compassion and Future Generations: A Buddhist Contribution to an Ethics of Global Interdependence](#), in Steven Emmanuel (ed.), *Philosophy's Big Questions: Comparing Buddhist and Western Approaches*, Columbia University Press.

Stefan Riedener (2022), [Human Extinction from a Thomist Perspective](#), in *Effective Altruism and Religion: Synergies, Tensions, Dialogue*.

² We have not divided the readings into core and optional for this topic. Since each reading addresses the central question from a different standpoint, we suspect it will be most helpful for either (i) each student to select readings to focus on, or (ii) the lecturer to choose core readings based on their own interests and background.

Topic 8: Progress and Value Change

If longtermism is true, then one possible priority is steering humanity away from negative futures and towards positive ones. This topic asks where humanity is heading and how (or whether) we can influence that trajectory.

Core:

Hanno Sauer, Charlie Blunden, Cicile Eriksen and Paul Rehren (2021), [Moral Progress: Recent Developments](#), *Philosophy Compass*, vol. 16, no. 19, pp. 1-10.

William MacAskill (2022), Chapters 3 and 4 in [What We Owe The Future](#), *Basic Books*.

Optional:

Nick Bostrom (2004), [The Future of Human Evolution](#), in *Death and Anti-Death: Two Hundred Years After Kant, Fifty Years After Turing*, Charles Tandy (ed.), Ria University Press.

Elizabeth Anderson (2014), [Social Movements, Experiments in Living, and Moral Progress: Case Studies from Britain's Abolition of Slavery](#), *The Lindley Lecture for 2014*, University of Kansas, Department of Philosophy.³

Allen Buchanan and Rachell Powell (2018), [The Evolution of Moral Progress: A Biocultural Theory](#) Oxford University Press. (The entire book is relevant, though Chapters 1 and 4 are good starting points.)

Ingmar Persson and Julian Savulescu (2019), [The Evolution of Moral Progress and Biomedical Enhancement](#), *Bioethics*, vol. 33, no. 7, pp. 814-819.

Hanno Sauer (2019), [Butchering Benevolence: Moral Progress beyond the Expanding Circle](#), *Ethical Theory and Moral Practice*, vol. 22, no. 1, pp. 153-167.

Jacy Reese Anthis and Eze Paez (2021), [Moral Circle Expansion: A Promising Strategy to Impact the Far Future](#), *Futures*, vol. 130, pp. 1-11.

³ This reading discusses the treatment of slaves in a way that some people might find difficult. This can be largely (though not entirely) skipped by beginning at page 3.

Topic 9: Representing Future Generations

If we care about future people, should they be represented in current political decision-making processes? And if so, how?

Core:

Chapter 3 in [Our Common Agenda](#), *United Nations Report of the Secretary-General*

Anja Karnein (2016), [Can we Represent Future Generations?](#), in *Institutions for Future Generations*, G. Iñigo and A. Gosseries (eds.), Oxford University Press.

Ludvig Beckman (2009), [The Vote of Unborn Generations](#), in *The Frontiers of Democracy: The Right to Vote and its Limits*, Palgrave Macmillan, London.

Optional:

Robert Goodin (2007), [Enfranchising All Affected Interests, and Its Alternatives](#), *Philosophy & Public Affairs* vol. 35, no. 1, pp. 40-68.

Torbjörn Tännsjö (2007), [Future People, the All Affected Principle, and the Limits of the Aggregation Model of Democracy](#), in *Hommage à Wlodek: Philosophical Papers Dedicated to Wlodek Rabinowicz*, T. Rønnow-Rasmussen, B. Petersson, J. Josefsson and D. Egonsson (eds.).

Dennis Thompson (2010), [Representing Future Generations: Political Presentism and Democratic Trusteeship](#), *Critical Review of International Social and Political Philosophy*, vol. 13, no. 1, pp. 17-37.

Karsten Klint Jensen (2015), [Future Generations in Democracy: Representation or Consideration?](#), *Jurisprudence* vol. 6, no. 3, pp. 535-548.

Danielle Zwarthoed (2018), [Political Representation of Future Generations](#), in *Towards the Ethics of a Green Future: The Theory and Practice of Human Rights for Future People*, M. Duwell, G. Bos, N. Van Steenberg (eds.), Routledge.

Andre Santos Campos (2020), [Representing the Future: The Interests of Future Persons in Representative Democracy](#), *British Journal of Political Science* vol. 51, no. 1, pp. 1-15.

Topic 10: Forward-Looking Political Institutions

One possible way of influencing humanity's long-term future is to ensure that institutions are appropriately oriented to the needs and demands of future people. This topic explores how institutions might be created or reformed along these lines.

Core:

Simon Caney (2016), [Political Institutions for the Future: A Fivefold Package](#), in *Institutions for Future Generations*, G. Iñigo and A. Gosseries (eds.), Oxford University Press.

Tyler John and William MacAskill (2021), [Longtermist Institutional Reform](#), in *The Long View: Essays on Policy, Philanthropy, and the Long-Term Future*, N. Cargill and T. John (eds.). FIRST Strategic Insight, London

Optional:

Alan Jacobs, [Policy Making for the Long Term in Advanced Democracies](#), *Annual Review of Political Science*, vol. 19, pp. 433-454.

The core readings are part of edited volumes. If you are interested in exploring the issues raised in more detail, those edited volumes have plenty of articles that explore specific policy proposals and case studies. The relevant sections are:

Parts III and IV in [Institutions for Future Generations](#), G. Iñigo and A. Gosseries (eds.), Oxford University Press.

Chapters 4-10 in [The Long View: Essays on Policy, Philanthropy, and the Long-Term Future](#), N. Cargill and T. John (eds.). FIRST Strategic Insight, London.

Topic 11: Existential Risk

You might think that, rather than steering humanity's long-term trajectory, our most pressing concern should be to ensure humanity's survival. This topic explores existential risk mitigation as a global priority.

Because of the diversity of topics that fall under this banner, we have included more optional readings than normal. The core readings cover foundational issues on existential risk, and each optional topic covers a specific source of risk. (The first two provide a few more readings and the rest provide just a couple of key introductory readings.)

Core:

Jason Matheny (2007), [Reducing the Risk of Human Extinction](#), *Risk Analysis*, vol. 27, no. 5, pp. 1335-1344.

Shahar Avin, Bonnie Wintle, Julius Weitzdörfer, Seán Ó hÉigeartaigh, William Sutherland, Martin Rees (2018), [Classifying Global Catastrophic Risks](#), *Futures*, vol. 102, pp. 20-26.

Toby Ord (2020), Chapter 6 in [The Precipice](#), Bloomsbury.

Optional I: Climate Change

The Intergovernmental Panel on Climate Change, [Climate Change 2022: Impact, Adaptation, and Vulnerability \(Summary for Policymakers\)](#).

David Frame and Myles Allen (2008), 'Climate Change and Global Risk', in *Global Catastrophic Risks* (Nick Bostrom and Milan Ćirković, eds.), Oxford University Press.

Peter Kareiva and Valerie Carranza (2018), [Existential Risk Due to Ecosystem Collapse: Nature Strikes Back](#), *Futures*, vol. 102, pp. 39-50.

SJ Beard, Lauren Holt, Asaf Tzachor, Luke Kemp, Shahar Avin, Phil Torres and Haydn Belfield (2021), [Assessing Climate Change's Contribution to Global Catastrophic Risk](#), *Futures*, vol. 127, pp.

John Halstead (2021), [Good News on Climate Change](#), *EA Forum*.

Optional II: Artificial Intelligence

Nick Bostrom (2014), *Superintelligence: Paths, Dangers, Strategies*, Oxford University Press. (Chapters 7 and 8 are especially relevant.)

Edward Geist and Andrew John (2018), [How Might Artificial Intelligence Affect the Risk of Nuclear War?](#), *RAND Corporation: Perspective*.

Karina Vold and Daniel Harris (2022), [How does Artificial Intelligence Pose an Existential Risk?](#), in *Oxford Handbook of Digital Ethics* (Carissa Véliz, ed.), Oxford University Press.

Ross Gruetzemacher and Jess Whittlestone (2022), [The Transformative Potential of Artificial Intelligence](#), *Futures*, vol. 135, pp. 1-11.

Joe Carlsmith (2022), [Is Power-Seeking AI an Existential Risk?](#).

Katja Grace, John Salvatier, Allan Dafoe, Baobao Zhang, Owain Evans, [When Will AI Exceed Human Performance? Evidence from AI Experts](#), *Future of Humanity Institute*

Optional III: Biosecurity

[Preventing Catastrophic Pandemics](#), *80,000 Hours Podcast*.

Piers Millett and Andrew Snyder-Beattie (2017), [Existential Risk and Cost-Effective Biosecurity](#), *Health Security*, vol. 15, no. 4, pp. 373-383.⁴

[Global Health Security Index](#), by the John Hopkins Center for Health Security and the Nuclear Threat Initiative.⁵

Optional IV: Natural Risks

Michael Rampino, 'Super-Volcanism and Other Geophysical Processes of Catastrophic Import', in *Global Catastrophic Risks* (Nick Bostrom and Milan Ćirković, eds.), Oxford University Press.

Toby Ord (2020), Chapter 3 in [The Precipice](#), Bloomsbury.

Optional V: The Dangers of Survival

Simon Knutsson (2021), [The World Destruction Argument](#), *Inquiry*, vol. 64, no. 10, pp. 1004-1023.

Richard Pettigrew (2022), [Effective Altruism, Risk, and Human Extinction](#), *GPI Working Paper*, no. 2-2022.

William MacAskill, Chapter 9 in in [What We Owe The Future](#), *Basic Books*.

⁴ Part of a [special issue](#) that contains plenty of further reading.

⁵ The whole website is worth exploring, but a good starting point is the *Recommendations* section in [Advancing Collective Action and Accountability Amid Global Crisis](#) report.

Topic 12: Catastrophic Risks and Precautionary Decision-Making

The future is vast and contains many possibilities, some of them wonderful and others catastrophic. This topic investigates serious harms and catastrophic risks and asks whether we should pay special attention to avoiding them.

Core:

Lara Buchak (2019), [Weighing the Risks of Climate Change](#), *The Monist*, vol. 102, no. 1, pp. 66-83.

H. Orri Stefánsson (2020), [Catastrophic Risk](#), *Philosophy Compass*, vol. 15, no. 11, pp. 1-11.

*Optional:*⁶

Christian Gollier, Benny Moldovanu and Tore Ellingsen (2001), [Should We Beware of the Precautionary Principle?](#), *Economic Policy*, vol. 16, no. 33, pp. 301-327.

Per Sandin, Martin Peterson, Sven Ove Hansson, Christina Rudén, and André Juthe (2002), [Five Charges Against the Precautionary Principle](#), *Journal of Risk Research* vol. 5, no. 4, pp. 287-299.

Katie Steele (2006), [The Precautionary Principle: A New Approach to Public Decision-Making?](#), *Law, Probability & Risk*, vol. 5, no. 1, pp. 19-31.

Andreas Christiansen (2019), [Rationality, Expected Utility Theory and the Precautionary Principle](#), *Ethics, Policy & Environment*, vol. 22, no. 1, pp. 3-20.

Christian Munthe (2019), [The Black Hole Challenge: Precaution, Existential Risks and the Problem of Knowledge Gaps](#), *Ethics, Policy & Environment*, vol. 22, no. 1, pp. 49-60.

Johanna Thoma (2022), [Time for Caution](#), *Philosophy & Public Affairs*, vol. 51, no. 1, pp. 50-89.

⁶ In addition to the following papers, there are a number of important books on this topic. Three especially useful ones for students wanting to engage deeply with this topic are Richard Posner (2006), *Catastrophe: Risk and Response*, Oxford University Press (especially Section 3); Christian Munthe (2011), *The Price of Precaution and the Ethics of Risk*, Springer Dordrecht; Daniel Steel (2015), *Philosophy and the Precautionary Principle: Science, Evidence, and Environmental Policy*, Cambridge University Press.