

Earth and Environmental Systems Institute  
314 Earth and Engineering Sciences Building  
Penn State University  
University Park, PA 16802-6813

helgeson@psu.edu  
[Google Scholar](#)  
[PhilPapers](#)  
[website](#)

## Casey Helgeson

**research** climate risk  
**interests** philosophy of science  
values in science  
research co-design

### appointments **Penn State University**

Assistant Research Professor, Earth and Environmental Systems Institute 2017–  
Affiliated Faculty, Rock Ethics Institute 2018–  
Affiliate Faculty, Department of Philosophy 2021–

### **French National Centre for Scientific Research (CNRS)**

Postdoctoral Researcher, GREGHEC joint research laboratory 2016–17

### **London School of Economics and Political Science**

Postdoctoral Researcher, Centre for Philosophy of Natural and Social Science 2013–16

### **education University of Wisconsin–Madison**

PhD, philosophy 2013  
MA, philosophy 2009  
BS, mathematics 1997

- journal articles** Pollack, A. B., **Helgeson, C.**, Kousky, C., and Keller, K. **2024**. Developing more useful equity measurements for flood-risk management. *Nature Sustainability*, 1–10. DOI: [10.1038/s41893-024-01345-3](#).
- Lucash, M. S., Williams, N. G., Srikrishnan, V., Keller, K., Scheller, R. M., **Helgeson, C.**, Nicholas, R. E., and Smithwick, E. A. H. **2023**. Balancing multiple forest management objectives under climate change in central Wisconsin, U.S.A. *Trees, Forests and People* 14 (100460), 100460. DOI: [10.1016/j.tfp.2023.100460](#).
- Helgeson, C.**, Nicholas, R. E., Keller, K., Forest, C. E., and Tuana, N. **2022**. Attention to values helps shape convergence research. *Climatic Change* 170 (17). DOI: [10.1007/s10584-021-03274-y](#).
- Helgeson, C.**, Srikrishnan, V., Keller, K., and Tuana, N. **2021**. Why simpler computer simulation models can be epistemically better for informing decisions. *Philosophy of Science* 88 (2), 213–233. DOI: [10.1086/711501](#).
- Keller, K., **Helgeson, C.**, and Srikrishnan, V. **2021**. Climate risk management. *Annual Review of Earth and Planetary Sciences* 49 (1), 95–116. DOI: [10.1146/annurev-earth-080320-055847](#).
- Helgeson, C.** **2020**. Structuring decisions under deep uncertainty. *Topoi. An International Review of Philosophy* 39 (2), 257–269. DOI: [10.1007/s11245-018-9584-y](#).
- Helgeson, C.** **2018**. Modus Darwin Reconsidered. *The British Journal for the Philosophy of Science* 69 (1), 193–213. DOI: [10.1093/bjps/axw015](#).
- Helgeson, C.**, Bradley, R., and Hill, B. **2018**. Combining probability with qualitative degree-of-certainty metrics in assessment. *Climatic Change* 149 (3), 517–525. DOI: [10.1007/s10584-018-2247-6](#).
- Bradley, R., **Helgeson, C.**, and Hill, B. **2017**. Climate Change Assessments: Confidence, Probability, and Decision. *Philosophy of Science* 84 (3), 500–522. DOI: [10.1086/692145](#).
- Guillaume, J. H. A., **Helgeson, C.**, Elsworth, S., Jakeman, A. J., and Kumm, M. **2017**. Toward best practice framing of uncertainty in scientific publications: A review of Water Resources Research

abstracts. *Water Resources Research* 53 (8), 6744–6762. DOI: [10.1002/2017wr020609](https://doi.org/10.1002/2017wr020609).

**Helgeson, C. 2017.** Pattern as observation: Darwin's 'great facts' of geographical distribution. *European Journal for Philosophy of Science* 7 (2), 337–351. DOI: [10.1007/s13194-016-0164-y](https://doi.org/10.1007/s13194-016-0164-y).

Thompson, E., Frigg, R., and **Helgeson, C. 2016.** Expert Judgment for Climate Change Adaptation. *Philosophy of Science* 83 (5), 1110–1121. DOI: [10.1086/687942](https://doi.org/10.1086/687942).

**Helgeson, C. 2015.** There Is No Asymmetry of Identity Assumptions in the Debate over Selection and Individuals. *Philosophy of Science* 82 (1), 21–31. DOI: [10.1086/679114](https://doi.org/10.1086/679114).

**Helgeson, C. 2013.** The Confirmational Significance of Agreeing Measurements. *Philosophy of Science* 80 (5), 721–732. DOI: [10.1086/673924](https://doi.org/10.1086/673924).

**Helgeson, C. 2013.** What Selection Can and Cannot Explain: A Reply to Nanay's Critique of Sober. *Philosophy of Science* 80 (1), 155–159. DOI: [10.1086/668880](https://doi.org/10.1086/668880).

Barrett, M., Clatterbuck, H., Goldsby, M., **Helgeson, C.**, McLoone, B., Pearce, T., Sober, E., Stern, R., and Weinberger, N. **2012.** Puzzles for ZFEL, McShea and Brandon's zero force evolutionary law. *Biology & Philosophy* 27 (5), 723–735. DOI: [10.1007/s10539-012-9321-7](https://doi.org/10.1007/s10539-012-9321-7).

**preprints** Cooper, C., **Helgeson, C.**, Troy, C. L. C., Keller, K., and Tuana, N. What do people care about when managing flood risks? A values-informed mental model approach. DOI: [10.31235/osf.io/wkgjip](https://doi.org/10.31235/osf.io/wkgjip).

**Helgeson, C.**, Auermuller, L., Gayle, D. B., Dangendorf, S., Gilmore, E., Keller, K., Kopp, R., Lorenzo-Trueba, J., Lowrie, K., Oppenheimer, M., Parrish, K., Ramenzoni, V., Tuana, N., and Wahl, T. Exploratory scoping of place-based research problems for convergence research. DOI: [10.31219/osf.io/z5ue4](https://doi.org/10.31219/osf.io/z5ue4).

**Helgeson, C.**, Keller, K., Nicholas, R. E., Srikrishnan, V., Cooper, C., Smithwick, E. A. H., and Tuana, N. Integrating values to improve the relevance and inclusiveness of climate-risk research. DOI: [10.31235/osf.io/c4k7d](https://doi.org/10.31235/osf.io/c4k7d).

Pollack, A., Santamaria-Aguilar, S., Maduwantha, P., **Helgeson, C.**, Wahl, T., and Keller, K. Funding rules that promote equity in climate adaptation outcomes. DOI: [10.31219/osf.io/kvyxr](https://doi.org/10.31219/osf.io/kvyxr).

Pollack, A., Campbell, J. E., Condon, M., Cooper, C., Coronese, M., Doss-Gollin, J., Hegde, P., **Helgeson, C.**, Kwakkel, J., and Lesk, C. Peer-reviewed climate change research has a transparency problem. The scientific community needs to do better. DOI: [10.31219/osf.io/29nhv](https://doi.org/10.31219/osf.io/29nhv).

**chapters** **Helgeson, C.**, Parker, W., and Tuana, N. **2025.** "How uncertainty interacts with ethical values in climate change research." In: *Uncertainty in Climate Change Research: An Integrated Approach*. Ed. by L. O. Mearns, C. Forest, H. Fowler, R. Lempert, and R. Wilby. Springer.

Smithwick, E. A. H., Caldwell, C., Klippel, A., Scheller, R. M., Tuana, N., Bird, R. B., Keller, K., Vickers, D., Lucash, M., Nicholas, R. E., Olson, S., Ruckert, K. L., Oyler, J., **Helgeson, C.**, and Huang, J. **2019.** "Learning About Forest Futures Under Climate Change Through Transdisciplinary Collaboration Across Traditional and Western Knowledge Systems." In: *Collaboration Across Boundaries for Social-Ecological Systems Science: Experiences Around the World*. Ed. by S. G. Perz. Cham: Springer International Publishing, pp. 153–184. DOI: [10.1007/978-3-030-13827-1\\_5](https://doi.org/10.1007/978-3-030-13827-1_5).

**reports** Iulo, L., Arora, A., Fowler, L., Goldberg, L., **Helgeson, C.**, Keller, K., Nicholas, R. E., Sharma, S., Tebyanian, N., Tuana, N., and Zarekarizi, M. **2020.** *Establishing priorities for Pennsylvania community flood resilience*. Research rep. Penn State Initiative for Resilient Communities. 7 pp. DOI: [10.31235/osf.io/qa4z7](https://doi.org/10.31235/osf.io/qa4z7).

**proceedings** Huang, J., Lucash, M. S., Simpson, M. B., **Helgeson, C.**, and Klippel, A. **2019.** Visualizing Natural Environments from Data in Virtual Reality: Combining Realism and Uncertainty. In: *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*. IEEE, pp. 1485–1488. DOI: [10.1109/VR.2019.8797996](https://doi.org/10.1109/VR.2019.8797996).

conferences,  
workshops

- Huang, X., Peng, W., Wang, P., Shiwang, J., Smith, S., and **Helgeson, C.** **Dec. 2023.** “Effects of model choice and uncertainties on the assessment of pollution and health disparities”. (poster). American Geophysical Union Fall Meeting. San Francisco, CA.
- Pollack, A., **Helgeson, C.**, Kousky, C., and Keller, K. **Dec. 2023.** “Transparency on underlying values is needed for useful equity measurements”. (poster). American Geophysical Union Fall Meeting. San Francisco, CA.
- Pollack, A., **Helgeson, C.**, Kousky, C., and Keller, K. **Oct. 2023.** “Transparency on underlying values is needed for useful equity measurements”. (poster). MultiSector Dynamics Workshop. Davis, CA.
- Pollack, A., **Helgeson, C.**, Kousky, C., and Keller, K. **Oct. 2023.** “Transparency on underlying values is needed for useful equity measurements”. (poster). Society of Decision Making Under Deep Uncertainty Annual Meeting. Delft, NL.
- Helgeson, C.** **Sept. 2023.** “Climate adaptation and public philosophy”. (panelist). Public Philosophy Network Annual Conference. Santa Cruz, CA.
- Cooper, C., **Helgeson, C.**, Keller, K., and Tuana, N. **Dec. 2021.** “What does it take for flood risk analysis to reflect homeowner values?” (poster). American Geophysical Union Fall Meeting. New Orleans, LA.
- Helgeson, C.**, Nicholas, R. E., Keller, K., Forest, C. E., and Tuana, N. **June 2019.** “Assessment of a multi-institution, multi-discipline research network”. (poster). Sustainability Research Networks Awardees Conference. Alexandria, VA: National Science Foundation.
- Helgeson, C.**, Srikrishnan, V., Keller, K., and Tuana, N. **Nov. 2018.** “Model simplicity where scientific models inform risk management”. (poster). Philosophy of Science Association Biennial Meeting. Seattle, WA.
- Helgeson, C.** and Hill, B. **May 2017.** “A comparison of approaches to deep uncertainty: Decision theory and decision support”. Coping with Uncertainty: Normative Approaches, Current Practice Workshop. Paris, France: École Normale Supérieure.
- Helgeson, C.** **Nov. 2016.** “Framing decisions under deep uncertainty”. Philosophy of Science Association Biennial Meeting. Atlanta, GA.
- Helgeson, C.** **Nov. 2016.** “Two pathways for combining modeling and decision support in climate change adaptation”. Society for Decision Making under Deep Uncertainty Annual Meeting. Washington, DC.
- Helgeson, C.** **Oct. 2016.** “Framing decisions under deep uncertainty”. New Trends in Rational Choice Theory Conference. Munich, Germany: LMU Munich.
- Helgeson, C.** **Oct. 2015.** “Better integrating theory and practice in deep uncertainty decision science”. Society for Decision Making Under Deep Uncertainty Annual Meeting. Delft, Netherlands.
- Helgeson, C.** **Aug. 2015.** “Likelihood and confidence in the IPCC’s uncertainty framework”. Congress of Logic, Methodology and Philosophy of Science. Helsinki, Finland.
- Helgeson, C.** **July 2015.** “Low confidence in extreme probabilities”. British Society for the Philosophy of Science Annual Meeting. Manchester, UK.
- Helgeson, C.** **June 2015.** “Decision and climate change assessments”. Workshop on Decision Making under Severe Uncertainty. London, UK: London School of Economics.
- Helgeson, C.**, Bradley, R., and Hill, B. **May 2015.** “Decision and climate change assessments”. Workshop on Uncertainty in Climate Science and its Impact on Decision-making. Paris, France: Université Paris-Sorbonne, Paris IV.
- Helgeson, C.**, Bradley, R., and Hill, B. **Mar. 2015.** “Decision and climate change assessments”. (poster). Understanding Uncertainty in Environmental Modelling Workshop. London, UK: London School of Economics, Centre for the Analysis of Time Series.

**Helgeson, C. Mar. 2014.** “Modus Darwin reconsidered”. Philosophy of Biology in the UK Workshop. Cambridge, UK: Cambridge University.

**Helgeson, C. July 2013.** “Modus Darwin reconsidered”. International Society for the History, Philosophy, and Social Studies of Biology Biennial Meeting. Montpellier, France.

**Helgeson, C. Mar. 2013.** “Modus Darwin reconsidered”. American Philosophical Association Pacific Division Annual Meeting. San Francisco, CA.

**Helgeson, C. Nov. 2012.** “The confirmational significance of agreeing measurements”. Philosophy of Science Association Biennial Meeting. San Diego, CA.

**Helgeson, C. July 2011.** “Why taxonomize hierarchically?” International Society for the History, Philosophy, and Social Studies of Biology Biennial Meeting. Salt Lake City, UT.

**Helgeson, C. Apr. 2009.** “Darwin’s biogeographical evidence”. Celebration of Darwin – A Conference on Darwin’s *Origin*. Blacksburg, VA.

#### invited talks

Department of River-Coastal Science and Engineering, Tulane University. **Nov. 2024.** “Exploratory scoping of place-based opportunities for convergence research”. New Orleans, LA.

Cornell University’s Climate Change Seminar Series. **Mar. 2024.** “Values and objectivity in climate-risk research”. Ithaca, NY.

NSF Coastlines and People Cross-Hub Seminar Series. **Nov. 2023.** “Successes and struggles on the path to convergence research”. (virtual). National Science Foundation. (with A. Pollack).

Paterno Fellows Program Lecture Series, Penn State. **Nov. 2023.** “The place of human values in climate-risk research”. State College, PA.

Penn State Climate Solutions Symposium. **May 2023.** “Stakeholder values in climate risk research”. Panel on Change & Risk: Compound Hazards, Integrated Impacts. State College, PA.

Irving Institute for Energy and Society, Dartmouth College. **Apr. 2023.** “Improving convergence science through managing values”. Hanover, NH.

Megalopolitan Coastal Transformation Hub Annual Meeting. **May 2022.** “Decision analyses as boundary objects to link stakeholders, academic researchers, and decision-makers”. (virtual). Rutgers University. (with K. Keller).

Collaborative Stakeholder Advisory Panel Quarterly Meeting, Megalopolitan Coastal Transformation Hub. **Apr. 2022.** “A process for choosing research problems and partner communities”. (virtual). Rutgers University.

External Advisory Board Semiannual Meeting, Megalopolitan Coastal Transformation Hub. **Apr. 2022.** “A process for choosing research problems and partner communities”. (virtual). Rutgers University. (with K. Keller).

Megalopolitan Coastal Transformation Hub Seminar Series. **Mar. 2022.** “How might decision analyses help communities to manage coastal climate risk?” (virtual). Rutgers University. (with K. Keller).

Megalopolitan Coastal Transformation Hub Seminar Series. **Nov. 2021.** “Values-informed mental models”. (virtual). Rutgers University. (with N. Tuana and K. Keller).

Department of Philosophy, Durham University. **Mar. 2021.** “Why simpler computer simulation models can be epistemically better for informing decisions”. (virtual). Durham, UK.

Susquehanna River Basin Commission. **Oct. 2020.** “Flood resilience in riverine communities: Understanding risk and facilitating values-informed decision making”. (virtual). (with L. Fowler, L. Lulo, N. Tebyanian, K. Keller, S. Sharma, and S. Leininger).

Department of Philosophy, University of South Carolina. **Feb. 2020.** “Why simpler computer simulation models can be epistemically better for informing decisions”. Columbia, SC.

Society for Decision Making under Deep Uncertainty Annual Meeting. **Nov. 2019.** “Where are the values in your analysis?” Plenary session. Delft, NL.

Susquehanna River Symposium. **Oct. 2019**. “Penn State Initiative for Resilient Communities: A pilot to develop community-based solutions to riverine flooding”. Keynote address. Lewisburg, PA: Bucknell University. (with L. Iulo and R. Nicholas).

NSF Sustainability Research Networks Awardees Conference. **June 2019**. “Value preferences and scientific knowledge”. Panel on Social Science Research and Policy Engagement. Alexandria, VA: National Science Foundation.

Rock Ethics Institute Seminar Series, Penn State. **Mar. 2018**. “Responsible framing of uncertainties in scientific publications”. State College, PA.

Center for Climate Risk Management Seminar Series, Penn State. **Jan. 2018**. “Value judgements within scientific practice”. State College, PA.

Models to Decisions: Decision Making Under Uncertainty Annual Conference. **July 2017**. “Informing decisions with models: Contributions from philosophy”. Exeter, UK.

IHPST, Université Paris 1 Panthéon-Sorbonne – CNRS. **Nov. 2016**. “Decision and climate change assessments”. Paris, FR: Institute of History, Philosophy of Sciences, and Technology.

Evidence Amalgamation Workshop, Durham University. **Nov. 2015**. “Treatment of uncertainties by the Intergovernmental Panel on Climate Change”. Durham, UK.

Evidence and Expertise Workshop, University of Helsinki. **Oct. 2015**. “Expert judgment for climate change adaptation planning”. Helsinki, FL.

Managing Severe Uncertainty Seminar Series, LSE. **May 2015**. “Expert judgment for climate change adaptation planning”. London, UK: London School of Economics.

Managing Severe Uncertainty Seminar Series, LSE. **Nov. 2014**. “Climate change uncertainties and expert elicitation”. London, UK: London School of Economics.

for Philosophy of Natural, C. and Social Science, L. **Jan. 2013**. “The confirmational significance of agreeing measurements”. London, UK: London School of Economics.

Department of Philosophy, Washington University in St. Louis. **Dec. 2012**. “Pattern as observation: Darwin’s geographical distribution argument”. St. Louis, MO.

Department of Philosophy, University of Wisconsin–Madison. **Nov. 2012**. “Pattern as observation: Darwin’s geographical distribution argument”. Madison, WI.

Center for Logic and Philosophy of Science, Tilburg University. **Oct. 2010**. “Darwin’s biogeographical evidence”. Tilburg, NL.

#### teaching

##### **Penn State University**

GEOSCI 597 – Climatic Change: Past, Present, and Possible Futures. Primary Instructor. Fall 2021.  
 PHIL 110 – Introduction to Philosophy of Science. Primary Instructor. Fall 2019.

##### **London School of Economics**

PH 404/213 – Scientific Revolutions. Primary Instructor. Fall 2014.

##### **University of Wisconsin–Madison**

PHILOS 210 – Reason in Communication. Primary Instructor. Fall 2009.  
 PHILOS 101 – Introduction to Philosophy. Teaching Assistant. Fall 2006.  
 PHILOS 210 – Reason in Communication. Teaching Assistant. Spring 2006.  
 PHILOS 211 – Elementary Logic. Teaching Assistant. Fall 2005.

##### **Guest lectures**

ENGS 172 – Climate Change and Engineering. ×2 (Dartmouth College) Spring 2024.  
 ENGS 7.02 – Climate Change. ×2 (Dartmouth College) Spring 2024.  
 34:970:631 – Communicating Science with Decision Makers. (Rutgers University) Spring 2024.  
 34:970:631 – Communicating Science with Decision Makers. (Rutgers University) Spring 2022.  
 GEOSC 450 – Risk Analysis in the Earth Sciences. (Penn State) Fall 2020.  
 EARTH 400 – Earth Science and Policy. (Penn State) Spring 2020.

##### **Other teaching**

Instructor. Climate Risk Management Summer Fest. (Dartmouth College) Summer 2023.



Instructor and Mentor. Summer Research Experience for Undergraduates Program. (Sustainable Development Institute, College of Menominee Nation.) Summer 2018.

### **Secondary School**

Mathematics Teacher. Britannica International School. Budapest, Hungary. 2001–2003.

#### **grants and contracts**

Co-Principal Investigator, Penn State Subaward of the *Megalopolitan Coastal Transformation Hub*. PI: Robert Kopp. NSF, \$981,900, (total: \$19,900,000). 2021–2026.  
Principal Investigator, *Climate and Sustainability Ethics Initiative*. Rock Ethics Institute (Penn State), \$75,500 (cumulative). 2019–2025.

#### **projects and networks**

*Megalopolitan Coastal Transformation Hub*. Team Co-Lead. PI: Robert Kopp. NSF. 2021–2026.  
*Penn State Initiative for Resilient Communities*. Participant. PI: Lisa Iulo. Office of the Provost (Penn State). 2019–2022.  
*Visualizing Forest Futures*. Participant. PI: Erica Smithwick. NSF. 2018–2021.  
*Network for Sustainable Climate Risk Management*. Participant. PI: Klaus Keller. NSF. 2012–2017.  
*Decision-Making & Belief Change Under Severe Uncertainty: A Confidence-Based Approach*. Participant. PI: Brian Hill. National Research Agency (France). 2015–2018.  
*Managing Severe Uncertainty*. Participant. PI: Richard Bradley. Arts and Humanities Research Council (UK). 2013–2016.

#### **professional service**

Co-Convener & Session Chair. Session: Climate Adaptation and Public Philosophy. Public Philosophy Network Annual Conference. Santa Cruz, CA. Sep. 2023.  
Co-Organizer. Workshop: Improving State-level Energy Decisions to Address Air Quality, Health, and Equity Goals. Washington, D.C. Sep. 2023.  
Co-Organizer. Climate Risk Management Summer Fest. Dartmouth College. Aug. 2023.  
Session Chair. ×2 Philosophy of Science Association Biennial Meeting. Pittsburgh, PA. Nov. 2022.  
Lead Organizer & Moderator. Science and Values in Climate Risk Management Webinar Series. Center for Climate Risk Management (Penn State). 2019–2020.  
Co-Convener & Session Chair. Session: Incorporating Values in Modeling and Decision Analyses. Society for Decision Making under Deep Uncertainty Annual Meeting. Delft, NL. Nov. 2019.  
Guest Editor. *The Reasoner*, Volume 11, Number 7. July, 2017.  
Lead Organizer. Coping with Severe Uncertainty Workshop. HEC Paris. May 2017.  
Session Chair. Philosophy of Biology at Madison (POB@M) Workshop. UW–Madison. May 2016.  
Lead Organizer. Decision Making under Severe Uncertainty Workshop. LSE. June 2015.  
Lead Organizer. Managing Severe Uncertainty Seminar Series. LSE. 2013–2016  
Organizing Committee. Philosophy of Biology at Madison Workshop. UW–Madison. June 2012.  
Organizing Committee. Philosophy of Biology at Madison Workshop. UW–Madison. May 2010.  
Organizing Committee. Formal Epistemology Workshop. UW–Madison. May 2008.

#### **institutional service**

Committee Member. Advisory Committee to the Director of the Earth and Environmental Systems Institute (Penn State). 2020–present.  
Committee Member. Rock Ethics Institute Steering Committee (Penn State). 2019–present.  
Committee Member. Committee implementing the Good Practice Scheme of the Society for Women in Philosophy. Department of Philosophy, Logic, and Scientific Method (LSE). 2014–2015.

#### **additional education**

Summer School on Sustainable Climate Risk Management, Penn State. Summer 2017.  
Advanced Study Summer Colloquium, National Center for Atmospheric Research. Summer 2014.  
Complex Systems Summer School, Santa Fe Institute. Summer 2009.

**fellowships  
and awards**

Marcus and Blanche Singer Graduate Fellowship (UW–Madison). 2012.  
Holtz Center for Science and Technology Studies (UW–Madison) Travel Grant. 2011  
Visiting Fellowship, Tilburg Center for Logic and Philosophy of Science. Fall 2010.  
UW–Madison Graduate School Travel Grant. 2009.  
Pittsburgh Center for Philosophy of Science Travel Grant. 2009  
Pittsburgh Center for Philosophy of Science Travel Grant. 2007.  
National Science Foundation Graduate Research Fellowship. 2007.