

# Chris Eliot Forest

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## Education

- Ph.D. in Meteorology, February 1996, Massachusetts Institute of Technology  
Thesis title: Paleoaltimetry incorporating atmospheric physics and botanical estimates of paleoclimate  
Honors: Office of Naval Research Graduate Research Fellow 1990-1993
- B.S. 1990, University of Wisconsin - Madison  
Major: Applied Mathematics, Engineering, and Physics  
Honors: Phi Beta Kappa Honor Society

## Appointments

- 2020–present: Director, Center for Earth System Modeling, Analysis, and Data, The Pennsylvania State University.
- 2019–present: Senior Research Fellow, Climate Dynamics, Project Drawdown, ([drawdown.org](http://drawdown.org)).
- 2018–present: Professor of Climate Dynamics, Department of Meteorology and Atmospheric Science, Department of Geosciences, The Pennsylvania State University.
- 2015–2018: Associate Professor of Climate Dynamics, Department of Geosciences, The Pennsylvania State University.
- 2008–2018: Associate Professor of Climate Dynamics, Department of Meteorology, The Pennsylvania State University.
- 2014–present: Associate Director, Sustainable Climate Risk Management (SCRiM), An NSF Sustainable Research Network.
- 2009–present: Associate, Earth and Environmental Systems Institute, The Pennsylvania State University.
- 2008: Principal Research Scientist, Center for Global Change Science, Massachusetts Institute of Technology (MIT).
- 1999–2008: Research Scientist, Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology (MIT).
- 1997–1999: Post-doctoral Associate with Prof. Peter Stone (MIT). Constraining uncertainties in Climate Models using climate-change detection methods.
- 1996–1997: Post-doctoral Associate with Prof. Dara Entekhabi (Civil and Environmental Engineering, MIT). Investigated the use of NCEP Reanalysis data for climate studies of water vapor and microwave emissions over land.
- Summer 1996: Research Affiliate with Prof. John Marshall (MIT). Tested the use of potential vorticity mixing theory as an eddy parameterization scheme in the MIT ocean GCM.

- 1990–1996: Graduate Student at MIT Center for Meteorology and Physical Oceanography. Developed a paleoaltimetry method with Kerry Emanuel and Peter Molnar.
- 1991 Summer: Naval Oceanic and Atmospheric Research Laboratory Incorporated a microphysics test case with Dr. Rich Hodur for the Coupled Ocean-Atmosphere Mesoscale Predictive System (COAMPS)
- 1987–1990: Department of Nuclear Engineering and Engineering Physics - UW-Madison. Investigated plasma double layers under Prof. Noah Hershkowitz

## Teaching

- Spring 2022: Pennsylvania State University, EARTH 400 – Earth Science Seminar.
- Spring 2022: Pennsylvania State University, METEO 523 – Modeling the Climate System.
- Fall 2021: Pennsylvania State University, INTAD 577 – Global Agricultural Systems
- Fall 2021: Pennsylvania State University, METEO 570 – Climate System Dynamics.
- Spring 2021: Pennsylvania State University, EARTH 400 – Earth Science Seminar.
- Spring 2021: Pennsylvania State University, METEO 473 – Application of Computers to Meteorology.
- Fall 2020: Pennsylvania State University, METEO 570 – Climate System Dynamics.
- Spring 2020: Pennsylvania State University, METEO 523 – Modeling the Climate System.
- Fall 2019: Pennsylvania State University, METEO 570 – Climate System Dynamics.
- Spring 2019: Pennsylvania State University, METEO 473 – Application of Computers to Meteorology.
- Fall 2018: Pennsylvania State University, METEO 570 – Climate System Dynamics.
- Spring 2018: Pennsylvania State University, METEO 523 – Modeling the Climate System.
- Fall 2017: Pennsylvania State University, METEO 580 – Communication of Meteorological Research.
- Summer 2017: SCRiM Summer School, Organizer and Lecturer, Topics: Climate Change, Climate Modeling, Uncertainty in Climate Predictions.
- Spring 2016: Pennsylvania State University, METEO 473 – Application of Computers to Meteorology.
- Fall 2015: Pennsylvania State University, METEO 480M/580 – Communication of Meteorological Research.
- Summer 2015: Abdus Salam International Centre for Theoretical Physics, Workshop on Uncertainty Quantification in Climate Modeling and Projection, Lecturer.
- Spring 2015: Pennsylvania State University, METEO 523 – Modeling the Climate System.
- Fall 2014: Pennsylvania State University, METEO 470 – Climate Dynamics.
- Summer 2014: SCRiM Summer School, Organizer and Lecturer, Topics: Climate Change, Climate Modeling, Uncertainty in Climate Predictions.
- Summer 2014: NCAR Advanced Studies Program Colloquium, Organizer and Lecturer, Uncertainty in Climate Research: An Integrated Approach.

- Spring 2014: Pennsylvania State University, METEO 480M/580 – Communication of Meteorological Research.
- Fall 2013: Pennsylvania State University, METEO 596a – Numerical Methods for Geophysical Fluid Dynamics (co-taught with Dr. Marcelo Chamecki).
- Fall 2013: Pennsylvania State University, METEO 470 – Climate Dynamics.
- Spring 2013: Pennsylvania State University, METEO 523 – Modeling the Climate System.
- Fall 2012: Pennsylvania State University, METEO 470 – Climate Dynamics.
- Summer 2012: NCAR IMAGE Theme of the Year,
- Fall 2011: Pennsylvania State University, METEO 597b – Climate Dynamics of the Earth, Meteorology 597i.
- Spring 2011: Pennsylvania State University, METEO 474 – Computer Methods in Meteorological Analysis and Forecasting.
- Fall 2010: Pennsylvania State University, METEO 597i – Climate Dynamics of the Earth, Meteorology 597i.
- Summer 2010: Lecturer at NCAR, IMAGE Theme of the Year, Graduate Summer School on Mathematics of Climate Change, Boulder, CO.
- Spring 2010: Pennsylvania State University, METEO 474 – Computer Methods in Meteorological Analysis and Forecasting.
- Fall 2009: Pennsylvania State University, METEO 470 – Climate Dynamics.
- 2006-2007 Masters Thesis Co-advisor: Development of reduced-form climate and carbon-cycle model for use in integrated assessment modelling (student: Greg Rabin, MIT EECS).
- 2005 UROP Co-advisor: Research project on sea-ice modelling uncertainty for MIT Undergraduate Research Opportunity Program (UROP) student Victoria Hsu (summer and fall terms).
- 2000-present Undergraduate Physics Tutor.
- 1997 Consulting Work: Advised project leaders and instructed teachers on meteorological content of satellite images for earth science curriculum in grades 6-12 as part of NSF-funded project at TERC, a nonprofit research and development organization in Cambridge, MA (see <http://www.terc.edu/>).
- 1995 MIT Independent Activities Period: Teaching Assistant to Lodovica Illari for Weather Forecasting Class.
- 1993 Fall Semester MIT: Teaching Assistant to Prof. Mario Molina and Prof. Ronald Prinn for Atmospheric Physics and Chemistry.

**Undergraduate Research Students**

- Baylee Sexton (Meteorology & Earth System Science, Class of 2022)
- Jacob Morse (Meteorology, Class of 2021)
- Alexander Tomoff (Meteorology, Class of 2018)
- Zach Barkley (Meteorology, Class of 2014)
- Randy Miller (Meteorology, Class of 2013)
- Erin Thomas (Meteorology, Class of 2012)
- Alicia Klees (Meteorology, Class of 2012)
- Ben Castellani (Meteorology, Class of 2010)

**Graduate Students Advised**

*Current:*

- Vikrant Sapkota (Ph.D., Meteorology and Atmospheric Science), Fall 2019 to present, Main advisor
- Vinicius Oliveira Silva (visiting Ph.D. student in Water Resources, Universidade Federal De Lavras, ufla.br) Fall 2019 to present, Main advisor at Penn State

*Completed:*

- Robert Ceres (Ph.D., Meteorology) Fall 2018, (co-advised by Klaus Keller) Fall 2018
- Bicheng Chen (Ph.D., Meteorology) Summer 2017, Chair/Advisor (Advised by M. Chamecki to Fall 2015)
- Livia Souza Freire Grion (Ph.D., Meteorology) Fall 2016 Chair/Advisor, (Advised by M. Chamecki to Fall 2015)
- Alexis Hoffman (M.S., Meteorology) Summer 2013
- Alexis Hoffman (Ph.D., Meteorology) Spring 2018
- Alex Libardoni (M.S., Meteorology) Summer 2011
- Alex Libardoni (Ph.D., Meteorology) Summer 2017
- Perry Oddo (M.S., Geosciences) Spring 2016, (co-advised with K. Keller)
- Kristina Rolph (Ph.D., Meteorology) Fall 2020
- Kelsey Ruckert (M.S., Geosciences) Fall 2015, (co-advised with K. Keller)
- Chii-Yun (Judy) Tsai (M.S., Meteorology) Spring 2013
- Chii-Yun (Judy) Tsai (Ph.D., Meteorology) Summer 2018
- Ashley Warner (M.S., Meteorology) Summer 2014
- Jeffery Waters (M.S., Meteorology) Spring 2011, (co-advised with J. Evans)
- Matthew Williams (M.S., Meteorology and Atmospheric Science) Spring 2019, (co-advised with M. Gervais)

**Graduate Degree Committees**

*Current:*

- Takafumi Seguchi (M.S., Meteorology)
- Jim Limbacher

*Completed:*

- Nicolai Balashov (M.S., Meteorology)
- Natasha Batalha (Ph.D., Astronomy & Ph.D., Astrobiology)
- Robert Ceres (Ph.D., Meteorology)
- Lisa Diaz (M.S., Meteorology)
- Lisa Diaz (Ph.D., Meteorology)
- Qin Fan (Ph.D., Agricultural Economics)
- Yawen Guan (Ph.D., Statistics)
- Yuting He (Ph.D., Meteorology)
- Alexis Hoffman (M.S., Ph.D. Meteorology)
- Xinye Ji (Ph.D., Civil Engineering)
- Mohammad Kamani (Ph.D., Information Sciences and Technology)
- Katia Lamer (Ph.D., Meteorology)
- Alex Libardoni (M.S., Ph.D. Meteorology)
- Michael Lowe (M.S., Meteorology)
- Mauricio Nascimento (Ph.D., Statistics)
- Perry Oddo (M.S., Geosciences)
- Roman Olson (Ph.D., Geoscience)
- Brett Raczka (Ph.D., Meteorology)
- Kelsey Ruckert (M.S., Geosciences)
- Keith Sawicz (Ph.D., Civil and Environmental Engineering)
- Justin Schulte (Ph.D., Meteorology)
- Chii-Yun (Judy) Tsai (Ph.D., Meteorology)
- Jeffrey Waters (M.S., Meteorology)
- Yu Zhang, (Ph.D., Information Sciences and Technology)
- Xinye (Rachel) Zheng (Ph.D., Information Sciences and Technology)

**PhD External  
Examiner:**

- Roger Bodman (PhD in Earth Sciences, University of Melbourne, Australia)
- Luke J. Harrington (PhD in Geography, Environment and Earth Sciences, Victoria University of Wellington, New Zealand)
- Daniel Rowlands (PhD in Atmospheric, Oceanic, and Planetary Physics, University of Oxford, United Kingdom)

**Post-doctoral  
Researchers  
Advised**

- Dr. Wei Li (2009-2014)
- Dr. Robert Ceres (2018-2020)

## Publications

Total number of publications in peer reviewed literature: 71

ResearcherID: M-1993-2014

ORCID ID: [orcid.org/0000-0002-2643-0186](https://orcid.org/0000-0002-2643-0186)

### Note Identifiers:

\*\* indicates post-doctoral researcher advisee

\* indicates graduate student advisee

### Articles

In review or preparation:

1. Ceres\*, R.L., K. Keller, and **C.E. Forest**, The critical role of sample size in optimizing multi-objective storm surge risk mitigation strategies, *Nature Communication*, in prep, 2022.
2. Colbert\* KR, Errickson FC, Anthoff D, Forest CE. Including climate system feedbacks increases the social cost of methane. Submitted to *Science Advances* December 21, 2021, (earlier preprint available at: <https://arxiv.org/abs/2012.04062>),

Published (or in press):

1. Helgeson, C., R. E. Nicholas, K. Keller, **C. E. Forest**, and N. Tuana. Attention to values helps shape convergence research, *Climatic Change*, 170:17, <https://doi.org/10.1007/s10584-021-03274-y>, 2022.
2. Ceres\*, R.L., **C.E. Forest**, and K. Keller, Trade-offs and synergies in managing coastal flood risk: A case study for New York City, *Journal of Flood Risk Management*, First published: 11 November 2021, <https://doi.org/10.1111/jfr3.12771>, 2021.
3. Veltman, K., C.A. Rotz, L. Chase, J. Cooper, C.E. Forest, P.A. Ingraham, R.C. Izaurralde, C.D. Jones, R.E. Nicholas, M.D. Ruark, W. Salas, G. Thoma, O. Jolliet, Assessing and reducing the environmental impact of dairy production systems in the northern US in a changing climate, *Agricultural Systems*, 192, <https://doi.org/10.1016/j.agsy.2021.103170>, 2021.
4. Snyder, G.J., S. LeBlanc, D. Crane, H. Pangborn, C.E. Forest, A. Rattner, L. Borgsmiller, S. Priya, Distributed and localized cooling with thermoelectrics, *Joule*, 5(4), <https://doi.org/10.1016/j.joule.2021.02.011>, 2021.
5. Williams\*, M.Z., M. Gervais, **C.E. Forest**, Causes and impacts of sea ice variability in the sea of Okhotsk using CESM-LE, *Climate Dynamics*, <https://doi.org/10.1007/s00382-020-05572-0>, 2021.
6. Tsai\*, C.-Y., **Forest, C.E.**, and D. Pollard, The role of internal climate variability in projecting Antarctica's contribution to future sea-level rise, *Climate Dynamics*, 55, 1875–1892, <https://doi.org/10.1007/s00382-020-05354-8>, 2020.
7. Bopp, G.P., B.A. Shaby, **C.E. Forest**, and A. Mejia, Projecting Flood-Inducing Precipitation with a Bayesian Analogue Model. *Journal of Agricultural, Biological and Environmental Statistics (JABES)*, <https://doi.org/10.1007/s13253-020-00391-6>, 2020.

8. Hoffman\*, A., A. Kemanian, and **C.E. Forest**, The response of maize, sorghum, and soybean yield to growing-phase climate revealed with machine learning, *Env. Research Letters*, <http://iopscience.iop.org/10.1088/1748-9326/ab7b22>, 2020.
9. Libardoni\*, A.G., **C.E. Forest**, A.P. Sokolov, and E. Monier, Underestimating Internal Variability Leads to Narrow Estimates of Climate Sensitivity, *Geophys. Res. Letters*, 46, <https://doi.org/10.1029/2019GL082442>, 2019.
10. Baker, H.S., T. Woollings, **C.E. Forest**, M.R. Allen, The Linear Sensitivity of the North Atlantic Oscillation and Eddy-Driven Jet to SSTs, *J. Climate*, 32, 6491–6511, <https://doi.org/10.1175/JCLI-D-19-0038.1>, 2019.
11. Ceres\*, R.L., K. Keller, and **C.E. Forest**, Optimization of multiple storm surge risk mitigation strategies for an Island City On a Wedge, *Environmental Modelling and Software*, <https://doi.org/10.1016/j.envsoft.2019.06.011>, 2019.
12. Rolph\*, K.A., **C.E. Forest**, and M.D. Ruark, The role of non-CO<sub>2</sub> mitigation options within the dairy industry for pursuing climate change targets, *Env. Research Letters*, <https://doi.org/10.1088/1748-9326/ab28a3>, 2019.
13. Libardoni\*, A.G., **C.E. Forest**, A.P. Sokolov, and E. Monier, Estimates of climate system properties incorporating recent climate change, *Adv. Stat. Clim. Meteorol. Oceanogr.*, 4, 19–36, <https://doi.org/10.5194/ascmo-4-19-2018>, 2018.
14. Libardoni\*, A.G., **C.E. Forest**, A.P. Sokolov, and E. Monier, Baseline Evaluation of Model Parameter Estimates in the Updated MIT Earth Systems Model, *Geosci. Model Dev.*, 11, 3313–3325, <https://doi.org/10.5194/gmd-11-3313-2018>, 2018.
15. Sokolov, A., Kicklighter, D., Schlosser, A., Wang, C., Monier, E., Brown-Steiner, B., R. Prinn, C. Forest, X. Gao, A. Libardoni\*, and S. Eastham, Description and Evaluation of the MIT Earth System Model (MESM), *Journal of Advances in Modeling Earth Systems*, 10, 1759–1789. <https://doi.org/10.1002/2018MS001277>, 2018.
16. **Forest, C.E.**, Inferred Net Aerosol Forcing Based on Historical Climate Changes: A Review, *Current Climate Change Reports*, <https://doi.org/10.1007/s40641-018-0085-2>, 2018.
17. Ceres\*, R.L., **C.E. Forest**, and K. Keller, Understanding the detectability of potential changes to the 100-year peak storm surge, *Climatic Change*, <https://doi.org/10.1007/s10584-017-2075-0>, 2017.
18. Hoffman\*, A.L., A. Kemanian, and **C.E. Forest**, Analysis of climate signals in the crop yield record of Sub-Saharan Africa, *Global Change Biology*, <https://doi.org/10.1111/gcb.13901>, 2017.
19. Oddo\*, P.C., B.S. Lee, G.G. Garner, V. Srikrishnan, P.M. Reed, **C.E. Forest**, K. Keller, Deep Uncertainties in Sea-Level Rise and Storm Surge Projections: Implications for Coastal Flood Risk Management *Risk Analysis*, <https://doi.org/10.1111/risa.12888>, 2017.
20. Tsai\*, C.-Y., **Forest, C.E.**, and D. Pollard, Assessing the contribution of internal climate variability to anthropogenic changes in ice sheet volume, *Geophys. Res. Lett.*, 44, 6261–6268, <https://doi.org/10.1002/2017GL073443>, 2017.
21. National Academies of Sciences, Engineering, and Medicine. *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon*. Committee on Assessing Approaches to Updating the Social Cost of Carbon, Board on Environmental Change

- and Society. (Members: M.L. Cropper (Cochair), R.G. Newell (Cochair), M. Allen, M. Auffhammer, **C.E. Forest**, I.Y. Fung, J. Hammitt, H.D. Jacoby, R. Kopp, W. Pizer, S. Rose, R. Schmalensee, J.P. Weyant, J. Heimberg, C.J. Wichman, M. Ghitelman). Washington, DC: The National Academies Press, <https://doi.org/10.17226/24651>, 2017.
22. Ruckert\*, K.L., G. Shaffer, D. Pollard, Y. Guan, T.E. Wong, **C.E. Forest**, and K. Keller, Assessing the Impact of Retreat Mechanisms in a Simple Antarctic Ice Sheet Model Using Bayesian Calibration. *PLoS ONE* 12(1):e0170052. <https://doi.org/10.1371/journal.pone.0170052>, 2017.
  23. Qian, Y., C. Jackson, F. Giorgi, B. Booth, Q.-G. Duan and **C. Forest**, D. Higdon, Z. J. Hou, and G. Huerta, Uncertainty Quantification in Climate Modeling and Projection, *Bul. Am. Meteorol. Soc.*, 5, 821–824, <https://doi.org/10.1175/BAMS-D-15-00297.1>, 2016.
  24. Ruckert\*, K.L., A.M.R. Bakker, Y. Guan, **C.E. Forest**, and K. Keller, The effects of time-varying observation errors on semi-empirical sea-level projections, *Climatic Change*, <https://doi.org/10.1007/s10584-016-1858-z>, 2016.
  25. National Academies of Sciences, Engineering, and Medicine. Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update. Committee on Assessing Approaches to Updating the Social Cost of Carbon, Board on Environmental Change and Society. (Members: M.L. Cropper (Cochair), R.G. Newell (Cochair), M. Allen, M. Auffhammer, **C.E. Forest**, I.Y. Fung, J. Hammitt, H.D. Jacoby, R. Kopp, W. Pizer, S. Rose, R. Schmalensee, J.P. Weyant, J. Heimberg, C.J. Wichman, M. Ghitelman). Washington, DC: The National Academies Press, 2016.
  26. Gleckler, P.J., P.J. Durack, R.J. Stouffer, G.C. Johnson, and **C.E. Forest**, Industrial Era Global Ocean Heat Uptake Doubles in Recent Decades, *Nature Climate Change*, <https://doi.org/10.1038/nclimate2915>, 2016.
  27. Sriver, R.L., **C.E. Forest**, and K. Keller, Effects of initial conditions uncertainty on regional climate variability: An analysis using a low-resolution CESM ensemble, *Geophys. Res. Lett.*, <https://doi.org/10.1002/2015GL064546>, 2015.
  28. Tsai\*, C.-Y., **C.E. Forest**, and T. Wagener, On the use of SST-forced teleconnection patterns to estimate precipitation effects on regional river basins, *Clim. Dynamics*, <https://doi.org/10.1007/s00382-014-2449-1>, 2014.
  29. Li\*\*, W. and **C.E. Forest**, Estimating the sensitivity of the atmospheric teleconnection patterns to SST anomalies using a linear statistical method. *J. Climate*, 27, 9065–9081. <https://doi.org/10.1175/JCLI-D-14-00231.1>, 2014.
  30. Hoffman\*, A.L., **C.E. Forest**, and W. Li\*\*, On the use of SST-forced teleconnection patterns to estimate dust emissions and depositions at sub-continental scales, *J. Geophys. Res.- Atmos.*, <https://doi.org/10.1002/2014JD021682>, 2014.
  31. Flato, G., J. Marotzke, B. Abiodun, P. Braconnot, S. C. Chou, W. Collins, P. Cox, F. Driouech, S. Emori, V. Eyring, **C. Forest**, P. Gleckler, E. Guilyardi, C. Jakob, V. Kattsov, C. Reason and M. Rummukainen, Evaluation of Climate Models. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels,



- Y. Xia, V. Bex and P.M. Midgley (eds.)*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. pp. 741–866, 2013.
32. Monier, E., J. Scott, A. Sokolov, **C.E. Forest** and A. Schlosser, An Integrated Assessment Modeling Framework for Uncertainty Studies in Global and Regional Climate Change: The MIT IGSM-CAM (version 1.0), *Geoscientific Model Development*, 6, 2063–2085, 2013.
  33. Zickfeld, K., M. Eby, K. Alexander, A.J. Weaver, E. Cresspin, T. Fichet, H. Goosse, G. Philippon-Berthier, N. R. Edwards, P.B. Holden, A.V. Eliseev, I. Mokhov, G. Feulner, H. Kienert, M. Perrette, **C.E. Forest**, P. Friedlingstein, F. Joos, R. Spahni, M. Steinacher, M. Kawamiya, K. Tachiiri, D. Kicklighter, E. Monier, A. Schlosser, A. Sokolov, K. Matsumoto, K.S. Tokos, S.M. Olsen, J. O.P. Pedersen, A. Ridgwell, G. Shaffer, M. Yoshimori, N. Zeng, and F. Zhao, Long-term Climate Change Commitment and Reversibility: An EMIC Intercomparison, *J. Climate*, <https://doi.org/10.1175/JCLI-D-12-00584.1>, 2013.
  34. Eby, M., A.J. Weaver, K. Alexander, K. Zickfeld, A. Abe-Ouchi, A.A. Cimadoribus, E. Cresspin, S.S. Drijfhout, N.R. Edwards, A.V. Eliseev, G. Feulner, T. Fichet, **C. E. Forest**, H. Goosse, P.B. Holden, F. Joos, M. Kawamiya, D. Kicklighter, H. Kienert, K. Matsumoto, I.I. Mokhov, E. Monier, S.M. Olsen, J.O.P. Pedersen, M. Perrette, G. Philippon-Berthier, A. Ridgwell, A. Schlosser, T. Schneider von Deimling, G. Shaffer, R.S. Smith, R. Spahni, A.P. Sokolov, M. Steinacher, K. Tachiiri, K. Tokos, M. Yoshimori, N. Zeng, and F. Zhao, Historical and Idealized Climate Model Experiments: An EMIC Intercomparison. *Climates of the Past*, 9, 1111-1140, <https://doi.org/10.5194/cp-9-1111-2013>, 2013.
  35. Libardoni\*, A.G., and **C.E. Forest**, Correction to “Sensitivity of distributions of climate system properties to the surface temperature data set,” *Geophys. Res. Lett.*, 40, 2309–2311, <https://doi.org/10.1002/grl.50480>, 2013.
  36. Schlosser, A., X. Gao, K. Strzepak, A. Sokolov, **C. Forest**, S. Awadalla and W. Farmer, Quantifying the Likelihood of Regional Climate Change: A Hybridized Approach, *J. Climate*, <https://doi.org/10.1175/JCLI-D-11-00730.1>, 2012.
  37. Li\*\*, W., **C.E. Forest**, and J.J. Barsugli, Comparing two methods to estimate the sensitivity of regional climate simulations to tropical SST anomalies, *J. Geophys. Res.*, 117, D20103, <https://doi.org/10.1029/2011JD017186>, 2012.
  38. Waters\*, J.J., J.L. Evans, and **C.E. Forest**, Large-scale diagnostics of tropical cyclogenesis potential using environment variability metrics and logistic regression models, *J. Climate*, 25, pp 6092-6107, <https://doi.org/10.1175/JCLI-D-11-00359.1>, 2012.
  39. Rowlands, D. J., D.J. Frame, D. Ackerley, T. Aina, B.B.B. Booth, C. Christensen, M. Collins, N. Faull, **C.E. Forest**, B.S. Grandey, E. Gryspeerd, E.J. Highwood, W.J. Ingram, S. Knight, A. Lopez, N. Massey, F. McNamara, N. Meinshausen, C. Piani, S.M. Rosier, B.M. Sanderson, L.A. Smith, D.A. Stone, M. Thurston, K. Yamazaki, Y.H. Yamazaki, and M.R. Allen, Broad range of 2050 warming from an observationally constrained large climate model ensemble, *Nature Geoscience*, 5, 256–260, <https://doi.org/10.1038/NCEO1430>, 2012.
  40. Webster, M., A.P. Sokolov, J.M. Reilly, **C.E. Forest**, S. Paltsev, A. Schlosser, C. Wang, D. Kicklighter, M. Sarofim, J. Melillo, R.G. Prinn and H.D. Jacoby. Analysis

- of Climate Policy Targets under Uncertainty, *Climatic Change*, 112:569–583, <https://doi.org/10.1007/s10584-011-0260-0>, 2012.
41. Libardoni\*, A. G., and **C.E. Forest**, Sensitivity of distributions of climate system properties to the surface temperature dataset, *Geophys. Res. Lett.*, 38, L22705, <https://doi.org/10.1029/2011GL049431>, 2011.
  42. Sokolov, A.P., **C.E. Forest**, and P.H. Stone, Sensitivity of Climate Change Projections to Uncertainties in the Estimates of Observed Changes in Deep-Ocean Heat Content, *Clim. Dyn.* <https://doi.org/10.1007/s00382-009-0556-1>, 2010.
  43. Sokolov, A.P., P.H. Stone, **C.E. Forest**, R.G. Prinn, M.C. Sarofim, M. Webster, S. Paltsev, C.A. Schlosser, D. Kicklighter, S. Dutkiewicz, J. Reilly, C. Wang, B. Felzer, J. Melillo, and H.D. Jacoby, Corrigendum, *J. Climate*, 23, 2230–2231, <https://doi.org/10.1175/2009JCLI3566.1>, 2010.
  44. Sokolov, A.P., P.H. Stone, **C.E. Forest**, R.G. Prinn, M.C. Sarofim, M. Webster, S. Paltsev, C.A. Schlosser, D. Kicklighter, S. Dutkiewicz, J. Reilly, C. Wang, B. Felzer, J. Melillo, and H.D. Jacoby, Probabilistic Forecast for Twenty-First-Century Climate Based on Uncertainties in Emissions (Without Policy) and Climate Parameters. *J. Climate*, 22, 5175–5204. <https://doi.org/10.1175/2009JCLI2863.1>, 2009.
  45. Sansó, B., and **C. Forest**, Statistical Calibration of Climate System Properties. *J. Royal Stat. Soc. A*) Appl. Statist., Vol. 58, Part 4, p.485–503, 2009.
  46. Drignei, D., **C. Forest**, and D. Nychka, Parameter Estimation for Computationally Intensive Nonlinear Regression with an Application to Climate Modeling. *Annals of Applied Statistics*, Vol. 2, No. 4, 1217–1230, <https://doi.org/10.1214/08-AOAS210>, 2008.
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#### *Conference Proceedings*

1. R.L. Ceres Jr., C.E. Forest, and K. Keller, Supporting policymakers with assessments of long-term risks and adaptation strategies for recovery from Hurricane Michael using the island City on a Wedge. Presented at: 15IMPACTS: Major Weather Events and Impacts of 2018, AMS Annual Meeting, Phoenix, AZ, 2019.
2. R.L. Ceres Jr., C.E. Forest, and K. Keller, 2018, The 100-year flood seems to be changing. Can we really tell?, Presented at GEWEX 2018.
3. Alex G. Libardoni, C. E. Forest, A. P. Sokolov, and E. Monier, 2018, Improving Constraints on Climate System Properties with Additional Data and New Statistical and Sampling Methods, Abstract ID: 335811, Presented at AMS Annual Meeting
4. C.E. Forest, A.G. Libardoni, A.P. Sokolov, E. Monier, 2017, Improving Constraints on Climate System Properties with Additional Data and New Statistical and Sampling Methods, Abstract ID: A33C-2378, Presented at AGU Fall Meeting
5. R.L. Ceres Jr., C.E. Forest, and K. Keller, 2017, The 100-year flood seems to be changing. Can we really tell?, Abstract ID: NH34B-03, Presented at AGU Fall Meeting
6. K. Rolph, C.E. Forest, 2017, The role of non-CO2 mitigation within the dairy sector in pursuing climate goals, Abstract ID: GC53B-0890, Presented at AGU Fall Meeting
7. C.-Y. Tsai, C.E. Forest, D. Pollard, 2017, Assessing the role of internal climate variability in Antarctica's contribution to future sea-level rise, Abstract ID: C12B-05, Presented at AGU Fall Meeting
8. A.P. Sokolov, S. Paltsev, Y.H. Chen, E. Monier, A.G. Libardoni, C.E. Forest, 2017, Probabilistic Estimates of Climate Impacts of the Paris Agreement and Contributions from Different Countries, Abstract ID: GC21E-0971, Presented at AGU Fall Meeting
9. C.-Y. Tsai, C.E. Forest, D. Pollard, 2016, Estimating the impact of internal climate variability on ice sheet model simulations, Abstract ID: C41B-0670, Presented at AGU Fall Meeting

10. A.L. Hoffman, C.E. Forest, and A. Kemanian, 2016, Estimating the impact of mineral aerosols on crop yields in food insecure regions using statistical crop models, Abstract ID: A14C-08, Presented at AGU Fall Meeting
11. A.P. Sokolov, S. Paltsev, H. Chen, C.E. Forest, A.G. Libardoni, E. Monier, X. Gao, 2016, Probabilistic Estimates of Climate Impacts of the Paris Agreement, Abstract ID: GC31F-1169, Presented at AGU Fall Meeting
12. C.-Y. Tsai, C. Forest, and D. Pollard, 2016, Assessing internal variability of climate variables as a driving force for ice sheet model simulations, Abstract ID: EMS2016-608, Presented at European Meteorological Society Annual Meeting.
13. A.G. Libardoni, C.E. Forest, A.P. Sokolov, and E. Monier, Assessing the 1.5 Degree Target in Light of Recent Estimates of Climate Change, 2016, 1.5 degrees: Meeting the challenges of the Paris Agreement, University of Oxford, United Kingdom.
14. C.E. Forest, A.G. Libardoni, C.-Y. Tsai, A.P. Sokolov, E. Monier, R.L. Sriver, K. Keller, 2015, Towards Quantifying Robust Uncertainty Information for Climate Change Decision-making, Abstract ID: GC41H-05, Presented at AGU Fall Meeting.
15. K.L. Ruckert, Y. Guan, C.E. Forest, G. Shaffer, and K. Keller, 2015, (Pre-) calibration of a Reduced Complexity Model of the Antarctic Contribution to Sea-level Changes, Abstract ID: G43A-1031, Presented at AGU Fall Meeting.
16. C.-Y. Tsai, C.E. Forest, 2015, Assessing The Impact of SST Anomalies on Polar Climate Using Global Teleconnection Operators from Multiple Models Uncertainties, Abstract ID: A51V-02, Presented at AGU Fall Meeting.
17. P. Oddo, G. Garner, B. Lee, C. Forest, K. Keller, 2015 Quantifying Multi-Objective Tradeoffs under Deep Uncertainty in the Design of Sea-Level Rise Adaptation Strategies, Abstract ID: NH13B-1934, Presented at AGU Fall Meeting.
18. P. Gleckler, P. Durack, R. Stouffer, G. Johnson, C. Forest, 2015, Total Human-Caused Global Ocean Heat Uptake Nearly Doubles During Recent Surface Warming Hiatus, Abstract ID: OS43B-04, Presented at AGU Fall Meeting.
19. A.G. Libardoni, C.E. Forest, and A.P. Sokolov, 2015, Examining robust estimates of climate system property distributions with climate data records to 2010, *Geophysical Research Abstracts* Vol. **17**, EGU2015-6044-1, Presented at EGU General Assembly.
20. C.-Y. Tsai, C.E. Forest, and T. Wagener, 2015, On estimating decadal-scale predictability in regional climate change over river basins in response to changes in tropical SST patterns, *Geophysical Research Abstracts*, Vol. **17**, EGU2015-7243, Presented at EGU General Assembly.
21. C.E. Forest, A. Warner, K. Keller, A. Sokolov, 2014, Assessing the impacts of using energy balance models to estimate probability distributions of equilibrium climate sensitivity, Abstract ID: GC41F-0654, Presented at AGU Fall Meeting.
22. A. Sokolov, A. Libardoni, C. Forest, and E. Monier, 2014, Probabilistic forecast of long-term climate changes under different RCP scenarios, *Geophysical Research Abstracts*, Vol.**16**, EGU2014-4448, Presented at the EGU General Assembly.
23. C. Forest, A. Libardoni, and A. Sokolov, 2013, Quantification of the uncertainty in estimates of climate system properties due to differences in available reconstructions of historical data (Invited), Abstract ID: GC34C-06, Presented at AGU Fall Meeting.

24. W. Li and C.E. Forest, 2013, Where is the tropical ocean important for the low-frequency variability of the atmospheric teleconnection patterns? A perspective from a linear statistical model, Abstract ID: GC51D-1009, Presented at AGU Fall Meeting
25. C.-Y. Tsai, C.E. Forest, and T. Wagener, 2013, Estimating the Regional Climate Responses over River Basins to Changes in Tropical Sea Surface Temperature Patterns, Abstract ID: A21B-0014, Presented at AGU Fall Meeting.
26. Hoffman, A.L., C.E. Forest, and W. Li, 2013, Estimating the Impact of Sea Surface Temperature Patterns on Mineral Aerosol Emissions and Deposition, Abstract ID: A41G-0141, Presented at AGU Fall Meeting.
27. C.E. Forest and W. Li, 2012, Uncertainty quantification of regional climate change based on structural uncertainty in atmospheric GCMs (Invited), Abstract ID: GC31C-08, Presented at AGU Fall Meeting.
28. A.G. Libardoni and C.E. Forest, 2012, Assessment of the Sensitivity of Climate System Properties to Methodology and Model Diagnostics, Abstract ID: GC43E-1083, Presented at AGU Fall Meeting.
29. W. Li, C.E. Forest, and J.J. Barsugli, 2012, Assessing the teleconnection effect on the regional climate change using a linear response to SST patterns, Abstract ID: GC43E-1079, Presented at AGU Fall Meeting.
30. C.E. Forest, W. Li, J.J. Barsugli, 2011, Comparing methods for estimating sensitivity of regional climate change to SST anomaly from multiple AGCMs, Abstract ID: GC11B-0911, Presented at AGU Fall Meeting.
31. A.G. Libardoni and C.E. Forest, 2011, Sensitivity of Distributions of Climate System Properties to Surface Temperature Datasets, Abstract ID: GC11B-0915, Presented at AGU Fall Meeting.
32. W. Li, C.E. Forest, J.J. Barsugli, 2011, Sensitivity of regional climate change predictions to SST anomaly patterns for present-day and future scenarios, Abstract ID: GC11A-0896, Presented at AGU Fall Meeting.
33. J.R. Scott, C.E. Forest, A.P. Sokolov, S. Dutkiewicz, 2011, Probabilistic Forecast for 21st Century Climate Based on an Ensemble of Simulations using a Business-As-Usual Scenario, Abstract ID: GC11A-0890, Presented at AGU Fall Meeting.
34. C.E. Forest, W. Li, and J.J. Barsugli, Assessing uncertainty of regional climate change from global climate models, *AMS 23<sup>rd</sup> Conference on Climate Variability and Change*, Paper 3B.6, 2011
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38. C.E. Forest and B. Sansó, Exploring unforced climate variability uncertainty as it applies to climate change detection and model calibration statistics, *Geophysical Research Abstracts*, **11**:EGU2009-6087-2, 2009.

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40. C.E. Forest and B. Sansó. On estimating probability distributions for climate system properties: exploring sensitivity to unforced climate variability from AOGCM control simulations. *Geophysical Research Abstracts*, **10**:EGU2008-A-09332, 2008.
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43. C. Forest, A. P. Sokolov, P. H. Stone. Estimating Climate System Properties from Historical Climate Observations: Progress and Challenges, Climate Sensitivity and Climate Feedbacks symposium (MS017) IUGG/IAMAS General Assembly, Perugia, Italy. July 2007.
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46. C. Curry, B. Sansó and C. Forest, Incorporating additional uncertainty in rigorous MCMC estimation of PDFs of Climate System Properties *Geophysical Research Abstracts*, **8**:10911, 2006.
47. C. Forest, P. Stone, and A. Sokolov, Estimated PDFs of climate system properties including natural and anthropogenic forcings and implications for 21st century climate change predictions *Geophysical Research Abstracts*, **8**:09667, 2006.
48. C.E. Forest, A.P. Sokolov, and P.H. Stone, On constraining climate system properties using observed and modeled climate changes, *Geophysical Research Abstracts*, **7**:05867, 2005.
49. C.E. Forest, B. Sansó, and C. Curry, A rigorous MCMC estimation of PDFs of climate system properties, *Geophysical Research Abstracts*, **7**:05715, 2005.
50. C.E. Forest, A.P. Sokolov, and P.H. Stone, Sensitivity of climate change diagnostics to latitude dependence of deep-ocean heat uptake, in: *Eos Transactions*, 85(47), AGU, Fall Meeting Supplement, Abstract GC51D-1089
51. C. Forest, Probabilistic Climate Forecasting: Limits in our Understanding, Symposium NCCR 2005: Interfaces between Climate and Economic Dynamics, Interlaken, Switzerland, 2-4 March (<http://ecolu-info.unige.ch/nccrwp4/GEMINIE3/Forest.pdf>)
52. J. Reilly, M. Webster, C. Forest, Describing Scientific Uncertainties in Climate Change to Support Analysis of Risk and of Options: Coupling Models Across Disciplines, IPCC Workshop on Describing Scientific Uncertainties in Climate Change to Support Analysis of Risk and of Options, Maynooth, Ireland, May 11-13, 2004.
53. C.E. Forest, D. Nychka, B. Sansó, C. Tebaldi, Towards a rigorous MCMC estimation of PDFs of Climate System Properties, AGU Fall Meeting, Abstract GC31B-0196, 2003.

54. C.E. Forest, P.H. Stone, A.P. Sokolov, and M.R. Allen, Revised PDFs of climate system properties including natural and anthropogenic historical climate forcings, *EGS Meeting, 2003* and *IUGG Meeting, Statistical Society of Canada, 2003*.
55. M. Webster, C. Forest, J. Reilly, D. Kicklighter, R. Prinn, M. Sarofim, A. Sokolov, P. Stone, C. Wang, Uncertainty analysis of climate change and policy response, *EGS Meeting, Spring 2003*
56. C.E. Forest, M.C. Sarofim, A.P. Sokolov, P.H. Stone, M.D. Webster and D.W. Kicklighter, Exploring Uncertainty in Polar Latitude Climate Change and Potential Effects, *AGU Meeting, Fall 2002*
57. M.C. Sarofim, A.P. Sokolov, C.E. Forest, M.D. Webster and R.G. Prinn, Responses of Carbon Uptake to Uncertain Climatic and Economic Parameters in an Integrated Global Systems Model, in: EOS Transactions, American Geophysical Union Fall Meeting, 83(47): GC62A-11
58. C.E. Forest, M.D. Webster, J.M. Reilly, A.P. Sokolov, P.H. Stone, H.D. Jacoby, and R.G. Prinn, Uncertainty analysis of global climate change projections, *AMS 13<sup>th</sup> Symposium on Global Change and Climate Variations*, January 2002
59. C.E. Forest, P.H. Stone, A.P. Sokolov, Testing for the linearity of responses to multiple anthropogenic climate forcings, *AGU Meeting, Fall 2001* and *EGS Meeting, Spring 2002*
60. C.E. Forest, P.H. Stone, A.P. Sokolov, and M.R. Allen, Using multiple diagnostics in climate change detection to assess climate model uncertainty, *AGU Meeting, Fall 2000*
61. C.E. Forest, P.H. Stone, A.P. Sokolov, and M.R. Allen, Climate model uncertainties and century-timescale climate change predictions, *AGU Meeting, Fall 2000*
62. P.H. Stone, C.E. Forest, and A. Sokolov, Implications of aerosol forcing uncertainty in climate change detection and attribution results, *AGU Meeting, Fall 2000*
63. C.E. Forest, M.R. Allen, P.H. Stone, and A.P. Sokolov, Uncertainty estimates of climate system properties and anthropogenic aerosol forcings using climate change detection methods, *AMS 11<sup>th</sup> Symposium on Global Change Studies*, January 2000
64. C.E. Forest, M.R. Allen, P.H. Stone, and A.P. Sokolov, Constraining uncertainties in climate models using climate change detection methods, *4th International Conference on Modelling of Global Climate Change and Variability*, Sept 13-17, 1999
65. C.E. Forest, M.R. Allen, A.P. Sokolov, P.H. Stone, and C. Wang, Uncertainty Estimates of the Aerosol Forcing Using the MIT 2D Climate Model, *AGU Meeting, Spring 1999*
66. M.R. Allen, P.A. Stott, R. Schnur, C.E. Forest, Beyond Attribution: Exploiting the Anthropogenic Signal, *AMS 10<sup>th</sup> Symposium on Global Change Studies* January 1999
67. C.E. Forest, M.R. Allen, and A. Sokolov, Constraining Climate Model Parameters Using Climate Observations, *AGU Meeting, Fall 1997*
68. C.E. Forest, P. Molnar, and K.A. Emanuel, Paleoaltimetry from Paleobotanical Data Using Energy Conservation Principles, *AGU Meeting, Fall 1994*
69. C.E. Forest, K.A. Emanuel, and P. Molnar, A Physical Method for Deducing Paleoelevations from Plant Macro-fossils, *AGU Meeting, Spring 1993*



## Grants and Funding

### Completed

1. DoD, Office of Naval Research, Navy Research Laboratory Graduate Research Fellowship Award, 1990-1993.
2. NOAA, NA06GP0061, 1999-2001, “Using optimal fingerprint detection methods to reduce uncertainty in climate model parameters and forcings” (PI-Peter Stone )
3. NOAA, GC02-070, 2002-2004, “Using optimal fingerprint detection methods to characterize and reduce uncertainty in climate model parameters, forcings, and projections” (PI-Peter Stone )
4. NSF-Collaborations in Mathematics and Geophysics, Geomath 0417753, 2004-2007, “CMG Collaborative Research: Improved Bayesian Estimators for Uncertainty in Climate Systems Properties” (Co-PI B. Sansó)
5. Unidata (NSF), Z10-76416, 2010-2011, “Addition of a Community THREDDS/RAMADDA Server System at Penn State” (Co-Pi C. Pavloski (lead), G. Young & W. Brune)
6. DOE, DE-FG02-08ER64597, 2008/-2011, “Quantifying climate feedbacks from abrupt changes in high latitude trace-gas emissions” (Co-PI’s C.A. Schlosser (lead), K. Walters)
7. Massachusetts Institute of Technology (NSF Prime), 2010-2012, “An improved model of endogenous technical change considering uncertain R&D returns and uncertain climate response” (Co-Pi’s M. Webster (lead), K. Fisher-Vanden, D. Popp)
8. NOAA, NA090AR4310176, 2007-2011, “Identifying structures and impacts of uncertainty on climate change detection results”
9. Massachusetts Institute of Technology, 2010-2012, “Parameter Estimation and Model Calibration Project Using Updated Climate Change Diagnostics”
10. Massachusetts Institute of Technology (DOE Prime), 2011-2014, “An Integrated Framework for Climate Change Analysis”
11. DOE, DE-SC0005399, 2010-2014, “Linking the Uncertainty of Low Frequency Variability in Tropical Forcing in Regional Climate Change”, (Co-Pi J. Barsugli)
12. Stanford University (DOE Prime), 2010-2016, “Integrated Assessment Model Development, Comparison, and Diagnostics Project”, (Co-Pi’s K. Fisher-Vanden (lead), K. Keller, P. Reed, I. Sue Wing, D. Popp, M. Webster)
13. Massachusetts Institute of Technology (DOE Prime), 2013-2016, “An Integrated Framework for Climate Change Analysis”
14. NSF, 2012-2017, “What are Sustainable Climate-Risk Management Strategies?” (Co-PI’s K. Keller (lead), C. Forest, N. Tuana, A. Robock, R. Lempert)
15. University of Wisconsin-Madison (USDA NIFA Prime), 2012-2017, “Climate Change Mitigation and Adaptation in Dairy Production Systems of the Great Lakes Region” (PI T. Richard)
16. NSF, 2014-2017, “Statistical Methods for Ice Sheet Projections using Large Non-Gaussian Space-time Data Sets and Complex Computer Models” (Co-PI’s M. Haran (lead), C. Forest)

17. NSF, 2022-2025, “LEAP HI: Optimal design and life-long adaptation of civil infrastructure in a changing and uncertain environment for a sustainable future” (Co-PI’s G. Warn
18. NSF, 2022-2024, “IRES Track I: Manifestations of climate change in extreme events” (Co-PI’s J. Urbina, Fuentes, Forest,

**Invited Talks**    *International:*

1. Implications for Climate Sensitivity and “Top-down” Constraints on Aerosol Forcing, Chris E. Forest, Ringberg 2018 Meeting, March 01, 2018
2. Transdisciplinary analysis of the design of flood-risk management strategies in New Orleans, Climate Change Research Centre, University of New South Wales, Sydney, Australia, May 31, 2017.
3. Global Teleconnection Operators: A method for assessing regional climate sensitivities to SST patterns, Climate Change Research Centre, University of New South Wales, Sydney, Australia, May 24, 2017.
4. When can we trust climate models? Characterizing uncertainty in climate change from global to regional scales, Climate Change Research Centre, University of New South Wales, Sydney, Australia, May 10, 2017.
5. Global Teleconnection Operators: A method for assessing regional climate sensitivities to SST patterns, National Institute of Water and Atmosphere (NIWA), Wellington, New Zealand, March 28, 2017.
6. When can we trust climate models? Characterizing uncertainty in climate change from global to regional scales, New Zealand Climate Change Research Institute and School of Geography, Environment, and Earth Science Seminar, Victoria University of Wellington, Wellington, New Zealand, March 14, 2017.
7. Transdisciplinary analysis of the design of flood-risk management strategies in New Orleans, New Zealand Climate Change Research Institute and School of Geography, Environment, and Earth Science Seminar, Victoria University of Wellington, Wellington, New Zealand, March 2, 2017.
8. Assessing the 1.5-Degree Target in Light of Recent Climate Change, CNRM / Météo France, Toulouse, France, November 9, 2016.
9. When can we trust climate models? Characterizing uncertainty in climate change from global to regional scales, Laboratoire des Sciences du Climat et de l’Environnement, IPSL, Gif-sur-Yvette, France, October 13, 2016.
10. Climate Change Risk Assessment, Workshop on Uncertainty Quantification in Climate Modeling and Projection, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, July 16, 2015
11. Climate and Earth System Modeling: Sources of Uncertainties in their Projections, Workshop on Uncertainty Quantification in Climate Modeling and Projection, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, July 13, 2015
12. Assessing model uncertainty in regional climate predictions: Using metrics based on global atmospheric responses to SST patterns, AOPP Informal Talk, Oxford University, UK, September 28, 2011.
13. Probabilistic predictions using the MIT IGSM2 under Reference and Stabilization Scenarios, 2nd Workshop on Climate Risk Assessment, Frontier Research Centre for Global Change, JAMSTEC, February 12, 2008.
14. “Estimating Climate System Properties from 20th C. Observations” and “Uncertainty Analysis of MIT IGSM2”, Probability, Uncertainty, Climate, and Models (PUCM) Workshop, Durham, United Kingdom, September 28, 2007.

15. New Diagnostics and Comparisons for Estimates of Climate System Properties from Climate Observations, 10th International Meeting on Statistical Climatology, Beijing, China, August 21, 2007.
16. Probabilistic Climate Forecasting: Limits in our Understanding, Symposium NCCR 2005: Interfaces between Climate and Economic Dynamics, Interlaken, Switzerland, March 3, 2005.
17. Issues in atmospheric stabilization considering multiple gases. Workshop on GHG Stabilization Scenarios, Tsukuba, Japan, January 23, 2004.
18. PDFs of climate system properties including natural and anthropogenic historical climate forcings. Statistical Society of Canada, June 11, 2003
19. Climate Change Detection, Uncertainty Analyses, and Decision Making. 8<sup>th</sup> International Meeting on Statistical Climatology, University of Lüneburg, Germany. 15 March 2001.

*United States:*

1. Embracing Uncertainty in Earth system modeling to assess climate change risks, Chris E. Forest, EarthTalks, Earth and Environmental Systems Institute Seminar Series, Pennsylvania State University, March 23, 2020.
2. Local Solutions: Achieving Drawdown in Centre County, Chris E. Forest, Elk Creek Climate Sessions, Elk Creek Cafe, February 26, 2020.
3. Some Highlights and Insights of the CMIP6 Earth System Modeling Simulations for Station Scientists Discussing the Latest IPCC Reports, Chris E. Forest, 48th Conference on Broadcast Meteorology, AMS Meeting 2020, Boston, MA, January 14, 2020
4. Characterizing Uncertainty in Climate Change: When can we trust climate models?, Chris E. Forest, EOS Seminar, Duke University, 11 OCT 2019
5. Efforts at Penn State on Sustainable Development Solutions, Chris E Forest, SDSN USA Pathways Project Open Members Meeting, Columbia University, New York, NY, September 28, 2019
6. Climate Science for Drawdown Solutions, Chris E. Forest, Workshop 2: Climate, Oceans, and Feedbacks: Integrating Natural Systems, Research to Action, The Science of Drawdown Conference, <https://drawdown.psu.edu>, September 17, 2019
7. Climate Science Discussion for Drawdown Scholars, Chris E. Forest, Penn State Drawdown Scholars Brown Bag Presentation, July 1, 2019
8. Characterizing Uncertainty in Climate Change: from global to local scales, Chris E. Forest, SEAS Colloquium in Climate Science, Columbia University, New York, NY, April 11, 2019.
9. Making Sense of Equilibrium Climate Sensitivity and Other Climate Responses, Chris E. Forest, EPRI Climate Science 2018 Meeting, Washington, DC, May 17, 2018.
10. Improving Constraints on Climate System Properties with Additional Data and New Statistical and Sampling Methods, Alex G. Libardoni, Chris E. Forest (invited), Andrei P. Sokolov, E. Monier, AMS 2018 Annual Meeting, January 9, 2018

11. Transdisciplinary analysis of the design of flood-risk management strategies in New Orleans, Chris E. Forest and Klaus Keller, Chevron Webinar Series (via Chevron Webex), Chevron Park C1032, San Ramon, CA, (delivered from Victoria University of Wellington, NZ), January 23, 2017.
12. When can we trust climate models? Characterizing uncertainty in climate change from global to regional scales, Chris E. Forest, Department of Physics Colloquium, University of Wisconsin-Madison, Madison, WI, March 4, 2016.
13. On using global teleconnection operators (GTOs) for attribution of climate events, Chris E. Forest and Chii-Yun Tsai, IDAG Meeting 2015, Boulder, CO, January 25, 2015.
14. Updating Estimates of Climate Response Characteristics Using Revised Model Diagnostics, Alex G. Libardoni, Chris E. Forest, Andrei P. Sokolov, IDAG Meeting 2015, Boulder, CO, January 25, 2015.
15. Characterizing uncertainty in climate change from global to regional scales, Chris E. Forest, Environmental & Water Resources Distinguished Speaker Seminar Series, School of Civil and Environmental Engineering, Cornell University, September 25, 2014.
16. Discussant in Probabilistic information on potential climate futures, Chris E Forest, Session on NEEDS FOR SCENARIOS: SCIENCE, ASSESSMENTS AND DECISIONMAKING ENERGY MODELING FORUM, Workshop on Climate Change Impacts and Integrated Assessment (CCI/IA), Snowmass, CO, July 30, 2014.
17. Uncertainty quantification of regional climate change based on structural uncertainty in atmospheric GCMs, Chris E. Forest, Wei Li, Chii-Yun Tsai, Alexis Hoffman, Joseph Barsugli, Thorsten Wagener, Erwan Monier, DOE CESM Principal Investigators Meeting, Washington, DC, May 13, 2014.
18. Global Teleconnection Operators: A Method of Assessing Regional Climate Sensitivities, Chris E. Forest, Department of Atmospheric and Oceanic Sciences (AOS) Colloquium, University of Wisconsin–Madison, March 3, 2014.
19. Equilibrium Climate Sensitivity: A discussion of the IPCC AR5 estimates and some recent results, Chris E. Forest, Climate, People, and the Environment Program Seminar, University of Wisconsin–Madison, February 28, 2014.
20. Linking SST Changes to River Flow; Linking River Flow and IAMs, Chris E. Forest, Chii-Yun Tsai, Wei Li, Thorsten Wagener, PIAMDDI Project Meeting, Stanford University, December 13, 2013.
21. Building emulators across model hierarchies, Chris E. Forest, Alex Libardoni, Ashley Warner, Randy Miller, Klaus Keller, PIAMDDI Project Meeting, Stanford University, December 13, 2013.
22. Exploring effects of different dynamical cores in global climate models on regional predictions. Chris E Forest, Wei Li, Joseph Barsugli, APS DFD/GPC Mini-Symposium: Global Climate Models: Dynamical Cores, Strengths and Weaknesses, APS DFD Meeting, November 25, 2013.
23. Observational constraints on modern climate sensitivity, Chris E. Forest, Uncertainty in Climate Change: A Conversation with Climate Scientists and Economists, Yale University, November 21, 2013.

24. The Fifth Assessment: A Discussion of IPCC Working Group 1 AR5 Report, ESSC Climate Dynamics Seminar, Pennsylvania State University, October 30, 2013.
25. On using climate data records for climate model calibration and uncertainty quantification, Prof. Chris E. Forest, Next Generation Climate Data Products Workshop, NCAR, Boulder, CO, July 15-19, 2013.
26. The impact of uncertainty in assessing regional climate change impacts, Biological Systems Simulation Group, Pennsylvania State University, April 24, 2013.
27. Open Discussion on Climate Change with Richard Alley, Chris Forest, and Michael Mann, GEMS Board of Directors, Pennsylvania State University, March 15, 2013.
28. Assessing model uncertainty in regional climate predictions: Using metrics based on global atmospheric responses to SST patterns, Earth and Atmospheric Sciences Seminar, Cornell University, Ithaca, NY, October 19, 2011.
29. Identifying Model Uncertainty in Regional Climate Predictions from Multiple Versions of NCAR CAM, MIT Atmospheric Science Seminar, MIT, Cambridge, MA, September 27, 2010.
30. Climate Science to Climate Policy – Assessing Uncertainty in Climate Models, NAS/CSTB Workshop on Innovation in Computing and Information Technology for Sustainability, Committee on Computing Research for Environmental and Societal Sustainability, Washington, DC, May 26, 2010.
31. Climate System Science: Where are the Uncertainties?, Chevron Climate Change Science Discussion, San Ramon, CA, March 25, 2010.
32. Uncertainty Quantification: Statistical calibration of climate system properties, SAMSI – Spatial: Climate Change Workshop, Research Triangle Park, NC, February 19, 2010.
33. Statistical calibration of climate system properties, *ad hoc* International Detection and Attribution Group, Boulder, CO, January 29, 2010.
34. Climate Change: Science and Policy, International Business Luncheon, Smeal College of Business, Pennsylvania State University, University Park, PA, November 18, 2009.
35. Quantifying Uncertainty in Climate Predictions, Jackson School of Geosciences, University of Texas-Austin, Austin, TX, March 31, 2008.
36. Quantifying Uncertainty in Climate Predictions, Department of Meteorology Colloquium, Pennsylvania State University, University Park, PA, February 25, 2008.
37. Paleoaltimetry: A Review of Thermodynamic Methods, Paleoaltimetry Short Course, Geological Society of America (GSA) Annual Meeting, Denver, CO, October 26, 2007.
38. Estimating the Uncertainty in Climate Sensitivity ... and other Climate System Properties, Peter H. Stone Symposium, Massachusetts Institute of Technology, December 7, 2007.
39. Inferring Climate System Properties from a Computer Model, Case Studies in Bayesian Statistics - 2007, Carnegie Mellon University, Oakland, PA, October 20, 2007.
40. Estimated PDFs of climate system properties and implications for 21st century climate change, Woods Institute for the Environment & School of Earth Sciences, Stanford University, January 30, 2007.

41. Estimated PDFs of climate system properties including natural and anthropogenic forcings, Marine Sciences Research Center, Stony Brook University, September 6, 2006.
42. Understanding uncertainties in climate change predictions and their implications for the future, National Lime Association Annual Meeting, Boston, MA, June 12, 2006.
43. Uncertainty in Climate Sensitivity?, Marine Biology Laboratory, Woods Hole, MA, February 14, 2006.
44. Discussant in “Symposium #1127: ENSO Predictability”, AAAS Annual Meeting, St. Louis, MO, January 27, 2006.
45. Uncertainty in Climate Sensitivity: How well does the historical climate record constrain it or future climate?, Departmental Seminar, Department of Geology and Geophysics, Yale University, October 11, 2004.
46. Limitations of historical data records for constraining the properties of the climate system that are relevant for decadal and longer predictions. Reconciling Vertical Temperature Trends Workshop in support of U.S. Climate Change Science Program (Product Ref #1.1), Asheville, NC, October 27-29, 2003.
47. Quantifying Uncertainty in Climate System Properties: Including natural and anthropogenic 20th C. Forcings. CEES-Geography Seminar Series, Boston University, October 17, 2003.
48. Climate and Global Change. General presentation to: Club of Retired University of Wisconsin-Extension Faculty: Madison, WI, July 7, 2003.
49. Revised PDFs of climate system properties including natural and anthropogenic historical climate forcings. Snowmass Integrated Assessment Workshop – Session on New Science of Climate Change, Aug 4, 2003.
50. Uncertainty Analysis of Climate Change: Can we do it?, National Center for Atmospheric Research, November 15, 2002.
51. Uncertainty analysis of climate change: A Global-scale Understanding. Workshop on Scaling and Uncertainty in Regional Ecological Studies: Methods and Applications, Tempe, AZ, Oct 17-19, 2002.
52. Climate Forecasts Based on Calibrated Climate Models. Climate Change Impacts and Integrated Assessment, Snowmass, CO, August 6, 2002.
53. Quantifying uncertainties in climate system properties using recent climate observations. Climate Change Impacts and Integrated Assessment, Snowmass, CO, August 7, 2001.
54. Uncertainties in Climate Change: the Scientific Debate. 2001 BELL Conference, Philadelphia, PA, July 20, 2001.
55. The Science of Climate Change: What do(n't) we know? Cinergy Corporation, June 13, 2001.
56. Using Multiple Climate Change Diagnostics to Assess Uncertainties in Climate Model Properties. NASA Goddard Institute for Space Studies, New York, NY, April 6, 2001.
57. C.E. Forest, P.H. Stone, A.P. Sokolov, and M.R. Allen, Climate model uncertainties and century-timescale climate change predictions, *AGU Meeting*, Fall 2000.

58. Coping with Uncertainties in the Climate System, Conference on Climate Change Science, Texaco Fellow's "Portals to Tomorrow", Texaco, Houston, TX, September 14, 2000.
59. Constraining Climate System Properties using an Intermediate Climate Model and Optimal Fingerprint Detection Techniques. Geophysical Fluid Dynamics Laboratory, NOAA, Princeton, NJ, March 31, 2000.
60. Detection of Climate Change and Calibration of Climate Models. MIT Global Change Forum XV, Boston, MA, November 18, 1999.



**Professional  
Activities**

1. Co-Program Chair, 36th Conference on Climate Variability and Change (CVC), American Meteorological Society, Annual Meeting, 2023
2. Member, Committee on Climate Variability and Change (CVC), American Meteorological Society, 2021-23
3. Past Chair, Topical Group on the Physics of Climate, American Physical Society, 2020
4. Chair, Topical Group on the Physics of Climate, American Physical Society, 2019
5. Chair-elect, Topical Group on the Physics of Climate, American Physical Society, 2018
6. Vice Chair, Topical Group on the Physics of Climate, American Physical Society, 2017
7. Member, Committee on Assessing Approaches to Updating Estimates for the Social Cost of Carbon, Board on Environmental Change and Society (BECS) of The National Academies of Sciences, Engineering and Medicine, September 2015 – January 2017.
8. Member, Electorate Nominating Committee (ENC) of the Section on Atmospheric & Hydrospheric Sciences, American Association for the Advancement of Science. 2015–2019
9. Invited Lecturer at the Workshop on Uncertainty Quantification in Climate Modeling and Projection, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, July 13-17, 2015 (Organizers: Yun Qian, Charles Jackson, Filippo Giorgi)
10. Associate Editor, *Advances in Statistical Climatology, Meteorology and Oceanography* (ASCMO).
11. Co-Lead Organizer for NCAR Advanced Studies Program Colloquium, *Uncertainty in Climate Change: An Integrated Approach*, Jul 22- Aug 6, 2014, Boulder, CO (Co-Organizers: Linda Mearns, Hayley Fowler, Robert Wilby).
12. Review Editor for *National Climate Assessment 2013*, Chapter 2: *The Climate Science*.
13. Co-Lead Organizer for NCAR Theme-of-the-Year Workshop, *Uncertainty in Climate Change: An Integrated Approach*, Aug 6-17, 2012, Boulder, CO (Co-Organizers: Linda Mearns, Hayley Fowler).
14. Organized six sessions at international meetings including the European Geophysical Union (EGU) and the American Geophysical Union (AGU).
15. Lead-author on Intergovernmental Panel on Climate Change Fifth Assessment Report Working Group I (IPCC WGI AR5) Chapter 9: “Evaluation of Climate Models”.
16. Lead-author on *Climate Change Science Program Synthesis and Assessment Product 1.1. Temperature trends in the lower atmosphere — steps for understanding and reconciling differences*.
17. Contributing Author - IPCC WGI Fourth Assessment Report, Chapter 9: “Understanding and Attributing Climate Change”.
18. Reviewer (both written and panel) on proposals for U.S. Department of Energy (DOE), National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), and United Kingdom Natural Environment Research Council (UK NERC) since 1998 with an average of four per year.

19. Reviewer of 10 journal articles per year on average since 1998 for Nature, Science, Proceedings of the National Academy of Sciences (PNAS), Journal of Climate, Journal of Geophysical Research, Geophysical Research Letters, Climate Dynamics, and others.

**Professional Societies**

- American Geophysical Union
- American Physical Society
- American Meteorological Society
- American Association for the Advancement of Science
- European Geosciences Union
- Phi Beta Kappa
- Sigma Xi

**Professional Services**

*Current: The Pennsylvania State University*

- 2009–present: Department of Meteorology Graduate Academic Program Committee.
- 2009–present: Department of Meteorology Computer Committee.
- 2009–2010: Earth and Environmental Systems Institute Advisory Committee, member.
- 2010–present: Earth and Environmental Systems Institute Associate.
- 2010–present: Schreyer Honors College departmental representative.
- 2011–present: Department of Meteorology, Scholarship Committee.
- 2011–2017: Faculty Senate Member.
- 2011–2017: Senate Committee on Research Member.
- 2012: Department of Meteorology, Faculty Search Committee, Cyberscience Cluster Hire.
- 2012: Department of Meteorology, Faculty Search Committee, Department Head.
- 2013: Cyberscience Institute Committee – Research Data and Computing Committee.
- 2014–2016: Cyberscience Institute Committee – Research CI Governance Task Force.
- 2014–2016: Penn State Institutes for Energy and the Environment (PSIEE), Task Force on Establishing a Graduate Degree Program in Climate Science (Chair).
- 2014–2016: Department of Meteorology, Task Force on Additional Graduate Degree Programs in the Department of Meteorology.
- 2014–2015: Pennsylvania State University Press – Editorial Committee.
- 2015: Search Committee for Vice President for Research, Pennsylvania State University.
- 2015–2016: Chair, Faculty Senate Committee on Research.
- 2015–2016: Co-Chair, High Performance Computing Working Group, Research Computing for CyberInfrastructure.
- 2015–2016: Advisory Council, Research Computing for CyberInfrastructure, Pennsylvania State University.
- 2018–2019: Member, Executive Committee, Research Computing for CyberInfrastructure, Pennsylvania State University.
- 2018–2019: Chair, Search Committee for Hydrometeorology Faculty position, (joint with ICS, EESI, Meteorology and Atmospheric Science), Pennsylvania State University.

- 2018-2019: Search Committee for Geohydrologist Faculty position, Department of Geosciences, Pennsylvania State University.
- 2019-present: Co-Chair, Executive Committee, Research Computing for CyberInfrastructure, Pennsylvania State University.

*Former:*

- 2003–2004: MIT Staff Quality of Life Committee, member.
- 2000–2004: Discussion leader at Ethics in Research Practices workshops led by Dr. Stephanie Bird.
- 1999–2002: MIT Atmospheric Sciences Seminars Committee. Organized new seminar series for Atmospheric Sciences group within Department of Earth, Atmospheric, and Planetary Sciences (EAPS). Invited and arranged visits for non-MIT speakers.
- 1995: Center for Meteorology and Physical Oceanography (CMPO) Annual Retreat. Developed and organized first educational retreat for CMPO faculty, students, and staff. Retreat now serves as opportunity for new students to meet people and learn about research in MIT Program in Atmospheres, Oceans, and Climate.
- 1995–1996: CMPO Student Seminars Committee. Initiated informal series for graduate student talks and discussions. Series is still active.
- 1994: CMPO Admissions Committee. Participated in admissions decisions and organized prospective student visits.
- 1992–1993: MIT Intramural Athletics Council - EAPS representative. Organized captains and teams for EAPS sports enthusiasts.
- 1990–1993: Graduate Student Advisory Council. Provided student feedback to faculty in EAPS.