Douglas William Nychka

Education

1978 B.A. Mathematics and Physics, Duke University
1983 Ph.D. Statistics, University of Wisconsin - Madison

Honors and Awards

1978 *Summa cum laude*, Duke University
1978 Julia Dale Mathematics Award Duke University
2003 Fellow, American Statistical Association
2004 Jerry Sacks Award for Multidisciplinary Research
2013 Distinguished Achievement Award ENVR Section American Statistical Association
2013 Achievement Award, International Statistics and Climatology Meeting
2015 Fellow, Institute of Mathematical Statistics

Professional Appointments

8/18 - present	Professor, Department of Applied Mathematics and Statistics, Colorado School of Mines, Golden, CO
8/97 - 8/18	National Center for Atmospheric Research, Boulder, CO. Visiting Scientist (8/97-7/99), Senior Scientist (8/99 - present), Project leader (8/99 - 9/04) Geophysical Statistics Project, Director (10/04 - 2017), Institute for Mathematics Applied to Geosciences (IMAGe) Senior Scientist Emeritus (8/18 - present)
7/83 - 6/99	Department of Statistics, North Carolina State University, Raleigh, NC Assistant (7/83 - 6/89), Associate (7/89 - 6/94) and Full Professor (7/94 - 7/99),
1/94 - 7/03	National Institute of Statistical Sciences, Research Triangle Park, NC, Senior Fellow (1/94 -7/99) and Trustee (2000 - 2003)
6/93 and 6/08	Isaac Newton Institute for the Mathematical Sciences, Cambridge, England, Visiting Scholar
5/88 - 6/88, 6/92	Statistics Group, University of Bath, Bath, England, Visiting Faculty
7/89, 8/90 - 12/90	Operations Research and Industrial Engineering Department, Cornell University, Visiting Faculty

Professional service and memberships

School of Mines

- Co-director Data Science Program (2018 – present) and member of Interdisciplinary Graduate Program committee
- Member AMS graduate committee (2020 – present)
- Co-organizer AMS summer bootcamp (2020)
- Schools of Mines COVID task force (2020 – present)

External

- Member (2015 – 2018) and Chair (2018 – present) Scientific Review Panel, Pacific Institute of Mathematical Sciences,
- Member (2015 – 2020) Scientific Advisory Committeee, Canadian Statistical Sciences Institute.
- Member (2019 – 2020) and Chair (present) , Gottfried E. Noether Awards Committee, American Statistical Association
- Member (2019 – 2020) and Chair (present) EVNR Distinguished Achievement Awar Committee, American Statistical Association
- NSF review panel IUSE Data Science. October 2020
- Member, Program Committee, Year long program on Mathematical and Statistical Methods for Climate and the Earth System, Statistics and Applied Mathematical Sciences Institute, (2017 – 2018)
- Member, Scientific Advisory Board, European Union Surface Temperature for All Corners of Earth (EUSTACE), (2015 –2019)
- Member and Chair, Board of Governors, Institute for Mathematical Applications, University of Minnesota (2011– 2015)
- Member, National Research Council Study on Verification & Validation and Uncertainty Quantification, (2010–2012)
- Member, Committee on Surface Temperature Reconstructions for the Last 2,000 Years, National Research Council (2006)
- Member and Chair, Scientific Advisory Panel, Center for Integrating Statistics and Environmental Sciences, University of Chicago (2003– 2006)
- Member, Committee on Applied and Theoretical Statistics (CATS), Board on Mathematical Sciences, The National Academies (2002 – 2005)
- Program Chair, 1994 Regional Institute of Mathematical Statistics Meetings, Birmingham, AL

- Associate Editor
  Technometrics (1995-1998)
  Journal of Nonparametric Statistics (1991–1995)
  Journal of the Royal Statistical Society Series B (1992–1994)
  International Statistical Review (1992–1994)
  Statistical Science (1999–2003)
  Journal of the American Statistical Association (2005 – 2007)

- Reviewer
  National Science Foundation, mail reviewer and panelist
  American Statistician, Annals of Statistics, Annals of Applied Statistics Biometrics, Econometrics, Environmetrics, Journal of Climate, Journal of the American Statistical Association, Journal of Microscopy, Letters in Statistics, The Institute of Statistical Mathematics, Nature, Technometrics, Spatial Statistics

- Memberships
  American Statistical Association, Institute of Mathematical Statistics, Society for Industrial and Applied Mathematics, American Geophysical Union

Peer-Reviewed Publications

103. Gerber, F. and Nychka, D. (2021a). Fast covariance parameter estimation of spatial gaussian process models using neural networks. *Stat*, 10(1):e382

102. Ilyas, M., Nychka, D., Brierley, C., and Guillas, S. (2021). Global ensemble of temperatures over 1850–2018: Quantification of uncertainties in observations, coverage, and spatial modelling (getquocs). *Atmospheric Measurement Techniques Discussions*, pages 1–19

101. Gerber, F. and Nychka, D. W. (2021b). Parallel cross-validation: A scalable fitting method for gaussian process models. *Computational Statistics & Data Analysis*, 155:107113

100. Wiens, A., Kleiber, W., Nychka, D., and Barnhart, K. R. (2021). Nonrigid registration using gaussian processes and local likelihood estimation. *Mathematical Geosciences*

99. Porcu, E., Furrer, R., and Nychka, D. (2020). 30 years of space-time covariance functions. *WIREs: Computational Statistics*

98. Wiens, A., Nychka, D., and Kleiber, W. (2020). Modeling spatial data using local likelihood estimation and a Matèrn to SAR translation. *Environmetrics*, 31(6)

97. Simonson, P., Nychka, D., and Bandyopadhyay, S. (2020). Rapid numerical approximation method for integrated covariance functions over irregular data regions. *Stat*, 9(1):e275

96. Huang, W. K., Nychka, D. W., and Zhang, H. (2019). Estimating precipitation extremes using the log-histospline. *Environmetrics*, 30(4):e2543

95. Heaton, M. J., Datta, A., Finley, A. O., Furrer, R., Guinness, J., Guhaniyogi, R., Gerber, F., Gramacy, R. B., Hammerling, D., Katzfuss, M., et al. (2019). A case study competition among methods for analyzing large spatial data. *Journal of Agricultural, Biological and Environmental Statistics*, 24(3):398–425

94. Dalmasse, K., Savcheva, A., Gibson, S., Fan, Y., Nychka, D., Flyer, N., Mathews, N., and DeLuca, E. (2019). Data-optimized coronal field model. i. proof of concept. *The Astrophysical Journal*, 877(2):111

93. Gagne II, D. J., Haupt, S. E., Nychka, D. W., and Thompson, G. (2019). Interpretable deep learning for spatial analysis of severe hailstorms. *Monthly Weather Review*, 147(8):2827–2845

92. Nychka, D., Hammerling, D., Krock, M., and Wiens, A. (2018). Modeling and emulation of nonstationary gaussian fields. *Spatial statistics*, 28:21–38

91. Pazdernik, K., Maitra, R., Nychka, D., and Sain, S. (2018). Reduced basis kriging for big spatial fields. *Sankhya A*, pages 1–21

90. Alexeeff, S. E., Nychka, D., Sain, S. R., and Tebaldi, C. (2016a). Emulating mean patterns and variability of temperature across and within scenarios in anthropogenic climate change experiments. *Climatic Change*, pages 1–15

89. Anderson, A. N., Browning, J. M., Comeaux, J., Hering, A. S., and Nychka, D. (2016). A comparison of automated statistical quality control methods for error detection in historical radiosonde temperatures. *International Journal of Climatology*, 36(1):28–42

88. Dalmasse, K., Nychka, D., Gibson, S., Fan, Y., and Flyer, N. (2016). Roam: a radial basis function optimization approximation method for diagnosing the three-dimensional coronal magnetic field. *Frontiers in Astronomy and Space Sciences*, 3

87. Alexeeff, S. E., Pfister, G. G., and Nychka, D. (2016b). A Bayesian model for quantifying the change in mortality associated with future ozone exposures under climate change. *Biometrics*, 72(1):281–288

86. Tolwinski-Ward, S., Tingley, M., Evans, M., Hughes, M., and Nychka, D. (2015). Probabilistic reconstructions of local temperature and soil moisture from tree-ring data with potentially time-varying climatic response. *Climate dynamics*, 44(3-4):791–806

85. Kleiber, W. and Nychka, D. W. (2015). Equivalent kriging. *Spatial Statistics*, 12:31–49

84. Nychka, D., Bandyopadhyay, S., Hammerling, D., Lindgren, F., and Sain, S. (2015). A multi-resolution Gaussian process model for the analysis of large spatial datasets. *Journal of Computational and Graphical Statistics*, 24(2):579–599

83. Heaton, M., Katzfuss, M., Berrett, C., and Nychka, D. (2014). Constructing valid spatial processes on the sphere using kernel convolutions. *Environmetrics*, 25(1):2–15

82. Lombardozzi, D., Bonan, G. B., and Nychka, D. W. (2014). The emerging anthropogenic signal in land-atmosphere carbon-cycle coupling. *Nature Climate Change*, 4(9):796

81. Anderes, E., Huser, R., Nychka, D., and Coram, M. (2013). Nonstationary positive definite tapering on the plane. *Journal of Computational and Graphical Statistics*, 22(4):848–865

80. Kleiber, W. and Nychka, D. (2012). Nonstationary modeling for multivariate spatial processes. *Journal of Multivariate Analysis*, 112:76–91

79. Sun, Y., Genton, M. G., and Nychka, D. W. (2012). Exact fast computation of band depth for large functional datasets: How quickly can one million curves be ranked? *Stat*, 1(1):68–74

78. Benestad, R. E., Nychka, D., and Mearns, L. O. (2012b). Specification of wet-day daily rainfall quantiles from the mean value. *Tellus A: Dynamic Meteorology and Oceanography*, 64(1):14981

77. Benestad, R., Nychka, D., and Mearns, L. (2012a). Spatially and temporally consistent prediction of heavy precipitation from mean values. *Nature Climate Change*, 2(7):544

76. Sain, S. R., Nychka, D., and Mearns, L. (2011). Functional anova and regional climate experiments: A statistical analysis of dynamic downscaling. *Environmetrics*, 22(6):700–711

75. Oh, H.-S., Lee, T. C., and Nychka, D. W. (2011). Fast nonparametric quantile regression with arbitrary smoothing methods. *Journal of Computational and Graphical Statistics*, 20(2):510–526

74. Matsuo, T., Nychka, D. W., and Paul, D. (2011). Nonstationary covariance modeling for incomplete data: Monte Carlo EM approach. *Computational Statistics & Data Analysis*, 55(6):2059–2073

73. Winter, C. and Nychka, D. (2010). Forecasting skill of model averages. *Stochastic environmental research and risk assessment*, 24(5):633–638

72. Li, B., Nychka, D. W., and Ammann, C. M. (2010). The value of multiproxy reconstruction of past climate. *Journal of the American Statistical Association*, 105(491):883–895

71. Smith, R. L., Tebaldi, C., Nychka, D., and Mearns, L. O. (2009). Bayesian modeling of uncertainty in ensembles of climate models. *Journal of the American Statistical Association*, 104(485):97–116

70. Storlie, C. B., Lee, T. C., Hannig, J., and Nychka, D. (2009). Tracking of multiple merging and splitting targets: A statistical perspective. *Statistica Sinica*, pages 1–31

69. Lankao, P. R., Tribbia, J. L., and Nychka, D. (2009). Testing theories to explore the drivers of cities' atmospheric emissions. *AMBIO: A Journal of the Human Environment*, 38(4):236–244

68. Whitcher, B., Lee, T., Weiss, J. B., Hoar, T. J., and Nychka, D. W. (2008). A multi-resolution census algorithm for calculating vortex statistics in turbulent flows. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 57(3):293–312

67. Santer, B. D., Thorne, P., Haimberger, L., Taylor, K. E., Wigley, T., Lanzante, J., Solomon, S., Free, M., Gleckler, P. J., Jones, P., et al. (2008). Consistency of modelled and observed temperature trends in the tropical troposphere. *International Journal of Climatology*, 28(13):1703–1722

66. Lankao, P. R., Nychka, D., and Tribbia, J. L. (2008). Development and greenhouse gas emissions deviate from the'modernization'theory and'convergence'hypothesis. *Climate Research*, 38(1):17–29

65. Malmberg, A., Arellano, A., Edwards, D. P., Flyer, N., Nychka, D., and Wikle, C. (2008). Interpolating fields of carbon monoxide data using a hybrid statistical-physical model. *The Annals of Applied Statistics*, pages 1231–1248

64. Khare, S. P., Anderson, J. L., Hoar, T. J., and Nychka, D. (2008). An investigation into the application of an ensemble kalman smoother to high-dimensional geophysical systems. *Tellus A*, 60(1):97–112

63. Kaufman, C. G., Schervish, M. J., and Nychka, D. W. (2008). Covariance tapering for likelihood-based estimation in large spatial data sets. *Journal of the American Statistical Association*, 103(484):1545–1555

62. Jun, M., Knutti, R., and Nychka, D. W. (2008b). Spatial analysis to quantify numerical model bias and dependence: how many climate models are there? *Journal of the American Statistical Association*, 103(483):934–947

61. Jun, M., Knutti, R., and Nychka, D. W. (2008a). Local eigenvalue analysis of cmip3 climate model errors. *Tellus A*, 60(5):992–1000

60. Drignei, D., Forest, C. E., Nychka, D., et al. (2008). Parameter estimation for computationally intensive nonlinear regression with an application to climate modeling. *The Annals of Applied Statistics*, 2(4):1217–1230

59. Huang, J.-C., Nychka, D. W., and Smith, V. K. (2008). Semi-parametric discrete choice measures of willingness to pay. *Economics Letters*, 101(1):91–94

58. Oh, H.-S., Nychka, D. W., and Lee, T. C. (2007). The role of pseudo data for robust smoothing with application to wavelet regression. *Biometrika*, 94(4):893–904

57. Li, B., Nychka, D. W., and Ammann, C. M. (2007). The Ôhockey stick' and the 1990s: a statistical perspective on reconstructing hemispheric temperatures. *Tellus A*, 59(5):591–598

56. Furrer, R., Sain, S. R., Nychka, D., and Meehl, G. A. (2007b). Multivariate bayesian analysis of atmosphere–ocean general circulation models. *Environmental and ecological statistics*, 14(3):249–266

55. Furrer, E. M. and Nychka, D. W. (2007). A framework to understand the asymptotic properties of kriging and splines. *Journal of the Korean Statistical Society*, 36(1):57–76

54. Furrer, R., Knutti, R., Sain, S., Nychka, D., and Meehl, G. (2007a). Spatial patterns of probabilistic temperature change projections from a multivariate bayesian analysis. *Geophysical Research Letters*, 34(6)

53. Cooley, D., Nychka, D., and Naveau, P. (2007). Bayesian spatial modeling of extreme precipitation return levels. *Journal of the American Statistical Association*, 102(479):824–840

52. Furrer, R., Genton, M. G., and Nychka, D. (2006). Covariance tapering for interpolation of large spatial datasets. *Journal of Computational and Graphical Statistics*, 15(3):502–523

51. Sain, S. R., Jagtap, S., Mearns, L., and Nychka, D. (2006). A multivariate spatial model for soil water profiles. *Journal of agricultural, biological, and environmental statistics*, 11(4):462–480

50. Fuentes, M., Kittel, T. G., and Nychka, D. (2006). Sensitivity of ecological models to their climate drivers: statistical ensembles for forcing. *Ecological Applications*, 16(1):99–116

49. Tebaldi, C., Smith, R. L., Nychka, D., and Mearns, L. O. (2005). Quantifying uncertainty in projections of regional climate change: A bayesian approach to the analysis of multimodel ensembles. *Journal of Climate*, 18(10):1524–1540

48. Gilleland, E. and Nychka, D. (2005). Statistical models for monitoring and regulating ground-level ozone. *Environmetrics*, 16(5):535–546

47. Feddema, J., Oleson, K., Bonan, G., Mearns, L., Washington, W., Meehl, G., and Nychka, D. (2005). A comparison of a gcm response to historical anthropogenic land cover change and model sensitivity to uncertainty in present-day land cover representations. *Climate Dynamics*, 25(6):581–609

46. Bengtsson, T., Milliff, R., Jones, R., Nychka, D., and Niiler, P. P. (2005). A state-space model for ocean drifter motions dominated by inertial oscillations. *Journal of Geophysical Research: Oceans*, 110(C10)

45. Oh, H.-S., Nychka, D., Brown, T., and Charbonneau, P. (2004). Period analysis of variable stars by robust smoothing. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 53(1):15–30

44. Meehl, G., Tebaldi, C., and Nychka, D. (2004). Changes in frost days in simulations of twentyfirst century climate. *Climate Dynamics*, 23(5):495–511

43. Oh, H.-S., Ammann, C. M., Naveau, P., Nychka, D., and Otto-Bliesner, B. L. (2003). Multiresolution time series analysis applied to solar irradiance and climate reconstructions. *Journal of Atmospheric and Solar-Terrestrial Physics*, 65(2):191–201

42. Milliff, R., Niiler, P., Morzel, J., Sybrandy, A., Nychka, D., and Large, W. (2003). Mesoscale correlation length scales from nscat and minimet surface wind retrievals in the labrador sea. *Journal of Atmospheric and Oceanic Technology*, 20(4):513–533

41. Holland, D. M., Cox, W. M., Scheffe, R., Cimorelli, A. J., Nychka, D., and Hopke, P. K. (2003). Spatial prediction of air quality data. *EM-PITTSBURGH-AIR AND WASTE MANAGEMENT ASSOCIATION-*, pages 31–35

40. Hoar, T. J., Milliff, R. F., Nychka, D., Wikle, C. K., and Berliner, L. M. (2003). Winds from a bayesian hierarchical model: Computation for atmosphere-ocean research. *Journal of Computational and Graphical Statistics*, 12(4):781–807

39. Bengtsson, T., Snyder, C., and Nychka, D. (2003). Toward a nonlinear ensemble filter for high-dimensional systems. *Journal of Geophysical Research: Atmospheres*, 108(D24)

38. Tebaldi, C., Nychka, D., Brown, B. G., and Sharman, R. (2002). Flexible discriminant techniques for forecasting clear-air turbulence. *Environmetrics*, 13(8):859–878

37. Nychka, D., Wikle, C., and Royle, J. A. (2002). Multiresolution models for nonstationary spatial covariance functions. *Statistical Modelling*, 2(4):315–331

36. Matsuo, T., Richmond, A. D., and Nychka, D. W. (2002). Modes of high-latitude electric field variability derived from de-2 measurements: Empirical orthogonal function (eof) analysis. *Geophysical research letters*, 29(7)

35. Johns, C. J., Nychka, D., Kittel, T., and Daly, C. (2001). Infilling sparse records of precipitation fields. *Journal of the American Statistical Association*, 98(464):796–806

34. Wikle, C. K., Milliff, R. F., Nychka, D., and Berliner, L. M. (2001). Spatiotemporal hierarchical Bayesian modeling of tropical ocean surface winds. *Journal of the American Statistical Association*, 96(454):382–397

33. Small, E. E., Sloan, L. C., and Nychka, D. (2001). Changes in surface air temperature caused by desiccation of the aral sea. *Journal of Climate*, 14(3):284–299

32. Cummins, D. J., Filloon, T. G., and Nychka, D. (2001). Confidence intervals for nonparametric curve estimates: Toward more uniform pointwise coverage. *Journal of the American Statistical Association*, 96(453):233–246

31. Santer, B. D., Wigley, T., Boyle, J., Gaffen, D. J., Hnilo, J., Nychka, D., Parker, D., and Taylor, K. (2000). Statistical significance of trends and trend differences in layer-average atmospheric temperature time series. *Journal of Geophysical Research: Atmospheres*, 105(D6):7337–7356

30. Huang, J.-C. and Nychka, D. W. (2000). A nonparametric multiple choice method within the random utility framework. *Journal of Econometrics*, 97(2):207–225

29. Errico, R. M., Fillion, L., Nychka, D., and Lu, Z.-Q. (2000). Some statistical considerations associated with the data assimilation of precipitation observations. *Quarterly Journal of the Royal Meteorological Society*, 126(562):339–359

28. Davis, J., Nychka, D., and Bailey, B. (2000). A comparison of regional oxidant model (rom) output with observed ozone data. *Atmospheric Environment*, 34(15):2413–2423

27. Tsai, K., Brownie, C., Nychka, D. W., and Pollock, K. H. (1999). Smoothing hazard functions for telemetry survival data in wildlife studies. *Bird Study*, 46(sup1):S47–S54

26. Ellner, S., Bailey, B., Bobashev, G., Gallant, A., Grenfell, B., and Nychka, D. (1998). Noise and nonlinearity in measles epidemics: combining mechanistic and statistical approaches to population modeling. *The American Naturalist*, 151(5):425–440

25. Davis, J., Eder, B., Nychka, D., and Yang, Q. (1998). Modeling the effects of meteorology on ozone in houston using cluster analysis and generalized additive models. *Atmospheric Environment*, 32(14):2505–2520

24. Royle, J. and Nychka, D. (1997). An algorithm for the construction of spatial designs with an implementation in splus. *Computers and Geosciences*, 24:479–488

23. Nychka, D. and Ruppert, D. (1995). Nonparametric transformations for both sides of a regression model. *Journal of the Royal Statistical Society. Series B (Methodological)*, pages 519–532

22. Nychka, D., Gray, G., Haaland, P., Martin, D., and O'Connell, M. (1995). A nonparametric regression approach to syringe grading for quality improvement. *Journal of the American Statistical Association*, 90(432):1171–1178

21. Nychka, D. (1995). Splines as local smoothers. *The Annals of Statistics*, pages 1175–1197

20. O'Connell, M. and Nychka, D. (1995). A generalized linear classification model with a smooth link function and predictors obtained from quantile spline fits to high-dimensional data. *Journal of statistical planning and inference*, 47(1-2):153–164

19. Graham, M. G., Paulos, J. J., and Nychka, D. W. (1995). Template-based mosfet device model. *IEEE transactions on computer-aided design of integrated circuits and systems*, 14(8):924–933

18. Schluter, D. and Nychka, D. (1994). Exploring fitness surfaces. *The American Naturalist*, 143(4):597–616

17. Haaland, P., Dickinson, B., McMillan, N., and Nychka, D. (1994). Analysis of space-filling designs. *Computing Science and Statistics*, pages 111–120

16. Meier, K. and Nychka, D. (1993). Nonparametric estimation of rate equations for nutrient uptake. *Journal of the American Statistical Association*, 88(422):602–614

15. Bloomfield, P. and Nychka, D. (1992). Climate spectra and detecting climate change. *Climatic Change*, 21(3):275–287

14. Nychka, D., Ellner, S., Gallant, A. R., and McCaffrey, D. (1992). Finding chaos in noisy systems. *Journal of the Royal Statistical Society. Series B (Methodological)*, pages 399–426

13. Ellner, S., Gallant, A. R., McCaffrey, D., and Nychka, D. (1991). Convergence rates and data requirements for jacobian-based estimates of lyapunov exponents from data. *Physics Letters A*, 153(6-7):357–363

12. Nychka, D. (1991). Choosing a range for the amount of smoothing in nonparametric regression. *Journal of the American Statistical Association*, 86(415):653–664

11. Silverman, B., Jones, M., Wilson, J., and Nychka, D. (1990). A smoothed em approach to a class of problems in image analysis and integral equations (with discussion). *Journal of the Royal Statistical Society Series B*, 52:271–324

10. Nychka, D. (1990). Some properties of adding a smoothing step to the em algorithm. *Statistics & probability letters*, 9(2):187–193

9. Nychka, D. et al. (1990). The average posterior variance of a smoothing spline and a consistent estimate of the average squared error. *The Annals of Statistics*, 18(1):415–428

8. Nychka, D. W. and Cox, D. D. (1989). Convergence rates for regularized solutions of integral equations from discrete noisy data. *The Annals of Statistics*, pages 556–572

7. Nychka, D. (1988). Bayesian confidence intervals for smoothing splines. *Journal of the American Statistical Association*, 83(404):1134–1143

6. Gallant, A. R. and Nychka, D. W. (1987). Semi-nonparametric maximum likelihood estimation. *Econometrica: Journal of the Econometric Society*, pages 363–390

5. Nychka, D., Wahba, G., Goldfarb, S., and Pugh, T. (1984b). Cross-validated spline methods for the estimation of three-dimensional tumor size distributions from observations on two-dimensional cross sections. *Journal of the American Statistical Association*, 79(388):832–846

4. Nychka, D., Pugh, T. D., King, J. H., Koen, H., Wahba, G., Chover, J., and Goldfarb, S. (1984a). Optimal use of sampled tissue sections for estimating the number of hepatocellular foci. *Cancer research*, 44(1):178–183

3. Koen, H., Pugh, T. D., Nychka, D., and Goldfarb, S. (1983). Presence of α-fetoprotein-positive cells in hepatocellular foci and microcarcinomas induced by single injections of diethylnitrosamine in infant mice. *Cancer research*, 43(2):702–708

2. Pugh, T. D., King, J. H., Koen, H., Nychka, D., Chover, J., Wahba, G., He, Y.-h., and Goldfarb, S. (1983). Reliable stereological method for estimating the number of microscopic hepatocellular foci from their transections. *Cancer research*, 43(3):1261–1268

1. Reinsel, G., Tiao, G., Wang, M., Lewis, R., and Nychka, D. (1981). Statistical analysis of stratospheric ozone data for the detection of trends. *Atmospheric Environment (1967)*, 15(9):1569–1577

Invited presentations

Invited talks, seminars and short courses with approximate audience size ( ).

- 2021
  Spatial Statistical Learning (methods from geostatistics)
  ISI 63rd World Congress, Short Course, May 2021, 3 Lectures, (30)

  Using neural networks for large spatial data,
  Texas A&M , April 2021, (25)
  Joint Statistical Meetings, (virtual) August 2021, (40)

- 2020
  The Earth's climate, a computer model, and a data scientist, John A Lynch Lecture Series, University of Notre Dame, February, 2020, (60).

  Non-stationary spatial data: think globally act locally, Statistics Department Seminar, UC Santa Barbara, April, 2020 (20).

  Learning a stationary covariance function,
  Texas A&M , April 2021, (25)
  Joint Statistical Meetings, (virtual) August 2020, (40).
  Kernel Klub, AMS, Mines, September 2020 (15)

- 2019
  Spatial data and the work of Grace Wahba ,
  Krishnaiah Memorial Lecture, Pennsylyvania State University, May, 2019 (50)

  Graduation Address to the Mathematics and Statistics Undergraduates,
  University of Illinois, May, 2019 This address was to approximately 1000 students, parents and faculty.

  Nonstationary Spatial Data: Think Globally Act Locally,
  Joint Statistical Meetings, Denver, August 2019 (40)
  Department of Statistics, Simon Fraser University, Vancouver, Canada, October, 2019. (35)

- 2018

  Statistical methods for nonstationary spatial data
  International Environmetrics Society, Guanajuato, MX, July 2018
  Joint Statistical Meetings, Vancouver, BC, August 2018

  Data Science and Climate
  Alan Turing Institute, London, UK, March 2018 (45)

An introduction to climate
October 2018, SAMSI, Research Triangle Park, NC (50)
May 2018, SAMSI, Research Triangle Park, NC (50)

Large and non-stationary spatial fields: Quantifying uncertainty in climate models
Hadley Center, Exeter, UK, (30), March 2018
University of Minnesota (50) , May 2018,
Symposium on Data Science and Statistics, Reston, VA, May 2018

- 2017

Large and non-stationary spatial fields: Quantifying uncertainty in climate models
October 2017, North Carolina State University (40)
October 2017, Argonne National Laboratory (35)

Pattern Scaling of Climate Models
November 2017, KAUST, Saudi Arabia (30)

HPC4Stats, Data analysis in R using High Performance Computing
August 2017, SAMSI, Research Triangle Park, NC (50)

Pattern Scaling of Climate Models
July 2017, Data Science and the Environment, Brest, FR (60)
July 2017, University of Lancaster, UK (60)
September 2017, Colorado School of Mines (30)

Estimating Curves and Surface
April 2017, University of Maryland-Baltimore Campus, (60) 4 lectures

Spatial statistics
May 2017, University of Fudan, Shanghai, PRC, (35) 9 Lectures

Multi-resolution spatial methods: LatticeKrig
April 2017, CSU, (45)

- 2016

Regional Climate and Extremes
October 2016, STATMOS Workshop on Extremes, College Station, PA (35)

Environmental Statistics at NCSU
October 2016, 75th Anniversary Department of Statistics, North Carolina State University, Raleigh, NC (70)

Solving Inverse Problems
October 2016, Reed College, (45)

Spatial Statistics
July 2016, Environmental Analytics, NCAR (2 Lectures) (30)
July 2016, Regional Climate Tutorial, NCAR (MMM) (60)
April 2016, Colorado School of Mines, Golden (25)
June 2016, R Bootcamp , NCAR (10)

Multi-resolution spatial methods: LatticeKrig
March 2016, Arizona State University, Tempe, AZ (40)
March 2016, ETH and University Zurich, Zurich, CH (40)

Hierarchical Models
July 2016, Beyond P-values, NCAR (25)

Regional Climate and Extremes
April 2016, Theme-of-the-Year, NCAR, Boulder (45)
June 2016, BIRS, Banff, CA (30)
September 2016, Climate Informatics, NCAR (60)

Pattern Scaling of Climate Models
June 2016, 13th International Statistics and Climate Conference, Canmore , CA (60)

Are Climate Models Built Using Statistics?
August 2016, Joint Meetings American Statistical Association, Chicago, (60)

Data analysis for extremes
August 2016, Tutorial CMIP5 Analysis Platform, NCAR (45) 2 Lectures

- 2015
Multi-resolution spatial methods: LatticeKrig
October 2015, KAUST, Saudi Arabia, (25)
November 2015, Big Data and the Environment, Buenos Aires (50)

Asymptotic theory for spatial methods
June 2015, Aalborg University, Aalborg, Denmark (30)

HPC4Stats
September, 2015, STATMOS short course, University of Michigan, (25)

Pattern Scaling of climate models
June 2016, 13th International Statistics and Climate Conference, Canmore, CA

April 2015, University of Indiana (20)
June 2015, Summer Research Conference on Statistics, Carolina Beach, NC (50)
July 2015, Joint Statistical Meetings, Seattle (60)
August 2015, University of Colorado-Denver, (25)
September 2015, Colorado School of Mines, (25)

Regional climate informatics
January 2015, Seismometrics, Valparaiso, Chile (50)

Spatial Statistics
March 2015, Indian Statistical Institute, Kolkata,IN (2 Lectures) (30)
July 2015, Data Analytics for Ecologists, NCAR (25)
July 2015, Regional Climate Short Course, NCAR (50)

A Statistical Excursion with DART
May 2015, STATMOS/Data Assimilation Short Course NCAR (20)

Bayesian Hierarchical Models
April 2015, University of Indiana (20)

Regional Climate and Extremes
May 2015, Pacific Institute of Mathematics, Vancouver, (40)

June 2015, BIRS, Banff, Alberta, (30)

- 2012 – 2014
  Uncertain Weather, Uncertain Climate
  October 2014, University British Columbia, Vancouver, CA (50)

  Statistical inference for spatial data
  November 2014, University of Kansas, Lawrence, KA (45)

  What would a statistician do with 10 seconds on a super computer?
  November 2014, University of Kansas, Lawrence, KA (45)

  Multi-resolution spatial methods: LatticeKrig
  October, 2014, University of British Columbia, Vancouver, CA (45)
  November 2014, Michigan State University, E. Lansing, MI (45)

  DART and Ocean Data Assimilation
  October 2013, Role of the Oceans in Climate Uncertainty, BIRS, Banff, Alberta, CA (30)

  Uncertain Weather, Uncertain Climate
  October 2013, Department of Statistics, Brigham Young University, Provo, UT (60)

  Regional Climate past, present and future
  November 2013, Royal Statistical Society and the American Statistical Association, London, UK (75)

  Regional Climate, Extremes and Spatial Data
  February, 2014, AAAS meeting, Chicago (10)

  Multi-Resolution Spatial Methods for Large Data Sets
  November 2013, Exeter University, Exeter UK, (45)
  November 2013, CISL Work in Progress (30)
  February 2014, University of Chicago, Chicago, IL (35)
  February 2014, Harvard University, Boston, MA (30)
  April 2014, SIAM/ASA Uncertainty Quantification, Savannah, GA, (4 Lectures) (45)
  April 2014, National Science Foundation, Arlington, VA (30)
  May 2014, University of Glasgow, Scotland, UK (35)
  June 2014, Conference on Nonparametric Statistics for Big Data and Celebration to Honor Professor Grace Wahba, Madison, WI

  Uncertain Weather, Uncertain Climate
  May 2014, University of Glasgow, Scotland, (35)

  Estimating Curves and Surfaces (4 Lectures)
  March 2014, KAUST, Saudi Arabia (45)

  Statistical inference for spatial data
  July 2014, SAMSI/IMAGe Summer Program: The International Surface Temperature Initiative

  Reconstructing CO2 for the past 2000 years
  August 2014, Joint Statistical Meetings, Boston, MA (20) (Invited poster session)

What would a statistician do with 10 seconds on a super computer?
August 2014, Joint Statistical Meetings, Boston, MA (50)

Multi-Resolution Spatial Methods for Large Data Sets
October 2012, U Arizona, Tucson, AZ (60)
December 2012, Stanford U, Palo Alto, CA (40)
February 2013, SAMSI Large Datasets, NCAR (50)
March 2013, Iowa State U, Ames, IA, (60)
May 2013, SIAM Data Mining Conference, Austin, TX (100)
June 2013, International Meeting on Statistics and Climatology, Jeju, South Korea (75)
July 2013 NSF Expeditions Workshop, Evanston, IL (40)
September 2013, Third Workshop on Bayesian Inference for Latent Gaussian Models, Reykavik, Iceland (60)

Statistical Methods for Nonstationary Spatial Data
December 2012, American Geophysical Union, San Francisco, CA (75)
June 2013, International Meeting on Statistics and Climate, Jeju, South Korea (50)
August 2013, American Statistical Association Annual Meeting, Montreal, CA (75)

Uncertain Weather, Uncertain Climate
March 2013, Invited University Lecture, U Toronto, CA (60)
October 2013, Department of Statistics, Brigham Young University, Provo, UT (60)

Book chapters, discussions and other edited publications

1. Nychka, D., Ma, P., and Bates, D. (2020). A conversation with Grace Wahba. *Statistical Science*

2. Nychka, D. and Wikle C. (2019). Spatial Analysis in Climatology. Chapter in *Handbook of Environmental Statistics* ed. A Gelfand and R Smith. Chapman & Hall/CRC. 657–686.

3. Nicolis, O and Nychka, D (2012). Reduced rank covariances for the analysis of environmental data. In *Advanced Statistical Methods for the Analysis of Large Data-Sets*, Springer, 253–263.

4. Nychka, D and Bo Li (2011). Discussion to: A Statistical Analysis of Multiple Temperature Proxies: Are Reconstructions of Surface Temperature over the last 1000 Years Reliable? McShane and Wyner. *Annals of Applied Statistics*

5. D. Nychka and J.L. Anderson (2010). Data Assimilation. Chapter in *Handbook of Spatial Statistics* ed. and A Gelfand, P. Diggle, P. Guttorp and M. Fuentes . Chapman & Hall/CRC.

6. Nychka,D. J. M. Restrepo and C. Tebaldi (2008). Uncertainty in Climate Predictions. American Mathematical Society, Mathematics Awareness Month.

7. National Research Council. (2007). *Surface temperature reconstructions for the last 2,000 years*. National Academies Press.

8. Gilleland, E., D. Nychka and U. Schneider (2006). Spatial models for the distribution of extremes. In *Applications of Computational Statistics in the Environmental Sciences: Hierarchical Bayes and MCMC Methods* ed. J.S. Clark and A. Gelfand, Oxford University Press.

9. Tebaldi, C. and Nychka, D. (2004) Invited discussion to Calibrated probabilistic mesoscale weather field forecasting: the geostatistical output perturbation (GOP) method. *Journal of the American Statistical Association.* **99** 583–585.

10. Nychka, D. and Tebaldi, C. (2002), Comment on 'Calculation of Average, Uncertainty Range and Reliability of Regional Climate Changes from AOGCM Simulations via the Reliability Ensemble Averaging (REA) method' *Journal of Climate*, **16**, 883–884.

11. Nychka, D. (2000). Challenges in Understanding the Atmosphere. *Journal of the American Statistical Association*, **95**, 972-975.
See also *Statistics in the 21st Century*, ed., Raftery, A., Tanner, M. and Wells, M., Chapman and Hall/CRC, New York, 199-206.

12. Hu, F., Hall, A. R. and Nychka, D. (2000). A Nonparametric Approach to Stochastic Discount Factor Estimation. *Applying Kernel and Nonparametric Estimation to Economic Topics*, eds. Fomby, T. and Hill, R.C., JAI Press Inc., Stamford Connecticut, 155-178.

13. Nychka, D. (2000). Spatial Process Estimates as Smoothers. *Smoothing and Regression. Approaches, Computation and Application*, ed. Schimek, M. G., Wiley, New York, 393-424.

14. Nychka, D. and Saltzman, N. (1998). Design of Air Quality Monitoring Networks. *Case Studies in Environmental Statistics*, ed. Nychka, D., Cox, L., Piegorsch, W., Lecture Notes in Statistics, Springer-Verlag.

15. Holland, D., Saltzman, N., Cox, L. and Nychka, D. (1998). Spatial Prediction of Sulfur Dioxide in the Eastern United States. *Proceedings of geoENV98*, Valencia, Spain, November 1998, Kluwer.

16. Nychka, D., Yang, Q. and Royle, J. A. (1997). Constructing Spatial Designs Using Regression Subset Selection. *Statistics for the Environment-3: Pollution Assessment and Control*, eds. Barnett, V. and Turkman, K. F., Wiley, New York.

17. Nychka, D. and O'Connell, M. (1996). Neural Networks in Applied Statistics - Discussion. *Technometrics*, **38**, 218-220.

18. Bailey, B., Ellner S. and Nychka, D. (1997). Asymptotics and Applications of Local Lyapunov Exponents. *Proceedings for the Fields/CRM Workshop: Nonlinear Dynamics and Time Series: Building a Bridge Between the Natural and Statistical Sciences*, American Mathematical Society, 115-133.

19. Nychka, D. and Cummins, D. (1996). Comment on: Eilers, P. and Marx, B. Flexible Smoothing with B-splines and Penalties. *Statistical Science*, **11**, 104-105.

20. Nychka, D. W., Ellner, S. and Bailey, B. A. (1995). A Personal Overview of Nonlinear Time-series Analysis from a Chaos Perspective - Discussion and Comments. *Scandinavian Journal of Statistics*, **22**, 433-435.

21. Nychka, D. (1994). Discussion to Epidemics: Models and Data. *Journal of the Royal Statistical Society Series B.*

22. Handcock, M., Nychka, D. and Meier, K. (1994). Discussion to Kriging and Splines: An Empirical Comparison of Their Predictive Performance. *Journal of the American Statistical Association*, **89**, 401-403.

23. Bloomfield, P., Brillinger, D. R., Nychka, D. W. and Stolarski, R. (1988). Appendix 1 Statistical Approaches to Ozone Trend Detection. *Present State of Knowledge of the Upper Atmosphere 1988: An Assessment Report NASA Reference Publication* 1208, ed. Watson, R. T., NASA.

24. Bloomfield, P., Brillinger, D. R., Nychka, D. W. and Stolarski, R. (1988). Appendix 1 Statistical Issues. *Report of the NASA-WMO Ozone Trend Panel*, ed. Watson, R. T., NASA.

Books

- Nychka, D., Cox, L. and Piegorsch, W. (1998). *Case Studies in Environmental Statistics*, Lecture Notes in Statistics, Springer Verlag, New York.

- Berliner, L.M., Nychka, D. and Hoar, T. (2000). *Statistics for Understanding the Atmosphere*, Springer Verlag, New York.

Software

- Nychka, D., Hammerling, D., Sain, S. Lenssen, N. and Smirniotis, C. (2011-present). LatticeKrig: Multi-resolution Kriging based on Markov random fields
  `http://cran.r-project.org/web/packages/LatticeKrig`
  (> 3.5K downloads since 7/2016)

- Nychka, D., Furrer, R., Paige, J., and Sain, S. (2000-present). fields: Tools for Spatial Data // `http://cran.r-project.org/web/packages/fields`
  (> 230K downloads since 7/2016)

Advisement of Doctoral Students

North Carolina State University

Thomas Filloon, Statistics May 1990
Kristen Meier, Statistics May 1990
Gary Kenney, Computer Science 1992 (committee co-chair)
Ju-Chin Huang, Economics and Statistics May 1994 (committee co-chair)
Mark Graham, Electrical Engineering 1993 (committee co-chair)
Bruce Elsheimer, Statistics December 1994
Barbara Bailey, Biomathematics May 1996
Jeffrey Andrew Royle, Statistics May 1996
David Cummins, Statistics May 1997
Jun Zhai, Statistics December 1997
Sarah Hardy, Statistics December 1998
Jung-min Baik, Statistics August 1999 (committee co-chair)

NCAR

Eric Gilleland, Statistics, Colorado State Univ., December 2004
Curtis Storlie, Statistics, Colorado State Univ., June 2005 (committee member)
Daniel Cooley, Applied Mathematics, CU-Boulder, August 2005 (co-chair)
Cari Kaufman, Statistics, Carnegie Mellon Univ., August 2006 (committee member)
Chris Paciorek, Statistics, Carnegie Mellon Univ., August 2006 Terry Lee, University of Victoria, March 2008 (external reviewer)

Suz Tolwinski-Ward, University of Arizona, July 2012 (committee member)
Whitney Wang, Purdue University, August 2017 (thesis co advisor)
Collette Smirniotis, San Diego State University, May 2018, (thesis advisor)
Ashton Weins, University of Colorado, May 2020, (co-advisor)

Mines

Peter Simonson (co-advisor)
Katie Martinez (committee member)

Postdoctoral mentoring

* indicates role as a co-mentor, (latest organization of employement)
Laura J. Steinberg 1995 (Syracuse University)*
Barbara Bailey, 1997 (San Diego State University)*
Jeffrey Andrew Royle, 1997 (USGS Patuxent Wildlife Research Center)*
Chris Wikle, 1997 (University of Missouri) *
Montserrat Fuentes,1999 (Virginia Commonwealth University)
Phillippe Naveau, 1998 - 2001 (Laboratoire des Sciences du Climat et l'Environnement)
Claudia Tebaldi, 1998 - 2000 (National Center for Atmospheric Research)
Sarah Sreett, 2000-2003 (National Institute of Standards and Technology)
Ulrike Schnieder 2003 - 2005 (Vienna University of Technology)
Daniel Cooley, 2005 - 2007 (Colorado State University)*
Dorin Drignei 2005 -2007 (Oakland University)
Reinhard Furrer 2002-2005 (Universitäit Zürich) Bo Li 2007 - 2009 (University of Illinois)
Cari Kaufman 2006 - 2008 (University of California- Berkeley)
William Kleiber 2010-2012 (University of Colorado)*
Matthew Heaton 2011-2013 (Brigham Young University)*
Suz Tolwinski-Ward 2012 -2014 (Air Worldwide)
Martin Tingley 2010 - 2011 (Netflix)
Stacy Alexeeff 2013 - 2015 (Kaiser Permanente Northern California Division of Research)
Kevin Dalmasse 2014-2017 (CNES Observatoire Midi-Phyrens, Toulose)*
David John Gagne 2016-2018 (NCAR)*
Florian Gerber 2019 - 2021 (Universitäit Zürich)
Hannah Director 2019 - present

Masters students

Maggie Bailey (co-advisor) 2021
Danelle Barna (advisor) 2020

Grants and Contracts

- Scalable Statistical Validation and Uncertainty Quantification for Large Spatio-Temporal Datasets PI 2015 - $75,090.00
- NSF Assessing and Improving the Scale Dependence of Ecosystem Processes in Earth System Models. coPI 2011- $896,674

- NSF Mathematical Sciences: Multi-resolution lattice models and theory for spatial process estimators coPI 2007 - 2011 $227,844
- NSF Atmospheric Sciences CMG Collaborative Research: Development of Bayesian Hierarchical Models to Reconstruct Climate Over the Past Millenium PI 2007-2011 $379,637
- NSF Atmospheric Sciences The North American Regional Climate Change Assessment Program (NARCCAP)–Using Multiple GCMs and RCMs to Simulate Future Climates and Their Uncertainty coPI 2006- present $941,779
- NSF Mathematical Sciences: A Statistics Program at the National Center for Atmospheric Research. 2004-2007 PI $1,240,000
- US EPA: Design Interface for Spatial Analysis of Monitoring Networks. 2000, $24,900
- NSF Spatial Data and Scaling Methods for Assessment of Agricultural Impacts of Climate Managing Multiple Sources of Uncertainty Over Space. coPI 2000 $725,000.00
- NSF Mathematical Sciences: A Statistics Program at the National Center for Atmospheric Research. co-PI 1999-2004 $3,000,000
- NSF Mathematical Sciences: Process Design, Modeling and Optimization in Electronics and Health Care Products. 1997, $70,800
- Becton Dickinson Research Center: Nonparametric Regression and Sequential Designs for Process Optimization. 1996, $8,190
- EPA Cooperative Agreement: Statistical Strategies for Monitoring and Assessing Environmental Changes and Effects. 1995, $404,000 (co-PI)
- Becton Dickinson Research Center: New Directions in Process Optimization. 1994, $8,108
- NSF Mathematical Sciences: Estimation and Inference for Nonlinear Systems. 1993, $119,876
- NSF Atmospheric Sciences: Microscopic and Macroscopic Approaches to Climate Dynamics. PI 1992, $54,137
- NSF SCREMS program: Estimation and Inference for Noisy Chaotic Systems. $36,000 (coI).
- NSF Mathematical Sciences: Applications of Smoothing Splines for Inference and Data Analysis. 1988, $65,000
- NCSU faculty development: Estimating Tumor Size Distributions from Planar Cross Sections. 1984, $3,494
- NSF SCREMS program: Data Analysis with Generalized Splines. 1984, coI $45,000