

Martin P. Tingley

CONTACT INFORMATION

Pennsylvania State University
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RESEARCH INTERESTS

Reconstruction of Holocene paleoclimate, calibration of sedimentary sea surface temperature and salinity proxies, analysis of the instrumental temperature record, applications of hierarchical and Bayesian models to climate data, models for describing and understanding climate extremes, projections and impacts of climate extremes, spatial and space-time modeling of climate data.

APPOINTMENTS

Pennsylvania State University, University Park, PA, USA
Departments of Meteorology and Statistics
Assistant Professor **August 2013 -**

Harvard University, Cambridge, MA, USA
Department of Earth and Planetary Sciences
Research Associate **September 2011 - July 2013**

National Center for Atmospheric Research, Boulder, CO, USA
Institute for Mathematics Applied to Geosciences
Postdoctoral Fellow **September 2010 - August 2011**

Statistical and Applied Mathematical Sciences Institute, Durham, NC, USA
Postdoctoral Fellow **September 2009 - August 2010**

Harvard University, Cambridge, MA, USA
Department of Earth and Planetary Sciences
Visiting Scholar **September 2009 - August 2011**
Postdoctoral Fellow **May 2009 - July 2009**

EDUCATION

Harvard University, Cambridge, Massachusetts, USA
Ph.D., Department of Earth and Planetary Sciences, 2009

- Dissertation Title: “A Bayesian approach to reconstructing space-time climate fields from proxy and instrumental time series, applied to 600 years of Northern Hemisphere surface temperature data.”
- Advisor: Peter Huybers

M.A., Statistics, May 2006

University of Toronto, Toronto, Ontario, Canada
Honours B.Sc. with High Distinction, 2003

- Major: Physics
- Minors: Mathematics, Political Science

HONORS AND AWARDS

Oral presentation prize at the PAGES First Young Scientists Meeting, Corvallis, USA (2009)
National Science Foundation Graduate Research Fellowship (2004–2007)
Natural Sciences and Engineering Research Council of Canada Graduate Fellowship (2003; declined)
James Loudon Gold Medal in Physics, awarded to U. Toronto’s top graduating physics student (2003).
Other U. Toronto distinctions: Dean’s List (4 years); University of Toronto Scholar (2002); Photonics Scholarship (2001-2003); Doctor James A. and Connie P. Dickson Scholarship in the Sciences and Mathematics (2000-2003); Howard Ferguson Scholarship, (1999-2003).

TEACHING

Pennsylvania State University

Meteorology 597A: Practical statistics for the Geosciences **Spring 2014**
Energy Business and Finance 472: Quantitative Analysis in Earth Sciences **Spring 2015**
Statistics 463: Applied Time Series Analysis **Spring 2015**

Teaching Assistant, Harvard University

Freshman Seminar 22l: Climate Change **Spring 2008**
Statistics 104 **Fall 2007, Spring 2006, Fall 2005**
Earth and Planetary Sciences 132 **Fall 2006**
Applied Math 105a **Fall 2004**

CURRICULUM DEVELOPMENT

New courses developed at Pennsylvania State University

Meteorology 597A: Practical statistics for the Geosciences

PUBLICATIONS

Barboza, Luis, Bo Li, **Martin P. Tingley** and Frederi Viens. Reconstructing past temperatures from natural proxies and estimated climate forcings using short- and long-memory models. *Annals of Applied Statistics*. 8(4): 1966-2001, 2014.

Tingley, Martin P., Alexander R. Stine, and Peter Huybers. Temperature reconstructions from tree-ring densities overestimate volcanic cooling. *Geophysical Research Letters*. 41(22): 7838-7845, 2014

Tingley, Martin P. and Ben Shaby. Comments on “Comparing and Selecting Spatial Predictors Using Local Criteria.” *TEST*. 10.1007/s11749-014-0413-3, 2014.

Huybers, Peter, Andrew Rhines, Karen A. McKinnon and **Martin P. Tingley**. U.S. daily temperatures: the meaning of extremes in the context of non-normality. *Journal of Climate*. 27: 7368-7384, 2014.

Tolwinski-Ward, S.E., **Martin P. Tingley**, Michael N. Evans, Malcolm Hughes, and Douglas Nyckla. Probabilistic reconstructions of local temperature and soil moisture from tree-ring data with potentially time-varying climatic response. *Climate Dynamics*, 10.1007/s00382-014-2139-z, 2014.

Tierney, Jessica E. and **Martin P. Tingley***. A spatially varying Bayesian calibration of the TEX86 paleothermometer. *Geochimica et Cosmochimica Acta*. 1127:83–106, 2014.

* Authors listed alphabetically and as equal contributors.

Tingley, Martin P. and Peter Huybers. Arctic temperature extremes over the last 600 years. *Nature*, 496:201-205, 2013.

Hanhijärvi, Sami, **Martin P. Tingley** and Atte Korhola. Pairwise Comparisons to Reconstruct Mean Temperature in the Arctic Atlantic Region Over the Last 2000 Years. *Climate Dynamics* 10.1007/s00382-013-1701-4, 2013

Mannshardt, Elizabeth, Peter F. Craigmile, and **Martin P. Tingley**. Statistical modeling of extreme value behavior in North American tree-ring density series. *Climatic Change* 117:843-858, 2013.

Tingley, Martin P. and Bo Li. Comments on “Reconstructing the NH mean temperature: Can underestimation of trends and variability be avoided?” by Bo Christiansen. *Journal of Climate* 25: 3441-3446, 2012.

Tingley, Martin P., Peter F. Craigmile, Murali Haran, Bo Li, Elizabeth Mannshardt, and Bala Rajaratnam. Piecing together the past: Statistical insights into paleoclimatic reconstructions. *Quaternary Science Reviews* 35:1-22, 2012. An earlier version is available as Technical Report No. 2010-09, Department of Statistics, Stanford University.

Tingley, Martin P. A Bayesian ANOVA scheme for calculating climate anomalies, with applications to the instrumental temperature record. *Journal of Climate* 25:777-791, 2012.

Tingley, Martin P. Spurious predictions with random time series: The Lasso in the context of paleoclimatic reconstructions. An invited discussion of “A Statistical Analysis of Multiple Temperature Proxies: Are Reconstructions of Surface Temperatures over the Last 1000 Years Reliable?” by Blakeley B. McShane and Abraham J. Wyner. *Annals of Applied Statistics*, 5(1): 83-87, 2011.

Cressie, Noel and **Martin P. Tingley**. Comment on “The Value of Multi-proxy Reconstruction of Past Climate” by Bo Li, Douglas W. Nychka, and Caspar Ammann. *Journal of the American Statistical Association* 105(491): 895-900, 2010.

Tingley, Martin P. and Peter Huybers. A Bayesian Algorithm for Reconstructing Climate Anomalies in Space and Time. Part 1: Development and applications to paleoclimate reconstruction problems. *Journal of Climate* 23:2759-2781, 2010.

Tingley, Martin P. and Peter Huybers. A Bayesian Algorithm for Reconstructing Climate Anomalies in Space and Time. Part 2: Comparison with the Regularized Expectation-Maximization Algorithm. *Journal of Climate* 23:2782-2800, 2010.

Wunch, Debra, **Martin P. Tingley**, Theodore G. Shepherd, James R. Drummond, G.W.K. Moore, and Kimberly Strong. Climatology and Predictability of the Late Summer Stratospheric Zonal Wind Turnaround over Vanscoy, Saskatchewan. *Atmospheres and Oceans*. 43 (4):301-313, 2005.

SEMINARS AND
COLLOQUIA

- 2014: Stochastic Modeling and Computing Seminar Series, Department of Statistics, Penn State; Department of Earth Sciences, USC; Departments of Statistics and Earth System Science, UC-Irvine. Department of Earth and Planetary Science, Rutgers; Climate Change Research Center, University of New South Wales.
- 2013: Department of Atmospheric and Oceanic Sciences, McGill University; Department of Meteorology, Pennsylvania State University; Department of Atmospheric, Oceanic and Space Sciences, University of Michigan; Earth System Science Center, Pennsylvania State University; Department of Applied Mathematics, University of Colorado at Boulder; Earth Systems Science Center, Pennsylvania State University.
- 2012: School of Mathematical Sciences, Monash University; School of Mathematics and Physics, The University of Queensland; Department of Earth Systems Science, University of California – Irvine; Department of Geology & Geophysics, Yale University.

- 2011: Woods Hole Oceanographic Institute.
- 2010: Program in atmospheres, oceans, and climate, Massachusetts Institute of Technology; Laboratory for Atmospheric and Space Physics / Department of Atmospheric and Oceanic Sciences, University of Colorado – Boulder; Division of Ocean and Climate Physics, Lamont-Doherty Earth Observatory.
- 2009: Institute for Mathematics Applied to Geosciences, National Center for Atmospheric Research; Department of Geological Sciences, University of North Carolina – Chapel Hill; Department of Meteorology, Stockholm University; Program in Atmospheres, Oceans, and Climate, Massachusetts Institute of Technology.
- 2008: Climatea Seminar, Harvard University.

CONFERENCE AND
WORKSHOP
REPORTS

PAGES 2k Consortium, including **Martin P. Tingley** as a primary author. PAGES 2k - A framework for community-driven climate reconstructions during the past two millennia. Eos, in press.

Tingley, Martin P., Eugene Wahl, and Edward Cook. A New Framework for Inferring Earths Past Climate. Eos, 92(36), 2011.

Cook, Edward, **Martin.P. Tingley**, Eugene Wahl and Eduardo Zorita. Bayesian hierarchical models for climate field reconstruction. PAGES News, 19(2), 2011

CONFERENCE AND
WORKSHOP
PRESENTATIONS

- 2014: PAGES 2k: Advances in Climate Field Reconstructions (WHOI); 4th International Workshop on Climate Informatics (NCAR).
- 2013: AGU Fall Meeting, San Francisco (invited and contributed); PAGES Arctic 2k workshop, San Francisco (invited); Third International Workshop on Climate Informatics, NCAR; 12th International Meeting on Statistical Climatology, Jeju, South Korea (invited); Geological data fusion: Tackling the statistical challenges of interpreting past environmental change, DIMACS Center, Rutgers University (invited).
- 2012: AGU Fall Meeting, San Francisco; Frontiers in the Detection and Attribution of Climate Change, Banff International Research Station, Banff, Canada; 8th Purdue Symposium on Statistics, West Lafayette.
- 2011: AGU Fall Meeting, San Francisco; EGU General Assembly, Vienna, Austria (invited and contributed talks).
- 2010: AGU Fall Meeting, San Francisco; Workshop on Environmetrics. National Center for Atmospheric Research, Boulder (invited); Transition workshop for the 2009-2010 program on Space-Time Analysis for Environmental Mapping, Epidemiology and Climate Change, Statistical and Applied Mathematical Sciences Institute, Durham, North Carolina (invited); Joint Statistical Meetings, Vancouver, Canada; 11th International Meeting on Statistical Climatology. Edinburgh, Scotland.
- 2009: AGU Fall Meeting. San Francisco; PAGES 1st Young Scientists Meeting and 3rd Open Science Meeting. Corvallis, USA.
- 2008: AGU Fall Meeting. San Francisco; All-Hands Meeting: Bayesian Hierarchical Models for High-Resolution Climate Reconstructions, National Center for Atmospheric Research, Boulder.
- 2007&2006: AGU Fall Meeting, San Francisco.

OTHER LECTURES/
SHORT COURSES

Set of two tutorials on Bayesian Data Analysis, Climate Change Research Center, University of New South Wales, during a visit funded by a Faculty of Science Visiting Research Fellowship (Host: Steven Phipps).

Guest lecturer for EMSC 100S “Climate Change and Potential Societal Impacts (First Year Seminar),” College of Earth and Mineral Sciences, Pennsylvania State University, 29 October 2013.

Guest lecturer for Statistics 693, “Paleoclimate Data and Models,” led by Noel Cressie. Department of Statistics, The Ohio State University, 11 January 2012 and 29 February 2012.

Series of four lectures at a workshop on Bayesian Hierarchical Models (BHMs) for Climate Field

Reconstruction (CFR) and Comparison to Existing CFR Methods, Lamont-Doherty Earth Observatory, Columbia University, 8-11 February, 2011.

OTHER WORKSHOPS AND SUMMER • 2014: PaleEON Paleoclimate meeting, Boston, 8 March. PAGES Workshop: Methods for Climate Reconstructions, WHOI, 15-16 April.

SCHOOLS ATTENDED • 2013: PaleEON Fall Meeting, Berkeley, 7 Dec.
• 2011: PaleEON kickoff meeting, Harvard Forest, 11-12 May.
• 2008: International Graduate Institute's Summer School on Statistics and Climate, NCAR, 9-13 August.
• 2007: Application of Statistics to Numerical Models: New Methods and Case Studies, NCAR, 21-23 May.
• 2006: Stochastic and Statistical Parameterization of Unresolved Features in the Atmosphere and Upper Ocean. NCAR 27 February - 3 March.

SUPERVISION Outside dissertation reviewer for S.E. Tolwinski-Ward, doctoral candidate in the Program in Applied Mathematics, University of Arizona, 2012.

SERVICE

Organization and Leadership:

- 2014: Program committee chair, Fourth International Workshop on Climate Informatics, September 25 - 26, NCAR. Session co-convenor, "Quantifying Changes in Temperature Distributions," AGU Fall Meeting, 15-19 December.
- 2012: Program committee member, Second International Workshop on Climate Informatics, September 20 - 21, NCAR.
- 2011: Lead organizer of a workshop on Bayesian Hierarchical Models for High Resolution Paleoclimate Reconstructions, March 24-25, NCAR.
- 2009–2010: Co-leader, with Bala Rajaratnam, of the Paleoclimate working group, part of SAMSI's 2009-10 Program on Space-time Analysis for Environmental Mapping, Epidemiology and Climate Change.
- 2007–2008: Co-organizer of the ClimaTea seminar series at Harvard University.

Journal reviewer:

- 2015: Annals of Applied Statistics.
- 2014: Nature Communications, Paleoceanography, Annals of Applied Statistics, Nature, Eos, Environmental Research Letters, Journal of Climate.
- 2013: Eos, Journal of the American Statistical Association, Journal of Climate, Annals of Applied Statistics.
- 2012: Journal of the American Statistical Association, Journal of Climate, Nature Geoscience, Climate Dynamics.
- 2011: Journal of the American Statistical Association, Journal of Climate, Journal of Statistical Software.
- 2010: Climate Dynamics, Proceedings of the National Academy of Sciences, Geophysical Research Letters, Climate of the Past, Journal of the American Statistical Association, Journal of Climate.

Grant proposal reviewer:

- 2015: NSF P2C2.
- 2014: NSF P2C2.
- 2013: Technical University of Munich.
- 2010: NSF Methodology, Measurement, and Statistics program.

Consulting:

- 2011: One day workshop on Bayesian data analysis, given to members of ExxonMobil's Upstream Research Company.

11th January, 2015