

Daniel S. Cooley

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Education

Ph.D. Applied Mathematics, University of Colorado at Boulder, 2005
M.S. Applied Mathematics, University of Colorado at Boulder, 2002
B.A. Mathematics, University of Colorado at Boulder, 1994

Academic and Professional Experience

2020-2023, 2024-: *Graduate Director*; Department of Statistics, Colorado State University.
2018-Present: *Professor*; Department of Statistics, Colorado State University.
2017-2020: *Associate Chair*; Department of Statistics, Colorado State University.
2015-Present: *Faculty Member*; School of Environmental Sustainability, Colorado State University.
2012-2018: *Associate Professor*; Department of Statistics, Colorado State University.
2007-2012: *Assistant Professor*; Department of Statistics, Colorado State University.
2005-2007: *Postdoctoral Researcher*; Department of Statistics, Colorado State University (joint appointment).
2005-2007: *Postdoctoral Researcher*; Geophysical Statistics Project, National Center for Atmospheric Research, (joint appointment).

Visiting Appointments

Fall 2014: *Visiting Scholar*; Department of Statistics, University of Washington, Seattle WA.
Fall 2011: *Research Fellow, Program on Uncertainty Quantification*; SAMSI, Research Triangle Park, NC.
June 2008: *Invited Visitor*; Institut de Recherche Mathématique Avancée, Université Louis Pasteur Strasbourg, France.

Research Interests

Extreme value theory, modeling multivariate extremes, heavy tailed phenomena, spatial statistics, applications in atmospheric science and environmental science.

Honors/Awards

ASA Fellow (Elected 2023)
ASA Section on Statistics and the Environment Distinguished Achievement Award, 2023.
College of Natural Sciences, Professor Laureate, 2017-2019.
ASA Section on Statistics and the Environment Young Researcher Award, 2012.
ASA Section on Statistics and the Environment JSM Presentation Award for the paper “Spatial Prediction of Extreme Value Return Levels”, August 2005.

Publications

Research Articles, Refereed

[†] denotes student author

1. Lee J.[†], Cooley D., Wagner A.M., Liston G.E. (2024+) A Calibration Method for Projecting Future Extremes via a Linear Mapping of Parameters. *Environmental and Ecological Statistics*, Accepted. October 25, 2024.
2. Mhatre N.[†], Cooley D. (2024) Transformed Linear Models for Time Series Extremes. *Journal of Time Series Analysis*, 45, 671-690. <https://doi.org/10.1111/jtsa.12732>.
3. Wixson, T. P.[†], Cooley, D. (2023) Attribution of Seasonal Wildfire Risk to Changes in Climate: A Statistical Extremes Approach. *Journal of Applied Meteorology and Climatology*, 62, 1511-1521. <https://doi.org/10.1175/JAMC-D-23-0072.1>.
4. Rohrbeck C., Cooley D. (2023) Simulating Flood Event Sets Using Extremal Principal Components. *Annals of Applied Statistics*, 17: 1333–1352 <https://doi.org/10.1214/22-AOAS1672>.
5. Wagner A.M., Bennett K.E., Liston G.E., Hiemstra C.A., and Cooley D. (2021) Multiple indicators of extreme changes in snow dominated regimes, Yakima River basin region, USA *Water*, 13:2608. doi:0.3390/w13192608.
6. Rutherford J.S, Sherwin E.D., Ravikumar A.P., Heath G.A., Englander J., Cooley D., Lyon D., Omara M., Langfitt Q., Brandt A.R. (2021) Closing the Gap: Explaining Persistent Underestimation by US Oil and Natural Gas Production-Segment Methane Inventories. *Nature Communications*, 12:4715. <https://doi.org/10.1038/s41467-021-25017-4>.
7. Fix M.[†], Cooley D., Thibaud E. (2020) Simultaneous Autoregressive Models for Spatial Extremes. *Environmetrics*, 32:e2656. <https://doi.org/10.1002/env.2656>
8. Yuen R., Stoev, S., Cooley D. (2020) Distributionally Robust Inference for Extreme Value-at-Risk. *Insurance: Mathematics and Economics*, 92:70-89. <https://doi.org/10.1016/j.insmatheco.2020.03.003>
9. Jiang Y., Cooley D., Wehner M.P. (2020) Principal Component Analysis for Extremes and Application to US Precipitation. *Journal of Climate*, 33 (15): 6441-6451. <https://doi.org/10.1175/JCLI-D-19-0413.1>
10. Cooley D., Thibaud E. (2019). Decompositions of Dependence for High-Dimensional Extremes. *Biometrika*, 106:587-604. DOI: 10.1093/biomet/asz028.
11. Hewitt J.[†], Fix M.J.[†], Hoeting J.A., Cooley D.S. (2019). Improved return level estimation via a weighted likelihood, latent spatial extremes model. *JABES*; 24:426-443. DOI: 10.1007/s13253-019-00356-4
12. Huang W.K., Cooley D.S., Ebert-Uphoff I., Chen C., Chatterjee S. (2019) New Exploratory Tools for Extremal Dependence: Chi Networks and Annual Extremal Networks. *JABES*; 24:484-501. DOI: 10.1007/s13253-019-00356-4
13. Cooley D., Thibaud E., Castillo F., Wehner M.F. (2019). A Nonparametric Method for Producing Isolines of Bivariate Exceedance Probabilities *Extremes*, 22:373-390; DOI:10.1007/s10687-019-00348-0.
14. Timmermans B., Wehner M., Cooley D., O'Brien T., Krishnan H. (2018). Consistency of Extremes in Gridded Precipitation Datasets. *Climate Dynamics*, 52:6651-6670. DOI: 10.1007/s00382-018-4537-0.
15. Fix M.[†], Cooley D., Sain S.R., Tebaldi C. (2018). A comparison of U.S. precipitation extremes under RCP8.5 and RCP4.5 with application to pattern scaling. *Climatic Change*, 146(3), 335-347. DOI: 10.1007/s10584-016-1656-7.

16. Fix M.J.[†], Cooley D., Hodzic A., Gilleland E., Russell, B.T., Porter W.C., Pfister G.G. (2018). Observed and Predicted Sensitivities of Extreme Surface Ozone to Meteorological Drivers in Three US Cities. *Atmospheric Environment* 176:292-300.
17. von Fischer J.C., Cooley D., Chamberlain S., Gaylord A., Griebenow C.J., Hamburg S.P., Salo J., Schumacher R., Theobald D., Ham J. (2017). Rapid, Vehicle-Based Identification of Location and Magnitude of Urban Natural Gas Pipeline Leaks. *Environmental Science and Technology*, 51:4091-4099.
18. Morris S.A., Reich B.J., Thibaud E., Cooley D. (2017). A space-time skew-t model for threshold exceedances. *Biometrics*, 73:749-758.
19. Hunter B.D.[†], Cooley D., Givens G.H., Beveridge J.R. (2017). Modeling the Upper Tail of the Distribution of Facial Recognition Non-match Scores. *Statistics and Its Interface*, 10:711-725.
20. Thibaud E., Aalto J., Cooley D., Davison A.C., and Heikkinen J. (2016). Bayesian Inference for the Brown-Resnick Process, with an Application to Extreme Low Temperatures. *Annals of Applied Statistics*, 10:2303-2324.
21. Russell B.T.[†], Cooley D., Porter W.C., Reich B.J., Heald C.L. (2016). Data Mining for Extreme Behavior with Application to Ground Level Ozone. *Annals of Applied Statistics*, 10:1673-1698.
22. Brandt A.R., Heath G.A., Cooley D. (2016). Methane leaks from natural gas systems follow extreme distributions. *Environmental Science and Technology*, 50:12512-12520.
23. Russell B.T.[†], Cooley D.S., Porter W.C., Heald C.L. (2016). Modeling the Spatial Behavior of the Meteorological Drivers of Extreme Ozone. *Environmetrics*, 27:334-344.
24. Shaby B.A., Reich B.J., Cooley D., Kaufman C.G. (2016). A Markov-Switching Model for Heat Waves. *Annals of Applied Statistics* 10:74-93.
25. Tye M.R., Cooley D. (2015). Examining Extreme Rainfall along Colorado's Front Range via a Spatial Model. *Journal of Hydrology*, 530:15-23.
26. Porter W.C., Heald C.L., Cooley D., Russell B. (2015). Investigating the Observed Sensitivities of Air-Quality Extremes to Meteorological Drivers via Quantile Regression. *Atmospheric Chemistry and Physics*, 15, 10349-10366.
27. Ogle S.M., Davis K., Lauvaux T., Schuh A., Cooley D., West T.O., Heath L.S., Miles N., Richardson S., Breidt F.J., Smith J.E., McCarty J.L., Gurney K.R., Tans P., Denning A.S. (2015). An Approach for Verifying Biogenic Greenhouse Gas Emissions Inventories with Atmospheric CO₂ Concentration Data. *Environmental Research Letters*, 10:034012.
28. Leung S.[†], Cooley D. (2014). A Comparison of Traditional Geostatistical and General Gaussian Process Approaches for Spatial Prediction. *Stat*, 3:228-239.
29. Reich B.J., Shaby B.A., Cooley D. (2014). A Hierarchical Model for Serially-Dependent Extremes: A Study of Heat Waves in the Western US. *Journal of Agricultural, Biological, and Environmental Statistics*, 19:119-135.
30. Weller, G.B.[†], Cooley, D. (2014). A Sum Characterization of Hidden Regular Variation with Likelihood Inference via Expectation–Maximization. *Biometrika*, 101:17-36.
31. Weller G.B.[†], Cooley D., Sain S.R., Bukovsky M.S., Mearns L.O. (2013). Two Case Studies of NARCCAP Precipitation Extremes. *Journal of Geophysical Research: Atmospheres*, 118:10,475-10,489.
32. Reich B.J., Cooley D., Foley K.M., Napelenok S.L., Shaby B.A. (2013). Extreme value analysis for evaluating ozone control strategies. *Annals of Applied Statistics*, 7:739-762.

33. Schuh A.E., Lauvaux T., West T., Denning A.S., Cooley D., Davis K.J., Miles N., Richardson S., Uliasz M., Lokupitiya E., Andrews A., Ogle S. (2013). Evaluating atmospheric CO₂ inversions at multiple scales over a highly-inventoried agricultural landscape. *Global Change Biology*, 19:1424-1439.
34. Cooley D., Davis R.A., Naveau P. (2012). Approximating the Conditional Density Given Large Observed Values via a Multivariate Extremes Framework, with Application to Environmental Data. *Annals of Applied Statistics*, 6:1406-1429.
35. Weller G.B.[†], Cooley D., Sain S.R. (2012). An Investigation of the Pineapple Express Phenomenon via Bivariate Extreme Value Theory. *Environmetrics*, 23:420-439.
36. Cooley D., Breidt F.J., Ogle S.M., Schuh A., Lauvaux T. (2013). A Constrained Least-Squares Approach to Combine Bottom-Up and Top-Down CO₂ Flux Estimates. *Environmental and Ecological Statistics*, 20:129-146.
37. Cooley D., Cisewski J., Erhardt R., Jeon S., Mannshardt E., Omolo B., Sun Y. (2012). A Survey of Spatial Extremes: Measuring Spatial Dependence and Modeling Spatial Effects. *RevStat*, 10:135-165.
38. Ribatet M., Cooley D., Davison A.C. (2012). Bayesian Inference from Composite Likelihoods, with an Application to Spatial Extremes. *Statistica Sinica*, 22:813-846.
39. Cooley D., Sain S.R. (2010). Spatial Hierarchical Modeling of Precipitation Extremes from a Regional Climate Model. *Journal of Agricultural, Biological, and Environmental Statistics*, 15:381-402.
40. Cooley D., Davis R.A., Naveau P. (2010). The Pairwise Beta Distribution: A Flexible Parametric Multivariate Model for Extremes. *Journal of Multivariate Analysis*, 101:2103-2117.
41. Mannshardt-Shamseldin E.C., Smith R.L., Sain S.R., Mearns L., Cooley D. (2010). Down-scaling Extremes: A Comparison of Extreme Value Distributions in Point-Source and Gridded Precipitation Data. *Annals of Applied Statistics*, 4:484-502.
42. Schliep E.[†], Cooley D., Sain S.R., Hoeting J.A. (2010). A Comparison Study of Extreme Precipitation from Six Different Regional Climate Models via Spatial Hierarchical Modeling. *Extremes*, 13:219-239.
43. Fowler H.J., Cooley D., Sain S.R., Thurston M. (2010). Detecting change in UK extreme precipitation using results from the climateprediction.net BBC Climate Change Experiment. *Extremes* 13:241-267.
44. Cooley D. (2009). Extreme Value Analysis and the Study of Climate Change. *Climatic Change*, 97:77-83.
45. Naveau P., Guillou A., Cooley D., and Diebolt J. (2009). Modeling Pairwise Dependence of Maxima in Space. *Biometrika*, 96:1-17.
46. Cooley D., Nychka D., Naveau P. (2007). Bayesian Spatial Modeling of Extreme Precipitation Return Levels. *Journal of the American Statistical Association*, 102:824-840.
47. Naveau P., Jomelli V., Cooley D., Grancher D., Rabatel A. (2007). Modeling Uncertainties in Lichenometry Studies. *Arctic, Antarctic, and Alpine Research*, 39:277-285.
48. Jomelli V., Grancher D., Naveau P., Cooley D., and Brunstein D. (2007). Assessment study of lichenometric methods for dating surface. *Geomorphology* 86:131-143.
49. Cooley D., Naveau P., Jomelli V., Rabatel A., Grancher D. (2006). A Bayesian Hierarchical Extreme Value Model for Lichenometry. *Environmetrics*, 17:555-574.
50. Naveau P., Nogaj M., Ammann C., Yiou P., Cooley D. and Jomelli V. (2005). Statistical Analysis of Climate Extremes. *Comptes Rendus de l'Academie des Sciences*, 337:1013-1022.

Panel Reports, Refereed

1. Committee on Modernizing Probable Maximum Precipitation Estimation [J.A. Smith (chair), D. Cooley, J. England, E. Foufoula-Georgiou, K. Holman, S-C. Kao, R. Leung, R. Mason, J.W. Nielsen-Gammon, J. Obeysekera, C.J. Paciorek, R. Schumacher] (2024) *Modernizing Probable Maximum Precipitation Estimation*. National Academies of Sciences, Engineering, and Medicine. National Academies Press. <https://doi.org/10.17226/27460>.
2. Committee on Anthropogenic Methane Emissions in the United States: Improving Measurement, Monitoring, Reporting, and Development of Inventories [J.W.C. White (chair), D. Allen, P.K. Amar, J. Bogner, L. Bruhwiler, D. Cooley, C. Frankenberg, F. George, L. Hanle, A.H. Hristov, E. Kebreab, A. Leytem, M. Mastalerz, S. Wofsy] (2018). *Improving Characterization of Anthropogenic Methane Emissions in the United States*. National Academies of Sciences, Engineering, and Medicine. National Academies Press, Washington D.C. doi:<https://doi.org/10.17226/24987>.

Book Chapters, Refereed

1. Cooley D., Hunter B.D., Smith R.L. (2019). Univariate and Multivariate Extremes for the Environmental Sciences. in *Handbook of Environmental and Ecological Statistics*. CRC Press, Boca Raton. edited by Gelfand A., Fuentes M., Hoeting, J.A., Smith R.L. pp. 153-180.
2. Cooley D. (2012). Return Periods Under Climate Change, in *Extremes in a Changing Climate: Detection, Analysis & Uncertainty*. Springer, Netherlands, Dordrecht. Water Science and Technology Series, Vol 65. edited by pp. 97-114.
3. Cooley D., Naveau P., Poncet, P. (2006). Variograms for spatial max-stable random fields. In *Dependence in Probability and Statistics*, edited by Bertail P., Doukhan P., Soulier, P.; Springer, New York, pp. 373-390.

Conference Proceedings, Refereed

1. Ebert-Uphoff I., Huang W., Mitra A., Cooley D., Chatterjee S., Chen C., Wang Z. (2018). Studying Extremal Dependence in Climate Using Complex Networks. In C. Chen, D. Cooley, J. Runge E. Szekely (Eds.), *Proceedings of the 8th International Workshop on Climate Informatics (CI2018)*. NCAR Technical Note NCAR/TN-550+PROC, 2018. DOI: [10.5065/D6BZ64XQ](https://doi.org/10.5065/D6BZ64XQ).
2. Cooley D., Jomelli V., Naveau P. (2004). Spatio-temporal Analysis of Extreme Values from Lichenometric Studies and their Relationships to Climate. In *Proceedings of The International Environmetrics Society Conference 2004*, Portland, Maine.

Book Reviews

1. Cooley D., (2017) Review of *Extreme Value Modeling and Risk Analysis* Dipak K. Dey and Jun Yan, editors. *Biometrics*, 73:1057-1058.

Conference Proceedings, Not Refereed

1. Cooley D. (2011) Spatial Hierarchical Models for Extremes: Modeling Both Climate and Weather Effects In *Proceedings of The International Statistical Institute Conference 2011*, Dublin, Ireland.

Invited Commentaries

1. Cooley D., Sain S.R. (2012). Invited commentary on ‘Statistical Modelling of Spatial Extremes’ by Davison, Padoan, and Ribatet. *Statistical Science*, 27:187-188.

2. Cooley D. (2011). Invited discussion of “Threshold modelling of spatially-dependent non-stationary extremes with application to hurricane-induced wave heights”, by Northrup and Jonathan, *Environmetrics*, 22:812-813.

Commentaries

1. Cooley, D., and M. Wehner (2019), Climate science needs professional statisticians, *Eos*, 100, <https://doi.org/10.1029/2019EO133569>.
2. Hering A.S., and Cooley D. (2019) Twenty Years of Statistics at the National Center for Atmospheric Research. *Chance*, 32, 40-43.
3. Cooley D., Hoeting J.A. (2011). Discussion of “An explicit link between Gaussian fields and Gaussian Markov random fields: the stochastic partial differential equation approach” by Lindgren, Rue, and Lindstrom. *Journal of the Royal Statistical Society, Series B*, 73:470.
4. Chenet M., Roussel E., Jomelli V., Grancher D., Cooley, D. (2011). A response to the commentary of M. Dabbski about the paper ‘Asynchronous Little Ice Age glacial maximum extent in southeast Iceland’ . *Geomorphology*, 128, 103-104.
5. Jomelli V., Naveau P., Cooley D., Grancher D., Rabatel A. (2010). A Response to Bradwell’s Commentary on Recent Statistical Studies in Lichenometry. *Geografiska Annaler: Series A, Physical Geography*, 92:485-487.

Technical Reports

1. Wagner A.M., Hiemstra C.A., Gelvin A.B., Liston G., Cooley D., Bennett K.E. (2021) Changes in Climate and its Effect on Timing of Snowmelt and Intensity-Duration-Frequency Curves. Technical Report of the Cold Regions Research and Engineering Laboratory, US Army. <http://dx.doi.org/10.21079/11681/41402>
2. Weller G.B.[†], Cooley D. (2012). An Alternative Characterization of Hidden Regular Variation in Joint Tail Modeling *CSU Department of Statistics Technical Report 2012/2*.
3. Cooley D., Davis R., Naveau P. (2007). Prediction for Max-Stable Processes via an Approximated Conditional Density. *CSU Department of Statistics Technical Report 2007/3*.

Forthcoming Publications

1. Lee J.[†], Cooley D. Transformed-linear prediction for extremes. *Submitted, arXiv:2111.03754*
2. Lee J.[†], Cooley D. Partial Tail Correlation for Extremes. *Submitted, arXiv:2210.02048*.
3. Mhatre N.[†], Cooley D. Transformed-Linear Innovations Algorithm for Modeling and Forecasting of Time Series Extremes *arXiv:2309.10061*.
4. Majumder R., Shaby B.A., Reich B.J., Cooley D. Semiparametric Estimation of the Shape of the Limiting Multivariate Point Cloud. *arXiv:2306.13257*.

Presentations

Invited Presentations (Since 2015)

- Transformed-Linear Methods for Extremes, Fire Season Attribution, (and Vector Spaces!). *2024 ENVR Workshop: Spatial Data Science for the Environment, NCAR Boulder CO; October 4-5, 2024*.
- Toward Inner Product Spaces for Regularly Varying Random Vectors. *Mathematics, Statistics, and Geometry of Extreme Events in High Dimensions, Oberwolfach Germany; August 18-23, 2024*.

- Transformed-Linear Methods for Extremes and Fire Season Attribution. *EnviBayes Workshop on Complex Environmental Data, Fort Collins CO; September 18-20, 2023.*
- Transformed-Linear Methods for Extremes and Application to Climate. *Joint Statistical Meetings, Invited Session: Statistics of Climate Extremes, Toronto ON; August 6-9, 2023.*
- Transformed-Linear Methods for Multivariate Extremes and Transformed-Linear Prediction. *2023 Clemson Climate Extremes Workshop, Clemson SC; May 16-18, 2023.*
- Transformed-Linear Methods for Multivariate Extremes and Application to Climate. *Colorado School of Mines; February 24, 2023.*
- Transformed-linear Regularly Varying Time Series Models and Extreme Event Attribution. *Extremes and Time Series: A Workshop on the Occasion of Richard Davis' 70th Birthday, Columbia University, New York; January 20-21, 2023.*
- Transformed-Linear Methods for Multivariate Extremes and Application to Climate. *Climate and Weather Extremes Workshop, Institute for Mathematical and Statistical Innovation, University of Chicago; October 3, 2022.*
- Attribution of Seasonal Fire Risk to Climate Change *Joint Statistical Meetings, Invited Session: Statistical Innovations to Facilitate Understanding and Prediction of Wildland Fires. Washington DC; August 10, 2022.*
- Transformed Linear Prediction for Extremes, *Banff International Research Station Workshop: Combining Causal Inference and Extreme Value Theory in the Study of Climate Extremes and their Causes. Kelowna, BC Canada; June 29, 2022 (Presented Virtually).*
- Statistics in Climate Science and Extreme Event Attribution (Plenary Talk), *UC Louvain, Belgium; May 12, 2022.*
- Attribution of the 2020 Colorado Fire Season by Transformed-linear Time Series for Extremes, *Joint Statistical Meetings, Invited Session: Advances in Statistical Climatology, Virtual; Aug 8, 2021.*
- Transformed-Linear Models for Time Series Extremes, *ISI World Statistics Conference, Invited Session: Statistics of Extremes, Virtual; July 16, 2021.*
- Climatic Extremes: Current Statistical Challenges, *Extreme Value Analysis Conference, Edinburgh Scotland, Virtual; June 30, 2021. (Plenary Talk)*
- Transformed-Linear Models for Time Series Extremes, *Workshop: Statistical Estimation and Detection of Extreme Hot Spots, with Environmental and Ecological Applications; KAUST Saudi Arabia, Virtual; February 1, 2021.*
- Transformed-Linear Methods and Extreme Value Analysis, *Clemson University, Virtual; October 19, 2020.*
- Transformed-Linear Methods and Extreme Value Analysis, *University of California, Santa Cruz, Virtual; October 5, 2020.*
- Transformed-Linear Methods for Modeling and Studying Extremes, *One World Extremes Seminar, Virtual, Hosted by the Bernoulli Society; July 7, 2020.*
- Compound Events from a Statistics Perspective: Multivariate Extremes, *Risk KAN Compound Events Working Group Webinar, Virtual, <https://www.risk-kan.org>; April 16, 2020.*
- Principal Component Analysis for Extremes and Applications for Exploration and Modeling, *Workshop on Risk Analysis in the Earth System, Lawrence Berkeley National Lab; July 22-24, 2019.*
- Decomposition of Extremal Dependence and Applications, *Extreme Value Analysis Conference 2019, Zagreb Croatia; July 1, 2019.*

- Decomposing Extremal Dependence and Application to US Precipitation, *Keynote Speaker at Florida International University's Annual Conference on Statistical Methods and Mentoring, Miami FL, March 29, 2019.*
- Extremes, Tail Dependence, and High Dimensions, *Workshop: The Nexus of Climate Data, Insurance, and Adaptive Capacity, Asheville NC; November 8-9, 2018.*
- Decomposing Extremal Dependence and Application to US Precipitation and Financial Data, *Purdue University, West Lafayette IN; October 5, 2018.*
- Exploring Weather Phenomena by Decomposing Extremal Dependence, *Joint Statistical Meetings, Vancouver BC, Canada; Invited Session: Statistical Methods in Detection and Attribution of Changes in Climate Extremes; July 28-August 2, 2018.*
- Decomposition of Dependence for High Dimensional Extremes with Application to US Precipitation and Financial Data, *Rare Events, Extremes, and Machine Learning Workshop, Télécom ParisTech, Paris, France; May 24-25, 2018.*
- Decomposition of Dependence for High Dimensional Extremes, *Lancaster University, Lancaster England; May 18, 2018.*
- Linear Algebra for Extremes and an Extremal Simultaneous Autoregressive Model, *Université Pierre-et-Marie-Curie, Paris, France; February 2, 2018.*
- Decompositions of Dependence for High Dimensional Extremes, *Environmental Risk Modeling and Extreme Events, Montreal; Canada, August 28-31, 2017.*
- Principal Component Decomposition and Completely Positive Decomposition for Multivariate Extremes, *10th Extreme Value Analysis Conference, Delft, Netherlands; June 26-30, 2017.*
- Methane Leaks from Natural Gas Systems Follow Extreme Distributions, *EPA Greenhouse Gas Stakeholders Workshop, Washington DC; June 22, 2017.* (Remote presentation.)
- Two Decompositions of Dependence for Multivariate Extremes, *Department of Statistics, Colorado State University, Fort Collins, CO; April 24, 2017.*
- Two Decompositions of Dependence for Multivariate Extremes, *Statistics for High Dimensional and Complex Data, KAUST, Thuwal, Saudi Arabia; November 6-9, 2016.*
- Two Decompositions of Dependence for Multivariate Extremes, *STATMOS Workshop on Weather and Climate Extremes, Penn State University, State College PA; October 24-25, 2016.*
- Extreme Analysis for Climate Models; *CMIP Analysis Platform Tutorial, NCAR, Boulder CO; August 17, 2016.*
- Principal Component Analysis for Extremes; Applications for Climate; *Joint Statistical Meetings, Chicago Illinois, Invited Session: Uncertainty Quantification in Climate Science; August 4, 2016.*
- Decomposition of Dependence for Multivariate Extremes; *Extreme Values and Water Resources Workshop, CNRS Center, Aussois France, June 27-July 1, 2016.*
- Assessing Regional Climate Models' Ability to Produce Extreme Precipitation; *Uncertainty and Causality Assessment in Modeling Extreme and Rare Events, NCAR, Boulder CO, April 25-28, 2016.*
- Extreme Values in Atmospheric Science: Progress and Current Challenges; *American Meteorological Society Annual Meeting, New Orleans LA; January 13, 2016.*
- Data Mining to Investigate the Meteorological Drivers of Extreme Ozone; *The Mathematics and Statistics of Quantitative Risk Management, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany; September 25, 2015.*

- Assessing Regional Climate Models’ Ability to Produce Extreme Precipitation; *Extreme Value Analysis Conference, Ann Arbor MI; June 18, 2015.*
- Data Mining for Extreme Behavior and Application to Ground Level Ozone; *Department of Biostatistics, Yale University; April 14, 2015.*

Invited Panels

- Application of Machine Learning Methods to Study Extreme Events *Collaborative Strategies for Predicting and Measuring Uncertainty in Rare Occurrences in Civil and Environmental Systems, Colorado School of Mines, Golden Colorado, November 6-8, 2024*
- Machine Learning and Extremes Panel Discussion *Rare Events, Extremes, and Machine Learning Workshop, Télécom ParisTech, Paris, France; May 24-25, 2018.*
- Climate Extremes Panel Discussion *Program on Mathematical and Statistical Methods for Climate and the Earth System, Opening Workshop, SAMSI, RTP NC; August 23, 2017.*

Workshops Presented

- Introduction to Statistical Methods for Environmental Extremes *Short course at the STAT-MOS Workshop for Weather and Climate Extremes, State College PA, October 23, 2016.*
- Extreme Value Modeling and Water Resources: Summer School. *Université Claude Bernard Lyon 1, Lyon France; June 13-24, 2016.* Instructor of three sessions:
 - Introduction to Multivariate Extremes
 - Spatial Extremes: Modeling Weather and Climate Effects
 - Extremes and Climate Models
- Beyond P-values: The Statistics of Extremes. *National Center for Atmospheric Research, Boulder CO; March 28-30, 2016.* (One of four instructors for a three day course)
- Introduction to Analysis of Extremes: Univariate and Multivariate Cases. *Joint Statistical Meetings, Montreal, Canada; August 2, 2013.* (Full-day short course)
- Introduction to Analysis of Extremes: Univariate and Multivariate Cases. *ENVR Workshop, Raleigh, NC; October 4, 2012.* (Half-day short course)
- Introduction to Analysis of Extremes: Univariate and Multivariate Cases. *Joint Statistical Meetings, San Diego, CA; July 28, 2012.* (Full-day short course)
- Introduction to Extreme Value Analysis: Univariate, Multivariate, and Spatial Cases. *SAMSI/Sandia UQ Summer School, Albuquerque NM, June 22, 2011.* (Full-day short course)

Other Presentations and Media

- Interviewed for “Colorado’s 20 Largest Wildfires Happened this Century. Here’s How Things are Changing.” *Coloradoan* (Fort Collins Newspaper). June 3, 2024.
- Podcast interview for “Carry the Two”. Episode title: Dan Cooley on the Colorado Fire Season. Released July 2023. <https://carry-the-two.castos.com/episodes/dan-cooley-on-the-colorado-fire-season>
- Interviewed for *Stats and Stories* podcast, January 2020.
- Attribution of the 2020 Colorado Fire Season. *Western EcoSystems Technology, Inc., August 11, 2021.*
- Extremes. *Fort Collins Utilities Large Staff Presentation, April 23, 2018.*

Grants

Funded

- 07/01/2023-06/30/2026, A New Parametric Model, Likelihood Methods, and Other Advancements for Multivariate Extremes. *NSF DMS-Statistics*, \$299,965. D. Cooley PI.
- 06/01/18-05/31/22, Extremes Models and Methods from Transformed Linear Operations. *NSF DMS-Statistics*, \$244,917. D. Cooley, PI.
- 7/1/2017 - 6/30/2018, Differentiated Methane Sensor Targets for Super-emitters: Develop a Pilot Tool for Well-Pads, *Novim/Colorado Energy Research Collaboratory*, D.Cooley, co-investigator, PI: Garvin Heath, National Renewable Energy Lab and Adam Brandt, Stanford. CSU: \$30K.
- 7/1/2015 - 6/30/2018, Changes in Climate and its Effect on Timing of Snowmelt and Intensity-Duration-Frequency Curves, *SERDP (DOD, EPA, DOE)*, D.Cooley, co-investigator (1 month), PI: Dr. Anna Wagner, U.S. Army Cold Regions Research and Engineering Laboratory, Fairbanks, AK. Total: \$1,391,000, CSU: \$666K, Statistics: \$59K.
- 7/1/2013-6/30/2018, Collaborative Research: Advancing extreme value analysis of high impact climate and weather events, *NSF/DOE/USDA Decadal and Regional Climate Prediction using Earth System Models (EaSM) Program Solicitation NSF 12-522*. D. Cooley, lead PI (1.5 months); collaborative research with UC Berkeley, Lawrence Berkeley National Labs, and University of North Carolina, Chapel Hill. CSU: \$867,275; Total: \$4,901,718.
- 07/15/12-10/31/12 Interpretation of street-level methane concentrations. *Environmental Defense Fund*, \$402,108. J. Von Fischer (CSU, Biology), PI, D. Cooley, Investigator: one-half month of salary.
- 06/01/12 - 5/31/15, Using advanced statistical techniques to identify the drivers and occurrence of historical and future extreme air quality events in the United States from observations and models, *EPA STAR Extreme Event Impacts on Air Quality and Water quality with a Changing Global Climate (EPA-G2011-STAR-D1)*, \$750,000. C. Heald (MIT Atmospheric Science) Lead-PI, D. Cooley, co-PI: CSU subcontract: \$190,844, one month per year summer support plus funding for one graduate student.
- 07/01/09-06/30/13, Models for extremes on a spatial lattice. *NSF DMS-Statistics*, \$169,990. D. Cooley, PI.
- 01/01/08-12/31/10, Resolving net CO₂ exchange in the mid-continent region of North America by comparing and reconciling results from inverse modeling and inventory-based approaches. *NASA Carbon Cycle Science*, \$1,094,526. S. Ogle (CSU, NREL), PI, D. Cooley, Investigator: two months per year of support.

Teaching

Colorado State University

STAT 192	First Year Seminar in Mathematical Sciences	S10, S14, S15
STAT 341	Statistical Data Analysis I	F16, F17, F18
STAT 342	Statistical Data Analysis II	S16, S17, S18
STAT 421	Stochastic Processes	S19
STAT 430	Probability/Mathematical Statistics II	S12
STAT 511	Design and Data Analysis for Researchers I	F07, F09(2), F10
STAT/NR 523	Quantitative Spatial Analysis	S08, S09, S11, S12, S13
STAT 525	Analysis of Time Series I	F08, F10, F13, F17, S23
STAT 540	Data Analysis and Regression	F24

STAT 623	Spatial Statistics	F19, F23
STAT 620	Introduction to Measure-Theoretic Probability	S20, S21, S22
STAT 630	Advanced Statistical Data Analysis	F20, F21, F22
STAT 740	Extreme Value Analysis	S09, F12, F15
STAT 795	Independent Study: Seminar on Spatial Statistics	S20

STAA 565	Quantitative Reasoning	F13
STAA 567	Computation and Simulation Methods	F19, F22, F23
STAA 574	Multivariate Statistics	S13, S14, S15, S16, S19, S21, S22, S23
STAA 576	Methods in Environmental Statistics	S13, S14, S17
MATH 495	FEScUE Seminar	S08
NCSI 610	TREE/PRIMES – Team Research in Ecology	S07

Other

Graduate Instructor, Applied Mathematics, University of Colorado at Boulder, Fall 2004
Teaching Assistant, Applied Mathematics, University of Colorado at Boulder, 2000-2002
Lead Teaching Assistant, Applied Mathematics, University of Colorado at Boulder, 2001-02
Mathematics Teacher, Glenwood Springs High School, Glenwood Springs Colorado, 1995-2000
Co-Instructor, Department of Applied Mathematics Summer Institute, July 2001, July 2002
Instructor, Colorado Mountain College, Summer 1999

Advising

Postdoctoral Advisor

Emeric Thibaud (2015-2016)
Yujing Jiang (2017-2018)

Advisor

Kenneth Broadhead (PhD, In progress)
Troy Wixson (PhD, In progress)
Nehali Mhatre (PhD, 2022)
Jeongjin Lee (PhD, 2022)
Miranda Fix (PhD, 2018)
Brett Hunter (PhD, 2016)
Brook Russell (PhD, 2015)
Grant Weller (PhD, 2013)
David Russo (MS, 2014)
Stanley Leung (MS, 2014)
Linde Bischak (MS, 2013)
George Weigt (MS, 2011)
Atul Sharma (MS, 2009)
Fatima Anderson (MS, 2009)
Erin Schliep (MS, 2009)
Austin Lampros (MS, 2009)

Co-advisor

Wilson Wright (PhD, 2024)¹

Michael Creutzinger (PhD, 2024)²

Committee Member (Since 2015)

Leif Fredericks (MS, Atmospheric Science, In Progress)

Nabeen Musfiq (PhD, In Progress)

Josh Carrell (PhD, Forest and Rangeland Stewardship, In Progress)

Elizabeth Lawler (PhD, In Progress)

Muyang Shi (PhD, In Progress)

Xiangdong Meng (PhD, In Progress)

Hanxiao Jing (PhD, In Progress)

Jacob Escobedo (MS, Atmospheric Science, 2022; PhD, In progress)

Callum Murphy-Barltrop (PhD, Lancaster University UK, 2023)

Mantautas Rimkus (PhD, 2023)

Nathan Ryder (PhD, 2023)

Peng Zhong (PhD, King Abdullah Univ. of Sci. and Tech., 2022)

Lauren Hoskovec (PhD, 2022)

Alex Fout (PhD, 2022)

Youngseok Song (PhD, 2021)

Kyle Salois (MS, Math, 2021)

Mihyun Kim (PhD, 2021)

Jungmin Park (PhD, Atmospheric Science, 2020)

Erika Cunningham (PhD, Duke University, 2020)

Jingyuan Li (MS, Atmospheric Science, 2016, PhD 2020)

Charlie Vollmer (PhD, 2019)

Ben Toms (MS, Atmospheric Science 2018; PhD, In Progress)

Josh Hewitt (PhD, 2019)

Sam Atwood (Atmospheric Science, PhD, 2019)

Kate Saunders (PhD, Statistics, University of Melbourne, 2018)

Qian Zhong (PhD, 2018)

Ben Zheng (PhD, 2018)

Emily Bell (MS, Atmospheric Science, 2018)

Lavinia Ghita (MS Statistics, École Polytechnique Fédérale de Lausanne, Switzerland, 2018)

Gregory Herman (MS, Atmospheric Science 2015, PhD, 2018)

Jordan Deshon (MS, Civil Engineering, 2018)

Joshua Mirth (MS, Mathematics, 2017)

Henry Scharf (PhD, 2017)

Max Nevill (MS, 2017)

Zach Weller (PhD, 2017)

Indrati Bosono (PhD, Applied Statistics, University of Melbourne, Australia, 2016)

Bettina Younge (MS, 2016)

Perry Williams (MS, 2015)

¹Wilson's research was primarily directed by Dr. Mevin Hooten. When Dr. Hooten left the university, I took on a minor role in Wilson's research.

²Michael's research was guided by Dr. Julia Sharp. When Dr. Sharp left the university, I served as Michael's official advisor, but did not direct his research.

Wuliang Sun (Computer Science, PhD, 2015)
Chad Martin (Civil Engineering, MS, 2015)

Undergraduate Research Advisor

Mikaela Elder (Fall 2018)

Other

Pierre-Hugues Dubois, visiting student from ENSAI, France, Summer 2017.
Quentin Grail, visiting student from ENSAI, France, Summer 2016.
Raphael DeFondeville, visiting student from Ecole des Mines, France, April - June 2014.
Hélène Beneviste, visiting student from Ecole des Mines, France, March - June 2012.
Virgile Bal, visiting student from ENSAI, France, Summer 2010.

Associations

American Statistical Association (2003-)
Institute for Mathematical Statistics (2009-)
Statistics and Environment Section of the ASA (2003-)
The International Environmetrics Society (2011-)
AGU (American Geophysical Union) (2008-2011)

Service

Departmental

StatLab search committee for research associate, Fall 2024.
MAS Admissions committee, 2023
Grade appeal committee, 2021
Reviewed applications and conducted interviews for office manager position, 2021
Strategic Planning Committee, 2020-2021
Graduate committee, 2014-15, Spring 2016, 2017-2018, Chair 2020-2023
Promotion and tenure advisory committee, 2015-2018, 2019-2020, Chair 2020-2021, Fill-in member 2021-2022, Chair 2022-2023.
Awards committee, 2018-2020, 2021-2022
Mentor to new assistant professors (2), 2016-
Faculty dinner schedule guy, 2016-2018
Undergraduate committee, 2015-16, 2019-20
Search/Hiring committee, 2012-13, 2013-14, 2015-16, 2017-2018, 2018-2019 (3 committees), 2019-2020 (chair), 2022-2023, Fall 2023 (chair).
Graduate student admissions committee, 2008-09, 2011-12 (chair), 2012-13 (chair), 2014-15
Distance compensation ad-hoc committee, Spring 2010
Distance/MAS committee, 2009-10, 2010-11, 2011-12, 2013-14, 2014-15, 2015-16
Undergraduate committee, 2009-10, 2010-11
Seminar organizer, 2007-08, 2008-09 (chair), Spring 2012 (chair), Spring 2015
Library liaison for statistics department, 2007-08

College/University

Reviewer, VPR Graduate Fellows Program, Spring 2024
Member, Department of Computer Science Search Committee for Data Science Position, Fall 2017-Spring 2018
Member, CNS Scholarship Committee 2017, 2018, 2019, 2020, 2021.
Member, Department of Statistics Chair Search Committee, Fall 2016.
CSU Colorado Flood Committee, 2014
ISTeC Research Computing Committee, Spring/Summer 2014
CNS Teaching Awards Committee, Spring 2013, Spring 2014, Spring 2015
Hiring committee for postdoc position for Climate Change Impacts to Hydropower Generation in Pacific Northwest River Basins project; P.I. Stephanie Kampf, Watershed Science, CSU, Fall 2008.

Professional

Editorial Duties

Guest co-editor of special issue of *Extremes*: Statistical modelling of environmental extremes, 2019
Associate Editor, *Extremes*, 2015 -
Associate Editor, *Advances in Statistical Climatology, Meteorology and Oceanography*, 2014 -
Associate Editor, *Environmetrics*, 2013-
Associate Editor, *STAT*, 2012-2018.
Associate Editor, *JRSSC*, 2009-2012.

Other

- Co-organizer Data Challenge for the 2025 Extreme Value Analysis Conference.
- Participant in ASA Climate and Extremes Roundtable, Boulder CO, October 2-3, 2024.
- Member of NSF review panel Statistics, February 2024.
- Member of the National Academy of Science Committee on Modernizing Maximal Precipitation Estimation. January 2023-Summer 2024.
- Organizer for session “Conditional Relationships and Sparsity for Extremes” for the Extreme Value Analysis Conference 2023.
- External evaluator for promotion and tenure cases, 2021 (2), 2017.
- Member of Climate Informatics 2019 Program Committee, Summer 2019.
- Member of NSF review panel Computational and Data-Enabled Science and Engineering (CDS&E-MSS), December 2018.
- Member of the scientific committee for the 2019 Extreme Value Analysis Conference.
- Co-chair of the 8th International Workshop on Climate Informatics, September 2018.
- Leader of the Extremes Working Group for SAMSI’s Program on Mathematical and Statistical Methods for Climate and Earth Systems, Aug 2017-May 2018.
- National Academy of Science Committee on Anthropogenic Methane Emissions in the US, member 2017.

- DOE Grant Review Panel: Regional and Global Climate Modeling and Integrated Assessment Research, June 1-2, 2016.
 - Participant in Climate Science Day on Capitol Hill, Washington DC, February 10, 2016.
 - Member, Scientific Advisory Panel, RPSEA Project 12122-95, "Development of a protocol to reconcile top-down and bottom-up methane emission estimates from onshore gas development in multiple basins." 2015-2017.
 - Program committee member, EVA 2015 conference
 - Organizer of STATMOS/NCAR Invited Poster Session on Statistics in Atmospheric Science JSM 2014.
 - JSM Program Committee Member, Chair of the Poster Session, 2013-2014
 - Co-organizer, INLA Short Course and Spatial Statistics Workshop, April 2013, Fort Collins, CO.
 - ASA Advisory Committee on Climate Change Policy, Member 2013 - 2018, vice chair 2016, chair 2017 & 2018.
 - Member, NSF DMS review panel statistics, Jan 2010.
 - Local organizer/Program co-chair 6th Extreme Value Analysis Conference/8th Graybill conference; Fort Collins, Colorado June 2009.
 - Member ENVR JSM Presentation Award Committee, Aug 2008, Aug 2009, Aug 2010 (Chair).
 - Assisted organizing New Researchers Conference; Boulder, Colorado, July 2008.
 - Organizer and Chair for the Session "Extremes: Methods for environmental and meteorological studies", JSM Conference; Seattle, WA; August 2006.
- Referee/Reviewer for:
- 2006: *Journal of Computational and Graphical Statistics, Global and Planetary Change, Water Resources Research, Advances in Water Resources*
 - 2007: *Annals of Applied Probability, Environmental and Ecological Statistics, Water Resources Research*, Grant Review for NERC (UK) Flood Risk from Extreme Events program, Grant Review for NSF-CMG, *Journal of Statistical Planning and Inference, Extremes, Environmetrics*
 - 2008: *JRSSC (2), Water Resources Research, Journal of Geophysical Research - Atmospheres, JABES*
 - 2009: *Advances in Water Resources, Water Resources Research, Biometrika, JASA*
 - 2010: *Biometrika, JASA (2), American Statistician, JRSSC*
 - 2011: *JABES, JSPI, Environmetrics*
 - 2012: *JABES, JRSSB, Biometrika, Extremes*
 - 2013: *JASA, JRSSC, Progress in Oceanography, Technometrics, Environmetrics*
 - 2014: Grant Reviews for NSF (2), *Environmetrics*, Proposal Review for Private Nonprofit Foundation, *Journal of Applied Meteorology and Climatology, Annals of Statistics, JASA, JCGS*
 - 2015: *Nature, Extremes*, Book Proposal Review, *Climate Dynamics, Biometrika*, NSF Grant ad hoc review
 - 2016: *AOAS*, NSF ad hoc review, *Scandinavian Journal of Statistics*
 - 2017: *Environmetrics, Stat, Scandinavian Journal of Statistics, Advances in Water Resources*, Chapter in Statistical Compilation, *Biometrika*
 - 2018: *Annals of Applied Statistics, Extremes, JABES, Stat*, Internal research grant proposal for a liberal arts institution

2019: *JMVA*, *Weather and Climate Extremes*, DoD Grant Proposal, *AoAS*
2020: *JCGS*, *Journal of Climate*, *JASA*, *AoAS*, *AoS*
2021: Two grant proposals, *JCGS*, *Journal of Statistics and Data Science Education*,
AoAS, Workshop Proposal
2022: Grant proposal, *AoS*, *Nature Communications*
2023: *AoS*, Grant proposals (2), *WIREs Computational Statistics*, *JRSSB*
2024: Referee for chapter volume on extremes, book proposal review, *Geophysical Research Letters*, EU Grant Proposal, *JMVA*, *JASA*, *Hydrology and Earth System Sciences*,
Workshop Proposal