

**Naomi Altman**  
VITA

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eRA COMMONS USER NAME NAOMI\_ALTMAN

**Current Position**

Professor Emerita of Statistics and Bioinformatics, Penn State University

**Education**

Ph.D. 1988 In Statistics from Stanford University

Advisor: Iain Johnstone

Topic: Smoothing Data with Correlated Errors

M.S. 1979 In Statistics from the University of Toronto

B.Sc. 1974 In Mathematics from the University of Toronto

**Awards**

1991 "Best Manuscript" from North Atlanta Area Office of the Director, USDA, for Gray et al

2004 The Canadian Journal of Statistics (best paper) with J. Villarreal

2009 Fellow of the American Statistical Association

**Student Paper Awards (advisor for)**

1996 Johnson, K.W. Title: Canonical Correspondence Analysis as an Approximation to Gaussian Ordination. Student Paper/Travel Award: American Statistical Association Section on Statistics and the Environment. MS Advisor: Naomi Altman

2008 Zeifman, Lubov Title: Independent Component Analysis of fMRI data Phi Beta Kappa Honors Thesis Award. Undergraduate Honors Advisor: Naomi Altman

**Positions Held**

2019- Professor Emerita

2013- Contributing Editor, Nature Methods

2012-2013 Visiting Professor – Statistical and Mathematical Sciences Institute, NC

2011-2019 Professor, Dept. of Statistics, PSU

2001-11 Associate Professor, Dept. of Statistics, PSU

2002-05 Associate Director – Bioinformatics Consulting Center, PSU

1997-01 Co-director of the Environmental Statistics Program,  
Dept. of Biometrics, Cornell University

1997-00 Chair, Department of Biometrics, Cornell University

1995-01 Associate Professor, Department of Biometrics, Cornell University.

1996-97 Visiting Associate Professor, Bioacoustics Laboratory, Cornell University  
 1987-95 Assistant Professor, Biometrics Unit, Cornell University  
 1991 Visiting Researcher, Departement d'Informatique et Recherche Operationelle,  
 University of Montreal  
 1984-86 Statistical consultant, Department of Statistics and Stanford Linear Accelerator Center,  
 Stanford University  
 1981-83 Research Associate, University of British Columbia, Department of Medical Genetics  
 1979-81 Statistical Consultant, Computing Centre, Simon Fraser University  
 1979 Statistical Consultant, Computing Centre, University of Toronto  
 1978 APL Consultant, Computing Centre, University of Toronto  
 1975-77 Teacher, Government Teacher's Training College, Lafia, Nigeria.

### **Published Peer Reviewed Papers**

1. (1988) **Altman, N.S.** Bit-wise Behavior of Random Number Generators. *SIAM Journal of Scientific and Statistical Computing*, 941-949.
2. (1990) **Altman, N.S.**, Kernel Smoothing of Data with Correlated Errors. *Journal of the American Statistical Association*, **85**, 749-758 <https://doi.org/10.2307/2290011> [jstor](#)
3. (1990) Wimpfheimer, L., **Altman, N.S.** and Hotchkiss, J.H., Growth of L. monocytogenes Scott A, serotype 4 and competitive spoilage organisms in raw chicken packaged under modified atmospheres and in air. *International Journal of Food Microbiology*, **11**, 205-214. PMID: 2126442
4. (1991) **Altman, N.S.**, Banks, D., Chen, P., Duffy, D., Hardwick, J., Leger, C., Owen, A. and Stukel, T. Meeting the needs of New Statistical Researchers. *Statistical Science*, **6**, 163-174.
5. (1991) **Altman, N.S.**, Discussion of "Some Tools for Functional Data Analysis". *Journal of the Royal Statistical Society, Ser. B.* **53**, 566.
6. (1991) Gray, S.M., Power, A.G., Smith, D.M., Seaman, A.J., **Altman, N.S.** Aphid Transmission of Barley Yellow Dwarf Virus: Acquisition Access Periods and Virus Concentration Requirements. *Vector Relations*, **81**, 539-545.
7. (1992) **Altman, N.S.**, An Iterated Cochrane-Orcutt Procedure for Nonparametric Regression. *Journal of Statistical Computation and Simulation*, **40**, 93-108.
8. (1992) **Altman, N.S.**, An Introduction to Kernel and Nearest Neighbors Nonparametric Regression. *The American Statistician*, **46**, 175-185.
9. (1993) **Altman, N.S.**, Estimating Error Correlation in Nonparametric Regression Models. *Statistics and Probability Letters*, **18**, 213-218.
10. (1993) **Altman, N.S.** and Paulson, C., Some Remarks about the Gasser-Sroka-Jennen-Steinmetz Variance Estimator. *Communications in Statistics*, **22**, 1045-1052.
11. (1993) Léger, C. and **Altman, N.S.**, Assessing Influence in Variable Selection Problems. *Journal of the American Statistical Association*, **88**, 547-556. <https://doi.org/10.2307/2290335>
12. (1993) Gray, S.M., Smith, D. and **Altman, N.S.**, Barley Yellow Dwarf Virus Isolate-Specific Resistance in Spring Oats Reduced Virus Accumulation and Aphid Transmission. *Phytopathology*, **83**, 716-720.

13. (1993) Todhunter, R.J., **Altman, N.S.**, Kallfelz, F.A., Nersesian, D.P., Lust, G. Use of Scintimetry to Assess Effects of Exercise and Polysulfated Glycosaminoglycan on Equine Carpal Joints With Osteochondral Defects. *American Journal of Veterinary Research*, **54**, 997-1006.
14. (1993) Langston, S.W., **Altman, N.S.**, and Hotchkiss, J.H. Within and between sample comparisons of Gompertz parameters for Salmonella enteritidis and aerobic plate counts in chicken stored air and modified atmosphere. *International Journal of Food Biology*, **18**, 43-52.
15. (1994) Kuesten, C.L., McLellan, M.R. and **Altman, N.S.**, Computerized Panel Training: Effects of Using Graphic Feedback on Scale Usage. *Journal of Sensory Studies*, **9**, 413-444.
16. (1994) Kuesten, C.L., McLellan, M.R. and **Altman, N.S.**, Influence of Computerized Panel Training on Contextual Effects. *Journal of Sensory Studies*, **9**, 401-412.
17. (1994) Ramsay, J.O., **Altman, N.S.** and Bock, R.D. Variation in Height Acceleration in the Fels Growth Data. *Canadian Journal of Statistics*, **22**, 89-102.
18. (1994) Todhunter, R.J., Wootton, J.W., **Altman, N.S.**, Lust, G., and Minor, R.R. Cross-validation of cyanogen bromide-peptide ratios to measure the proportion of type II collagen in pepsin digests of equine articular cartilage, meniscus, and cartilage repair tissue. *Analytical Biochemistry*, **216**, 195-204. PMID: 8135352
19. (1995) **Altman, N.S.** and Casella, G. Nonparametric Empirical Bayes Growth Curve Analysis. *Journal of the American Statistical Association*, **90**, 508-515 <https://doi.org/10.2307/2291061> [jstor](#)
20. (1995) **Altman, N.S.** and Léger, C. A Note on Bandwidth Selection in Kernel Distribution Function Estimation. *Journal of Statistical Planning and Inference*, **46**, 195-214.
21. (1997) Federer, Walter T., Newton, Elizabeth A. and **Altman, Naomi S.**, Combining Standard Block Analyses With Spatial Analyses Under a Random Effects Model. In *Modeling Longitudinal and Spatially Correlated Data: Methods, Applications, and Future Directions*. Gregoire, Brillinger, Diggle, Russek-Cohen, Warren, Wolfinger eds. Springer-Verlag (Berlin; New York): 373--386.
22. (1997) Hobert, J.P., **Altman, N.S.** and Schofield, C.L. Spatial Analysis of the Fish Species Richness of Adirondack Lakes: Applications of Geostatistics and Nonparametric Regression. *Journal of the American Statistical Association*, **92**, 846-854.
23. (1997) **Altman, N.S.** and Léger, C. On the Optimality of Prediction Based Selection Criteria and the Convergence Rates of Estimators. *Journal Royal Statistical Society, Series B*, **59**, 205-216 [jstor](#).
24. (1998) **Altman, N.S.** and MacGibbon, B. Consistent Bandwidth Selection for Kernel Binary Regression, *Journal of Statistical Planning and Inference*, **70**, 121-137.
25. (1999) Johnson, K.W. and **Altman, N.S.**, Canonical Correspondence Analysis as an Approximation to Gaussian Ordination. *Environmetrics*, **10**, 39-52.
26. (2000) **Altman, N.S.** Krige, Smooth, Both or Neither? (with discussion) *Australian and New Zealand Journal of Statistics*, **42**, 441-461
27. (2001) Ahrens, C. **Altman, N.S.**, Casella, G.C., Malaika, E., Hwang, J.T., Staudenmayer, J., Stefanescu, C. Leukemia Clusters and TCE Waste Sites in Upstate New York: How Adding Covariates Changes the Story. *Environmetrics*, **12**, 659-672.
28. (2001) **Altman, N.S.**, Bernstein, E, Cottrell, K, Dhondt, A.A., Hochachka, W., Slothower, R. Measuring Bird Migration Using Spatial and Temporal Counts. *Chance*, **14**, 7-14.

29. (2001) **Altman, N.S.** Discussion of " Estimation of Fetal Growth and Gestation in Bowhead Whales" by C. Shane Reese, James A. Calvin, John. C. George, and Raymond J. Tarpley. (*JASA Invited Discussion Paper*) *JASA*, **96**, 923-925
30. (2001) **Altman, N.S.** and Sullivan, P. Discussion of "What shall we teach in environmental statistics?" by Walter Piegorsch and Don Edwards. (*Environmental and Ecological Statistics Invited Discussion*), **9**, 139-140.
31. (2001) Flecker, A.S., Taylor, B.W., Bernhardt, E.S., Hood, J., Cornwell, W.K., Cassatt, S.R., Vanni, M.J., **Altman, N.S.** Interactions Between Herbivorous Fishes and Limiting Nutrients in a Tropical Stream Ecosystem. *Ecology*, **83**, 1831-1844.
32. (2002) Bargo, F., Muller, L. and **Altman, N.S.** Milk Response to Bovine Somatotropin of High-Producing Dairy Cows with Three Different Feeding Systems Combining Pasture and Total Mixed Rations, *The Professional Animal Scientist*, **19**, 10-18.
33. (2004) **Altman N.S.** and Villarreal, J. Self-Modelling Regression with Random Effects using Penalized Splines, *Canadian Journal of Statistics*, **32**, 251-268. [WileyOnline](https://doi.org/10.2307/3315928) <https://doi.org/10.2307/3315928>, [jstor](https://doi.org/10.2307/3315928)
34. (2004) Wang G., Kong H., Sun Y., Zhang X., Zhang W., **Altman N.S.**, dePamphilis, C.W., Ma, H. Genome-wide analysis of the cyclin family in *Arabidopsis* and comparative phylogenetic analysis of plant cyclin-like proteins, *Plant Physiology*, **135**, 1084-1099. PMID: 15208425.
35. (2005) Altman, N.S. Replication, Variation and Normalization in Microarray Experiments *Applied Bioinformatics*, **4**, 33-44. PMID: 1600001. [Springer](https://doi.org/10.1007/s10484-005-0001-0)
36. (2005) Zhang, X., Zhang, D., Feng, B., **Altman, N.S.**, Ma, H. Genome-wide Expression Profiling and Identification of Gene Activities during Early Flower Development in *Arabidopsis*, *Plant Molecular Biology*, **58**, 401-419. PMID: 16021403.
37. (2005) Walters, E., **Altman, N.S.**, Elnitski, L. Clustering of Gene Locations, *J. Computational Statistics and Data Analysis*, **50**, 2920-2932.
38. (2006) Duarte, J., Cui, L., Wall, K., Zhang, Q., Zhang, X., Leebens-Mack, J., Ma, H., **Altman, N.S.**, and dePamphilis, C. Expression pattern shifts Following Duplication Indicative of Subfunctionalization and Neofunctionalization in Regulatory Genes of *Arabidopsis*. *Molecular Biology and Evolution* 2006, **23**(2):469-478. PMID: 16280546. [oxfordjournals](https://doi.org/10.1093/molbev/msi001)
39. (2006) **Naomi Altman**, Jim Leebens-Mack, Laura Zahn, André Chanderbali, Donglan Tian, Lillian Werner, Hong Ma, and Claude dePamphilis. Behind the Scenes: Planning a Multispecies Microarray Experiment, *Chance*, Vol 19, No. 3, p. 27-38.
40. (2006) Clark, C.W.; **Altman, N.S.**; Acoustic detections of blue whale (*Balaenoptera musculus*) and fin whale (*B. physalus*) sounds during a SURTASS LFA exercise, *IEEE Journal of Oceanic Engineering*, Vol 31, No. 1, p. 120 – 128.
41. (2006) **Altman, N.S.**, Hua, J. Extending the loop design for 2-channel microarray experiments *Genetical Research*, Vol 88, No. 3, p. 153-163. PMID: 17371610.
42. (2007) William R. Evans, Yukio Akashi, **Naomi Altman**, and Albert Manville. Response of night migrating birds in cloud to colored and flashing light *North American Bird*, Vol 60, No 4, p. 476-488.
43. (2007) Vineet Sangar, Daniel J. Blankenberg, **Naomi Altman** and Arthur M. Lesk. Quantitative Sequence Function Relationships in Proteins Based on the Gene Ontology. *BMC Bioinformatics*, Vol 8, p. 294. PMID: 17686158.

44. (2007) P. Kerr Wall, Jim Leebens-Mack, Kai Müller, Dawn Field, **Naomi S. Altman**, Claude W. dePamphilis. PlantTribes: A gene and gene family resource for comparative genomics in plants. *Nucleic Acids Research*, **36**, 970-976. PMID: 18073194.
45. (2007) Soltis D.E., Ma H., Frohlich M.W., Soltis P.S., Albert V.A., Oppenheimer D.G., **Altman N.S.**, dePamphilis C.W. and Leebens-Mack J.H.. (2007) The floral genome: an evolutionary history of gene duplication and shifting patterns of gene expression. *Trends in Plant Science* 12(8):358-367. PMID: 17658290.
46. (2008) Madsen, L., Ruppert, D. and **Altman, N.S.**, Regression with Spatially Misaligned Data *Environmetrics*, **19**: 453–467 [www.environmetrics.org](http://www.environmetrics.org).
47. (2008) Soltis, D.E., Albert V.A., Leebens-Mack J., Palmer J., Wing R., dePamphilis C.W., Ma H., Carlson J.E., **Altman N.S.**, Kim S., Wall P. K., Zuccolo A., Soltis P. The *Amborella* genome: an evolutionary reference for plant biology. [BMC](https://doi.org/10.1186/1471-2164-9-1)
48. (2008) Han, B., **Altman, N.S.**, Mong, J.A., Klein, L.C., Pfaff, D.W. and Vandenberg, D. Comparing Quantitative Trait Loci and Gene Expression Data Associated with a Complex Trait, *Advances in Bioinformatics* Article ID 719818, 6 pages [Hindawi Press](https://doi.org/10.1155/2008/719818)
49. (2009) André S. Chanderbali, Victor A. Albert, Jim Leebens-Mack, **Naomi S. Altman**, Douglas E. Soltis, and Pamela S. Soltis .Transcriptional signatures of ancient floral developmental genetics in avocado (*Persea americana*; Lauraceae). *PNAS*, **106**, 8929-8934; doi:10.1073/pnas.0811476106
50. (2009) Wall, P.K., Leebens-Mack J., Chanderbali A., Barakat, A., Wolcott, E., Liang, H., Landherr, L., Tomsho, L.P., Hu, Y., Carlson J.E., Ma H., Schuster S.C., Soltis D.E., Soltis P.S., **Altman N.S.**, and dePamphilis C.W.. Comparison of next generation sequencing technologies for transcriptome characterization. *BMC Genomics*, 10:347.  
(the most viewed article in *BMC Genomics* 2009-2010)
51. (2009) Philip J. Jensen, Izabela Makalowska, **Naomi Altman**, Gennaro Fazio, Craig Praul, Siela N. Maximova, Robert M. Crassweller, James W. Travis, Timothy W. McNellis Rootstock-regulated gene expression in apple tree scions. *Tree Genetics and Genomes*, **6**, 1614-2942, doi: 10.1007/s11295-009-0228-7.
52. (2009) Han, X., Wu X., Chung W.-Y., Li T., Nekrutenko A., **Altman N.S.**, Chen G., and Ma H., Transcriptome of embryonic and neonatal mouse cortex by high-throughput RNA sequencing. *Proceedings of the National Academy of Sciences*, vol. 106, no. 31, pp. 12741-6.
53. (2010) Li, B., Kim, M.K., **Altman, N.S.** On dimension folding of matrix or array valued statistical objects. *Annals of Statistics*, **38**, 1094-1121; doi:10.1214/09-AOS737
54. (2010) **Altman, N.S.**, Wang, Q., Karwa, V. and Slavkovic, A. Resolving Isoform Expression using Digital Gene Expression Data. *Journal of the Indian Society of Agricultural Statistics*, special issue on Statistical Genomics, **4**, 19-31. [pdf](#)
55. (2010) André S. Chanderbali, Mi-Jeong Yoo, Laura M. Zahn, Samuel Brockington, P.Kerr Wall, Victor A. Albert, Jim Leebens-Mack, **Naomi S. Altman**, Matthew A. Gitzendanner, Hong Ma, Claude dePamphilis, Douglas E. Soltis, and Pamela S. Soltis. Conservation and Canalization of Gene Expression During Angiosperm Diversification Accompany the Origin and Evolution of the Flower, *PNAS*, **107**, 22570-22575. Doi: 10.1073/pnas.1013395108
56. (2010) Zahn, LM, Ma,X, Altman, NS, Zhang, Q, Wall, PK, Tian, D., Gibas, CJ, Gharaibeh, R, Leebens-Mack, JH, dePamphilis, CW and Ma, H. Comparative transcriptomics among floral organs of the basal eudicot *Eschscholzia californica* as reference for floral evolutionary developmental

studies. *Genome Biology*, **11**:R101. <https://genomebiology.biomedcentral.com/articles/10.1186/gb-2010-11-10-r101>

57. (2010) Mi-Jeong Yoo, André S. Chanderbali, **Naomi S. Altman**, Pamela S. Soltis, and Douglas E. Soltis. Evolutionary trends in the floral transcriptome: insights from one of the basalmost angiosperms, the water lily *Nuphar advena* (Nymphaeaceae) feature article: *The Plant Journal*, Volume 64, Issue 4, 687–698.
58. (2011) Walter C. Kolczynski, Jr., David R. Stauffer, Sue Ellen Haupt, **Naomi S. Altman**, Aijun Deng Investigation of Linear Variance Calibration For Spread-Error Relationship Using a Stochastic Model *Monthly Weather Review* Vol. 139, No. 12 3954-3963.
59. (2012) Philip J Jensen, Noemi Halbrendt, Gennaro Fazio, Izabela Makalowska, **Naomi Altman**, Craig Praul, Siela N Maximova, Henry K Ngugi, Robert M Crassweller, James W Travis, Timothy W McNellis. Rootstock-regulated gene expression patterns associated with fire blight resistance in apple. *BMC Genomics*, **13**:9 doi:10.1186/1471-2164-13-9
60. (2012) Polato, Nicholas R., **Altman, Naomi S.** and Baums, Iliana B. Variation in the transcriptional response of threatened coral larvae to elevated temperatures *Molecular Ecology* DOI: 10.1111/mec.12163
61. (2013) Luo, W. and **Altman, N. S.** A Characterization of Conjugate Priors in Linear Exponential Families with application to Dimension Reduction. *Statistics and Probability Letters*, **83**, 650-654.
62. (2013) I. B. Baums, M. K. Devlin-Durante, N. R. Polato, D. Xu, S. Giri, **N. S. Altman**, D. Ruiz, J. E. Parkinson, J. N. Boulay. Genotypic variation influences reproductive success and thermal stress tolerance in the reef building coral, *Acropora palmate*. *Coral Reefs* DOI 10.1007/s00338-013-1012-6
63. (2013) Honaas, L. A., Wafula, E. K., Yang, Z., Der, J. P., Wickett, N. J., **Altman, N. S.**, Taylor, C. G., Yoder, I. Y., Timko, M. P., Westwood, J. H. & Depamphilis, C. W. (2013). Functional genomics of a generalist parasitic plant: Laser microdissection of host-parasite interface reveals host-specific patterns of parasite gene expression. *BMC plant biology*, **13**(1), 9.
64. (2013) **Altman, N. S.**, G. Balco, C. Crainiceanu, W. R. Gehrels, J. Qiu, J. Staudenmayer, and P. Sullivan. "Statistical modeling of changes in relative sea level in Maine during the Holocene Era." *Environmetrics*.
65. (2013) Smyth, G.K. and **Altman, N.S.** Separate-Channel Analysis of Two-Channel Microarrays: recovering inter-spot information. *BMC Bioinformatics* **14**:165 doi:10.1186/1471-2105-14-165
- (2013) Amborella Genome Project "The Amborella Genome and the Evolution of Flowering Plants" *Science*. **20**: 1241089 [DOI:10.1126/science.1241089] [science](https://doi.org/10.1126/science.1241089)
66. (2014) Philip J Jensen, Gennaro Fazio, **Naomi Altman**, Craig Praul and Timothy McNellis. Mapping in an apple (*Malus x domestica*) F1 segregating population based on physical clustering of differentially expressed genes. *BMC Genomics* **15**:261 <http://www.biomedcentral.com/1471-2164/15/261>
67. (2014) Stefanie R. Austin, Isaac Dialsingh, **Naomi Altman**. Multiple Hypothesis Testing: A review. *J. Indian Soc. Of Agricultural Stat.* **68**: 303-314. [JISAS](https://doi.org/10.1007/s12349-014-0261-1)
68. (2014) Zhenzhen Yang, Eric K. Wafula, Loren A. Honaas, Huiting Zhang, Malay Das, Monica Fernandez-Aparicio, Kan Huang, Pradeepa C.G. Bandaranayake, Biao Wu, Joshua P. Der, Christopher R. Clarke, Paula E. Ralph, Lena Landherr, **Naomi S. Altman**, Michael P. Timko, John I.

Yoder, James H. Westwood, and Claude W. dePamphilis. Comparative transcriptome analyses reveal core parasitism genes and suggest gene duplication and repurposing as sources of structural novelty. *Molecular Biology and Evolution*. DOI: 10.1093/molbev/msu343

69. (2015) Dialsingh, I., Austin, S. and **Altman, N.S.** Estimating the Percentage of True Null Hypotheses when the Statistics are Discrete. **31**(14) 2302-2309 *Bioinformatics* doi:10.1093/bioinformatics/btv104
70. (2015) Parkinson, J. E., Banaszak, A. T., **Altman, N. S.**, LaJeunesse, T. C., & Baums, I. B. Intraspecific diversity among partners drives functional variation in coral symbioses. *Scientific reports*,5.
71. (2016) Honaas, Wafula, E.K., Wickett, N.J, Der, J.P., Zhang, Y., Egder, P.P., **Altman, N.S.**, Pires, J.C., Leebens-Mack, J.H., dePamphilis, C.W. Selecting superior de novo transcriptome assemblies: lessons learned by leveraging the best plant genome *PLoS ONE* 11(1): e0146062. doi: 10.1371/journal.pone.0146062
72. (2016) Sharma, A., Da Motta, V. E., Choi, J. G., & **Altman, N. S.** Economic production in hospitality and tourism industry: how do we compare to other services?. *International Journal of Contemporary Hospitality Management*, 28(5).
73. (2016) **Altman, N. S.** Comment on The ASA's Statement on *p*-Values: Context, Process, and Purpose.(R. Wasserstein and N. Lazar) *The American Statistician*, **70**(2) doi:/10.1080/00031305.2016.1154108
74. (2016) Zhenzhen Yang\*, Yeting Zhang\*, Eric Wafula, Loren A. Honaas, Paula E. Ralph, Sam Jones, Huiting Zhang, **Naomi S. Altman**, Michael P. Timko, John I. Yoder, James H. Westwood, Claude W. dePamphilis. Horizontal gene transfer is more frequent with increased heterotrophy and may contribute to parasite adaptation. *Proc. Natl. Acad. Sci. U.S.A.*, 113 (45). doi: 10.1073/pnas.1608765113
75. (2016) Mario Padilla, M., Amsalem, E., Altman, N., Hefetz, A., & Grozinger, C. M. . Chemical communication is not sufficient to explain reproductive inhibition in the bumblebee *Bombus impatiens*. *Royal Society open science*, 3(10), 160576.
76. (2017) Qingyu Wang, Cooduvalli S. Shashikant, **Naomi S. Altman**, Santhosh Girirajan. Novel metrics to measure coverage in whole exome sequencing datasets reveal local and global non-uniformity. *Scientific Reports*, 7(1), 885.
77. (2017) Etya Ansalem, Padilla, M, Schreiber, P.M., **Altman, N.S.** , Hefetz, A., Grozinger, C.M. Do bumble bee (*Bombus impatiens*) queens signal their reproductive and mating status to their workers? *J. Chemical Ecology* 43: 563. <https://doi.org/10.1007/s10886-017-0858-4>
78. (2017) Gary A Clawson, Ph.D., M.D.; Gail L. Matters; Ping Xin; Christopher McGovern; Eric Wafula Wafula; Claude dePamphilis; Morgan Meckley; Joyce Wong; Luke Stewart; Christopher D'Jamoos; **Naomi Altman**; Yuka Imamura Kawasawa; Zhen Du; Loren Honaas; Thomas Abraham; "Stealth Dissemination" of Macrophage-Tumor Cell Fusions Cultured from Blood of Patients with Pancreatic Ductal Adenocarcinoma. *PLOS ONE* 12(9) e0184451. <https://doi.org/10.1371/journal.pone.0184451>
79. (2019) Zhenzhen Yang, Eric K. Wafula, Gunjune Kim, Saima Shahid, Joel R. McNeal, Paula E. Ralph, Prakash R. Timilsena, Wen-bin Yu, Elizabeth A. Kelly, Huiting Zhang, Thomas Nate Person, Naomi S. Altman, Michael J. Axtell, James H. Westwood, and Claude W. dePamphilis. Convergent horizontal gene transfer and crosstalk of mobile nucleic acids in parasitic plants. *Nature Plants*,
80. (2019) Loren A. Honaas, Sam Jones, Nina Farell, William Kamerow, Huiting Zhang, Kathryn Vescio, Naomi S. Altman, John I. Yoder and Claude W. dePamphilis. (2019) Risk versus reward: host dependent parasite mortality rates and phenotypes in the facultative generalist *Triphysaria versicolor*.

*BMC Plant Biology*. 19, 334. <https://bmcpantbiol.biomedcentral.com/articles/10.1186/s12870-019-1856-1>

81. (2020) Voelkl B, Altman NS, Forsman A, Forstmeier W, Gurevitch J, Jaric I , Karp NA, Kas MJ, Schielzeth H, Van de Castele T, Würbel H Reproducibility of animal research in light of biological variation. *Nat Rev Neurosci* 21, 384–393. <https://doi.org/10.1038/s41583-020-0313-3>
82. (2020) Hanno Wuerbel, Bernhard Voelkl, Naomi Altman, Anders Forsman, Wolfgang Forstmeier, Jessica Gurevitch, Ivana Jaric, Natasha Karp, Martien Kas, Holger Schielzeth, and Tom Van de Castele. Reply to “It is time for an empirically informed paradigm shift in animal research” by *Nat Rev Neurosci* 21, 661–662 <https://doi.org/10.1038/s41583-020-0370-7>
83. (2023) Jessica Waite, Elizabeth Kelly, Huiting Zhang, Heidi Hargarten, Sumyya Waliullah, Naomi Altman, Claude dePamphilis, Loren Honaas, Lee Kalcsits Transcriptomic approach to uncover dynamic events in the development of mid-season sunburn in apple fruit. *G3: Genes, Genomes, Genetics* (to appear)
84. Karen Funderburk, Sara R. Bang-Christensen, Brendan F. Miller, Hua Tan, Gennady Margolin, Hanna M. Petrykowska, Nader Jameel, David Holland, Naomi S. Altman, and Laura Elnitski Stacking methylation markers to optimize blood based multicancer detection. *Cancers*. (to appear)

### **Book Chapters**

1. (2009) **Altman, N.S.** Batches and Blocks, Sample Pools and Subsamples in the Design and Analysis of Gene Expression Studies. in *Batch Effects and Noise in Microarray Experiments: Sources and Solutions*. A. Scherer (editor). John Wiley & Sons, Chichester. <https://onlinelibrary.wiley.com/doi/10.1002/9780470685983.ch4>
2. (2016) Honaas L.A., **Altman N.S.**, Krzywinski M. (2016) Study Design for Sequencing Studies. In: Mathé E., Davis S. (eds) *Statistical Genomics. Methods in Molecular Biology*, vol 1418. Humana Press, New York, NY [https://link.springer.com/protocol/10.1007/978-1-4939-3578-9\\_3](https://link.springer.com/protocol/10.1007/978-1-4939-3578-9_3)

### **Invited Columns – Points of Significance**

1. Krzywinski, M., & Altman, N. (2013). Points of significance: Importance of being uncertain. *Nature methods*, 10(9), 809-810. <http://dx.doi.org/10.1038/nmeth.2613>  
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9. Krzywinski, M., & Altman, N. (2014). Points of significance: Designing comparative experiments. *Nature Methods*, 11(6), 597-598, doi:10.1038/nmeth.2974 <https://www.nature.com/articles/nmeth.2974>
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<https://www.nature.com/articles/s41592-019-0369-z>
44. Das, K., Krzywinski, M. & Altman, N. (2019) Points of Significance: Quantile regression. *Nature Methods*, 16(6), pp. 451-452. doi:10.1038/s41592-019-0406-y <https://www.nature.com/articles/s41592-019-0406-y>
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57. Derry, A., Krzywinski, M. & Altman, N. (2023) Neural networks primer. *Nature Methods*, 20, 165–167. <https://doi.org/10.1038/s41592-022-01747-1> <https://www.nature.com/articles/s41592-022-01747-1>

### **Published Proceedings**

1. (1988) **Altman, N.S.** Smoothing Data with Correlated Errors. *Computer Science and Statistics: Proceedings of the 20th Symposium on the Interface*, 246-253.
2. (1994) **Altman, N.S.** and Léger, C. Cross-validation, the Bootstrap, and Related Methods for Tuning Parameter Selection. *Proceedings of the Statistical Computing Section of the American Statistical Association*, 41-50.
3. (1994) Léger, C. and **Altman, N.S.** On the Optimality of Prediction Based Selection Criteria and the Convergence Rates of Estimators *Proceedings of the Statistical Computing Section of the American Statistical Association*, 112-117.
4. (1996) **Altman, N.S.**, Semi-Parametric Methods for Longitudinal Data Analysis. *Proceedings of the Biometrics Section of the American Statistical Association*, 49-57.
5. (1997) **Altman, N.S.**, Krige, Smooth, Both or Neither. *Proceedings of the Biometrics Section of the American Statistical Association*, 60-65.
6. (1997) Aragaki, A. and **Altman, N.S.** Local Polynomial Regression for Binary Response. *Computer Science and Statistics: Proceedings of the 29th Symposium on the Interface*, 467-472.
7. (2001) Villarreal, J. and **Altman N.S.** Inference for Self-Modeling Regression with Random Effects. *Computer Science and Statistics: Proceedings of the 33rd Symposium on the Interface of Computing Science and Statistics*.
8. (2004) **Altman, N.S.** Extending the Loop Design for Microarray Experiments *Computer Science and Statistics: Proceedings of the 33rd Symposium on the Interface of Computing Science and Statistics*.
9. (2004) Walters, E., **Altman, N.S.**, Elnitski, L., Are Gene Locations Clustered on Chromosomes? (*Proceedings of the Joint Statistical Meetings*).

### **Technical Reports**

1. (1984) **Altman, N.S.**, Expert Systems and Statistical Expertise, Part 1: Statistical Expert Systems. Department of Statistics, Stanford, Technical Report LCS 17.
2. (1987) **Altman, N.S.**, Smoothing Data with Correlated Errors. Ph.D. Thesis, and Department of Statistics, Stanford, Technical Report No. 280.

3. (1990) **Altman, N.S.** et al, Report of the New Researchers' Committee of the IMS. Biometrics Unit Technical Report BU-1066-M, Cornell University.
4. (1990) Ward, R.H., **Altman, N.S.**, and Prior, I.A.M., Patterns of Blood Pressure Response in Migrant and Nonmigrant Tokelauans I: Defining response. Biometrics Unit Technical Report BU-994-M, Cornell University.
5. (1990) **Altman, N.S.**, Ward, R.H., and Prior, I.A.M., Patterns of Blood Pressure Response in Migrant and Nonmigrant Tokelauans II: Physiological and Socio-Cultural Correlates of Blood Pressure Response. Biometrics Unit Technical Report BU-995-M, Cornell University.
6. (1990) **Altman, N.S.**, Ward, R.H., and Prior, I.A.M., Patterns of Blood Pressure Response in Migrant and Nonmigrant Tokelauans III: Response in Tokelauan Children. Biometrics Unit Technical Report BU-996-M, Cornell University.
7. (1992) **Altman, N.S.** and Ramsay, J.O. Reducing Bias in Nonparametric Regression Problems Involving Families of Curves. Biometrics Unit Technical Report BU-1175-M, Cornell University.
8. (1994) **Altman, N.S.** and Léger, C. Cross-Validation, the Bootstrap and Related Techniques for Tuning Parameter Selection. Biometrics Unit Technical Report BU-1216-M, Cornell University.
9. (1997) Aragaki, A. and **Altman, N.S.**, Local Polynomial Regression for Binary Response. Biometrics Unit Technical Report BU-1379-M, Cornell University
10. (2009) Han, B., Arnold, S.F., **Altman, N.S.** A Bayesian Approach to Large Scale Simultaneous Inference Based on False Discovery Rate. Statistics Dept. Technical Report TR 09-01, Penn State.

### **Invited Conference Talks**

- 1986 Expert Systems and Statistical Expertise, at the Statistical Society Society of Canada, Winnipeg, CAN (**Altman**)
- 1988 Smoothing Data with Correlated Errors, at the 20th Symposium on the Interface: Computing Science and Statistics, Reston, VA. (**Altman**)
- 1990 Issues in Kernel Regression Estimation for Data with Correlated Errors, Mathematical Sciences Institute, Ithaca, NY (**Altman**)
- 1994 On the Use of Cross-Validation and Adjusted Residual Sum of Squares for Parameter Selection, at the Meeting of the Statistics Society of Canada, Banff, CAN. (**Altman** (presenter), Leger)
- 1996 Semi-parametric Methods for Longitudinal Data Analysis, at the Joint Statistical Meetings, Chicago, IL (**Altman**)
- 1997 Discussant for : "The Use of Nonparametric Regression in the Analysis of Biomedical Data" at the meetings of the International Biometrics Society, ENAR, Memphis, TN. (**Altman**)
- 2000 Self-Modeling Regression for Longitudinal Data. Los Alamos National Laboratory, Los Alamos, NM. (**Altman**)
- 2001 Self-modeling Regression With Random Effects Using Penalized Regression Splines. National Institute of Standards and Technology, Gaithersberg, MD. (**Altman** (presenter), Villarreal)

- 2001 Discussant for "Estimation of Fetal Growth and Gestation in Bowhead Whales" by C. Shane Reese, James A. Calvin, John. C. George, and Raymond J. Tarty at the Joint Statistical Meetings Atlanta, GA (**Altman**)
- 2003 P-splines as a tool for Semiparametric Longitudinal Modeling at ENAR, Tampa, FL. (**Altman** (presenter), Villarreal)
- 2005 Self-Modeling Regression for Longitudinal Data with Time-Invariant Covariates, Statistical Society of Canada, Saskatoon, SK (Journal of the Canadian Statistical Society Award)(**Altman** (presenter), Villarreal)
- 2005 Global Classification of (Plant) Proteins across Multiple Species at ENAR, Austin, TX (**Altman** (presenter), Wall, Leebens-Mack, Albert, Field, Ma, dePamphilis)
- 2010 The Biology, Technology, and Statistical Modeling of High-throughput Genomics Data. Meeting of the Canadian Statistical Society, Quebec City, PQ (**Altman**)
- 2010 Isoform detection from RNA-seq with restriction enzyme fragmentation, Data Analysis and Statistical Foundations III: A Conference in Honour of D.A.S. Fraser, Toronto, CAN. (**Altman** (presenter), Wang, Karwa, Slavkovic)
- 2012 Adaptive FDR Estimation for High Dimensional Discrete Data. 16<sup>th</sup> ADNAT Conference on Animal Genetics and Geomics, C.R. Rao Institute, Hyderabad, India. (**Altman** (presenter), Dialsingh)
- 2013 The Many Roles of Principal Component Analysis. Joint Statistical Meetings Montreal. (**Altman** (presenter), Raskutti, Wei Luo)
- 2013 Data Obesity: Inflated Estimation and Irreproducible Results with High Throughput Data. Indian Institute of Science, Bangalore, India. (**Altman**)
- 2013 Statistics: Taskmistress or Temptress? International Conference on the Role of Statistics in the Advancement of Science and Technology. U. of Pune, Pune, India. (**Altman**)
- 2014 Differential Expression Analysis. Association of Biomolecular Resource Facilities, Albuquerque, NM. (**Altman**)
- 2014 Generalizing Principal Components Analysis. The 1<sup>st</sup> International Conference on Big Data & Applied Statistics Renmin University, Beijing, China (**Altman**)
- 2015 Generalizing Principal Components Analysis. Fields Institute -Program on Statistical Inference, Learning, and Models for Big Data, Toronto, Canada (**Altman**)
- 2015 (invited workshop presentations on various topics) Dagstuhl Seminar 15351 Computational Mass Spectrometry, Dagstuhl, Germany (**Altman**)
- 2016 Communication, Consultation and Collaboration in Cross-Disciplinary Studies, Women in Statistics and Data Science Conference, Charlotte, NC (**Altman**)
- 2017 P-values: Variability, Reproducibility and Lessons from Multiple Testing, Joint Statistical Meetings Baltimore (**Altman**)
- 2017 Discussion of "**Enabling Reproducibility in Statistical Translations of Genomics Data for Biomedical Research**" Joint Statistical Meetings, Baltimore (**Altman**)
- 2018 Discussion of " Building a computing age #StatisticsCurriculum for biomedical scientists" Joint

Statistical Meetings, Vancouver, CA (**Altman**)

2019 Understanding Principal Components Analysis. Conference on Applied Probability and Statistics, Hanoi, Viet Nam (**Altman**)

2019 **The Review and Revise Cycle**: Ushering your paper through peer review, Joint Statistical Meetings, Denver, CO (**Altman**)

#### **Invited Talks at Other Venues since 2001**

2001 Self-modeling Regression for Longitudinal Data (Lawrence H. Baker Center for Bioinformatics and Biological Statistics, Iowa State U.) (**Altman**)

2001 Self-modeling Regression for Longitudinal Data (Dept. of Biostatistics, U. Michigan) (**Altman**)

2002 A Semi-parametric Model for Longitudinal Data with Mixed Effects. (Dept. of Statistics, U. Pittsburgh) (**Altman**)

2002 Analysis of Controlled Experiments in Which the Response is a Curve (with inference) (Dept. of Biostatistics, U. Rochester) (**Altman**)

2004 Hybridization Design for 2-Channel Microarray Experiments (NSF-RCN Retreat on Microarrays, New Paltz, NY) (**Altman**)

2005 Interface Global Classification of (Plant) Proteins across Multiple Species (Dept. of Statistics, Temple U.) (**Altman** (presenter), Wall, Leebens-Mack, Albert, Field, Ma, dePamphilis)

2010 Resolving Isoform Expression using Digital Gene Expression Data (Dept. of Statistics, Iowa State U.) (**Altman** (presenter), Wang, Karwa, Slavkovic)

2014 Generalizing Principal Components Analysis (Dept. of Statistics, Tsinghua University, Beijing, China) (**Altman**)

2015 Matrix Decompositions: The Polar Vortex, Human Population Structure and the Netflix (Dept. of Mathematics, Juniata College, Huntingdon, PA) (**Altman**)

2015 Reproducible Research and Multiple Testing (Dept. of Biology, Juniata College, Huntingdon, PA) (**Altman**)

2016 P-values: Preaching to the Choir or Prancing with the Devil? (Memorial Sloan Kettering Cancer Centre, NYC), NY (Altman)

2018 Minding your P's and Q's. (Dept. of Statistics, Miami U of Ohio, Miami OH) (Altman)

2018 Rethinking Principal Components Analysis (Dept. of Statistics, Oregon State U., Corvallis, OR)

2019 Experimental Design for High Throughput Biology Studies. (Shanghai Tech University, School of Life Science and Technology, Shanghai, China) (**Altman**)

#### **Contributed Conference Talks and Posters (since January, 2001)**

2001 Inference for Self-Modeling Regression With Random Effects, (Interface Symposium, Costa Mesa, CA) (**Altman**)

- 2002 Analysis of Controlled Experiments in Which the Response is a Curve, (Joint Statistical Meetings, New York City, NY) (**Altman**)
- 2002 Bayesian Penalized Splines in Semi-Parametric Modeling (interface Symposium, Montreal, CAN). (**Altman**)
- 2003 A Semi-parametric Model for Longitudinal Data with Mixed Effects. (IMS Meeting on Functional Data Analysis, U. Florida) (**Altman**)
- 2003 Confidence Sets for Clusterings of Microarray Data, (NSF-RCN Retreat on Microarrays, New Paltz, NY) (**Altman**)
- 2003 Design and Analysis of cDNA Microarray Studies When Most Genes Express Differentially (Joint Statistical Meetings, San Francisco, CA) (**Altman**)
- 2004 Extending the Loop Design for Microarray Experiments (Interface Symposium, Baltimore, MD) (**Altman**)
- 2004 Strong evidence for extensive regulatory Subfunctionalization driving maintenance of duplicated genes in regulatory gene families of Arabidopsis thaliana.(Genomes and Evolution 2004, University Park, PA) (Ricker (presenter), Cui, Wall, Zhang, Zhang, Leebens-Mack, Ma, **Altman**, dePamphilis)
- 2005 Global Classification of (Plant) Proteins across Multiple Species (Interface Symposium, St. Louis, Mo) (**Altman** (presenter), Wall, Leebens-Mack, Albert, Field, Ma, dePamphilis)
- 2005 Maintenance Of Duplicated Regulatory Genes In Arabidopsis (Plant and Animal Genome Conference, San Diego, Ca). (Ricker (presenter), Zhang, Wall, Cui, Zhang, Leebens-Mack, **Altman**, Ma, dePamphilis)
- 2005 PlantTribes: A Global Classification For Arabidopsis And Rice Proteins (Plant and Animal Genome Conference, San Diego, Ca.) (Wall (presenter), **Altman**, Leebens-Mack, Ma, Albert, Field, and DePamphilis.)
- 2006 Some Technical Issues in Microarray Experiments (The Australian Statistical Conference/ New Zealand Statistical Association Conference, Auckland, NZ. ( Werner (presenter), **Altman**)
- 2006 The Floral Genome Project (Plant and Animal Genome Conference, San Diego, Ca.) (dePamphilis (presenter), Ma, Soltis, Soltis, Leebens-Mack, Oppenheimer, Carlson, Farmerie, Frohlich, Zahn, Kim, Buzgo, **Altman**, Zheng, Chanderbali, Wall, Cui, Solow, Mueller, Albert, Doyle, Barakat, Landherr)
- 2006 Populus Genome Aids Identification Of Gene Families Across The Angiosperms (Plant and Animal Genome Conference, San Diego, Ca.) (Wall (presenter), Leebens-Mack, Carlson, Albert, Field, **Altman**, Ma, dePamphilis)
- 2006 Apple Tree Functional Genomics: Getting To The Rootstock Of It (Plant and Animal Genome Conference, San Diego, Ca.)(Jensen (presenter), **Altman**, Crassweller, Makalowska, Maximova, Praul, Travis, McNellis)
- 2007 The ancestral angiosperm: steps toward a genetic and genomic understanding of the origin of flowering plants. (Botany & Plant Biology 2007 Joint Congress, Chicago) (DePamphilis (presenter), **Altman**, Carlson, Clifton, J.L. Goicoechea, Kudrna, Landherr, Leebens-Mack, Ma, Soltis, Soltis, Wall and Wing.)

- 2007 Development Of Gene Expression Phenotypic Markers For Apple (Plant and Animal Genome Conference, San Diego, Ca. (McNellis (presenter), Jensen, Crassweller, Maximova, Travis, **Altman**, Makalowska, Praul, Fazio)
- 2007 Microarray Expression Profiling Of *Persea americana* Flowers: In Search Of Organ-Specific Regulatory Networks (Plant and Animal Genome Conference, San Diego, Ca. (Chanderbali (presenter). **Altman**, Soltis, Soltis).
- 2008 Rootstock-Regulated Gene Expression Profiling In Apple Trees Reveals Genes Whose Expression Levels Are Associated With Growth Vigor (Plant and Animal Genome Conference, San Diego, Ca.) (Jensen (presenter), Makalowska, **Altman**, Praul, Maximova, Crassweller, Travis, Fazio, McNellis).
- 2008 The Ancestral Angiosperm Genome Project (AAGP): Toward A Genetic And Genomic Understanding Of The Origin Of Flowering Plants (Plant and Animal Genome Conference, San Diego, Ca.) (dePamphilis (presenter), **Altman**, Bliss, Carlson, Chanderbali, Clifton, Collura, Duarte, Goicoechea, Hu, Kudrna, Landherr, Liang, Leebens-Mack, Ma, Ralph, Schlarblum, Soltis, Soltis, Wall, Yu, Zuccolo, Wing)
- 2008 Gene Expression Patterns In Floral And Vegetative Parts Of *Nuphar advena* (Plant and Animal Genome Conference, San Diego, Ca.) (Yoo (presenter), Chanderbali, **Altman**, Soltis, Soltis)
- 2009 Using Ambiguous Tags in Digital Tag Analysis, (Joint Statistical Meetings, Washington, DC) (**Altman**)
- 2009 The Ancestral Angiosperm genetic toolkit. (Botany and Mycology 2009, Snowbird, UT) (DePamphilis (presenter) Ayyampalayam, Bliss, Brockington, Chanderbali, Duarte, Hu, Jiao, Liang, Landherr, Ralph, **Altman**, Carlson, Clifton, Ma, Leebens-Mack, Schlarbaum, Soltis, Soltis, Stevenson) .
- 2010 Isoform detection from RNA-seq with restriction enzyme fragmentation, (Statistical Society of Canada, Quebec City, CAN) (**Altman** (presenter), Wang, Karwa, Slavkovic)
- 2010 Resolving Isoform Expression using High-Throughput Sequence Data, (Joint Statistical Meetings, Vancouver, CAN) (**Altman** (presenter), Wang, Karwa, Slavkovic)
- 2011 FDR Control for Discrete Test Statistics (Joint Statistical Meetings, Miami Beach, FL) (Dialsingh (presenter), **Altman**)
- 2012 Estimating  $\pi_0$  for High Dimensional Discrete Data, (Joint Statistical Meetings, San Diego, CA) (**Altman** (presenter), Dialsingh)
- 2014 Extending PCA to Non-elliptical Data, (Statistical Society of Canada, Toronto, CA) (**Altman**)
- 2014 Reproducible Research and Multiple Testing, (Joint Statistical Meetings, Boston, MA) (**Altman**)

#### **Talks at Penn State and State Colee (Since January 2002)**

- 2002 Analysis of Controlled Experiments in Which the Response is a Curve (and why an Animal Scientist Should Care) (Dept. of Animal Science)
- 2003 The MCL algorithm for clustering protein families. (Genomics Journal Club)
- 2003 How should we normalize Affymetrix microarray data? (Genomics Journal Club)

- 2004 Confidence Sets for Clusterings (Dept. of Statistics, Alumni Workshop)
- 2004 Some Contributions of Statistics to the Genomics Revolution (PSU Statistics Club)
- 2006 Using Microarray Data with Comparative Sequence Analysis to Infer Evolutionary Relationships (Health Evaluation Sciences, Hershey)
- 2006 Nonparametric regression in longitudinal studies (Social Science Statistics Partnership)
- 2008 Statistical Research (PSU Statistics Club)
- 2009 Statistics and Science (State College Area High School, AP Statistics Class)
- 2010 The Biology, Technology and Statistical Modeling of High-throughput Genomics Data (Dept. of Statistics and Huck Institute)
- 2010 Resolving Isoform Expression using RNA-seq Data (poster, Genetics Symposium)
- 2010 Resolving Isoform Expression using RNA-seq Data (talk, Bioinformatics and Genomics Retreat)
- 2014 Generalizing Principal Components Analysis (talk, Dept. of Statistics SMAC)
- 2015 Interpreting and Extending Principal Components Analysis (talk, Dept. of Meteorology)
- 2018 Principal Components Analysis: A general purpose tool for high dimensional data (talk, Big Data Social Science)
- 2018 The Biology and Technology of "Omics" Biological Data (talk, Statistics)
- 2018 Principal Components Analysis: Dimension reduction and pattern detection (talk, Data Science)

### **Conferences Organized**

- 1996 Conference to honor Shayle R. Searle upon his retirement.
- 1997 Conference for the Inauguration of the New Department of Statistical Science at Cornell

### **Short Courses**

- 1989 Nonparametric Regression - A Short Course. Dept. of Mathematics, Statistics and Computer Science, Dalhousie University, Halifax, Canada.(sole lecturer)
- 2005 U. of Alabama at Birmingham First Plant Microarray Short Course, at U. Wisconsin, Madison, WI (2 sections – data analysis and design of microarray experiments)
- 2006 U. of Alabama at Birmingham Second Plant Microarray Short Course, at Boston MA.. (data analysis for microarray studies)
- 2010 Integrated Data Analysis 2010, Cold Spring Harbor Lab, NY (data analysis and experimental design for gene expression studies)
- 2011 Statistical Analysis of Genomics Data, Cold Spring Harbor Lab, NY (data analysis and experimental design for gene expression studies)

- 2012 Statistical Analysis of Genomics Data, Cold Spring Harbor Lab, NY (data analysis and experimental design for gene expression studies)
- 2013 Statistical Analysis of Genomics Data, Cold Spring Harbor Lab, NY (data analysis and experimental design for gene expression studies)
- 2013 Statistical Analysis of Gene Expression Data, U. of the West Indies, Port of Spain, Tobago.
- 2016 Bootcamp in data reproducibility and scientific transparency Penn State U. (data analysis)
- 2017 May Institute: Computation and statistics for mass spectrometry and proteomics Northeastern U., Boston (Multiple Testing)

### **Research Projects Funded**

- 1987-92 USDA Hatch NYC 151410. Semiparametric Techniques for Time and Spatially Related Data. (PI: N. Altman, \$20,000)
- 1990-91 NSF DMS 8916245: Computationally Intensive Problems in Statistics. (PI **N. Altman** co-PI G. Casella)  
March 1, 1990 - Feb. 28, 1991 \$20,000
- 1992-97 USDA Hatch NYC 151403. Semiparametric Techniques for Time and Spatially Related Data. (PI: N. Altman, \$5000 annually)
- 1996-99 NSF: Mathematical Sciences Computing Research Environments 9627207. (PI: **N. Altman** co-PIs: G. Casella, C. McCulloch, G. Churchill and D. Ruppert)  
August 15, 1996 - July 31, 1999 \$58,756
- 1996-00 USDA Hatch NYC 151307. Semi-Parametric Techniques for Longitudinal Data Analysis. (PI: N. Altman, \$7000 annually)
- 1996-00 NSF DMS 9625350: Semi-Parametric Methods for Longitudinal Data Analysis. (PI **N. Altman**)  
July 1, 1996 - June 30, 2000 \$50,000
- 2001-06 NSF PGRP 0115684: Floral Genome Project (PI: dePamphilis, co-PIs: Ma, Carlson, Miller, Tanksley, Doyle, Soltis, D., Soltis, P., Oppenheimer, Leebens-Mack; **N. Altman** key collaborator, 2002-2003, co-PI 2003-2006)  
October 1, 2001 - September 30, 2007 \$7,471,263
- 2004-05 PSU Tobacco Settlement funds: Support of a Bioinformatics and Statistical Genomics Service Center for Penn State University (PI: J. Rosenberger, co-PIs : **N. Altman**, I. Makalowska, W. Liu, G. Chase  
July 1, 2004 - June 30 2006 \$162,260
- 2004-10 NSF PGRP 0420394: Rootstock Dependent Gene Expression in Apple (PI: T. McNellis, co-PIs: R. Crassweller, S. Maximova, J. Travis; key collaborators: **N. Altman**, I. Makalowska)  
September 1, 2004 - August 31, 2010 \$2,269,241
- 2007-10 NSF PGRP 0638595: The Ancestral Angiosperm Genome Project (PI: C. dePamphilis, Co-PIs: H. Ma J. Leebens-Mack, P. Soltis, D. Soltis; Senior Personnel: S. Clifton, **N. Altman** (until 2009).)  
January 1, 2007 - December 31, 2010 \$2,967,113

- 2008-11 NSF OCE 0825979: Predicting the effects of ocean warming on larval dispersal by measuring adaptive potential of corals (PI: I. Baums; essential personnel: N. Altman)  
September 1, 2008 - August 31, 2011 \$474,000
- 2008-10 NSF IOS 0820729: Genetic and genomic approaches to understanding the role of auxin in shoot development (PI: P. McSteen, co-PIs: S. Malcomber, A. Gallavotti, Y. Zhao; Senior Personnel: **N. Altman**, R. Albert, R. Schmidt)  
October 1, 2008 - June 30, 2010 \$2,823,793
- 2010-13 NSF DMS 1007801: Statistical Methods for High Dimensional Discrete Data (PI: **N. Altman**)  
June 1, 2010-May 31, 2013 (extension to May 31, 2015) \$200,000
- 2010-16 GEPR: NSF IOS 0820729 (subcontract from U. Missouri): Genetic and genomic approaches to understanding the role of auxin in shoot development (PI: **N. Altman**) July 1, 2010-June 30, 2016 \$234,388
- 2011-16 NIH UL1RR033184: Institutional Clinical and Translational Science Awards (PI: LI Sinoway, multiple participants, biostatistician: **N. Altman**) \$4,467,207
- 2012-13 Grant DMS-1127914 to the Statistical and Applied Mathematical Sciences Institute.  
(subcontract from U. North Carolina) (PI: **N. Altman**) Sept. 1, 2012 -May 31, 2013 \$ 54,740
- 2013-18 NIGMS GM102057 Computation, Bioinformatics and Statistics (CBIOS) Training Program  
(PI: Hardison, multiple participants, program co-director: **N. Altman**) July 1, 2013 - June 30, 2018, \$244,087
- 2013-18 NIMH GABAergic Control of Depression-Related Brain States (PI: B. Luscher, biostatistician: **N. Altman**) 4/01/2013-3/31/2018, \$2,740,394
- 2014-18 BSF United States-Israel Binational Science Foundation: Bumble bee sociogenomics (co-PIs: A. Hefetz, C. Grozinger, **N. Altman**) \$49,408
- 2015 – 16 Penn State CTSI: RNASeq Analyses of individual circulating Macrophage-Tumor cell Fusions (MTFs) cultured from blood of patients with pancreatic ductal adenocarcinoma (PDAC)  
(PI: Gary A. Clawson, Co-Investigators: Thomas Abraham, **Naomi Altman**, Kirsten Eilertson, Yuka Imamura-Kawasawa, Gail Matters, Diane Thiboutot, Joyce Wong) \$63687
- 2016-21 NIGMS: (supplement to the CBIOS Training Program) Bootcamp in data reproducibility and scientific transparency \$40,000 (PI: C. Shashikant, faculty: **N. Altman**)
- 2015-19 California Dried Plums: Randomized Control Trial of Dietary Supplementation with Dried Plums on Bone Density, Geometry and Estimated Bone Strength in Postmenopausal Women  
12/01/2015 to 11/30/2019 \$755,937 (PI: M. De Souza, co-investigator: **N. Altman**)
- 2016-21 NIH Penn State Biomedical Big Data to Knowledge (B2D2K) Training Program \$1,604,971  
03/01/2016-02/28/2021 (PI: M. Ritchie, core faculty and chair of Evaluation Committee: **N. Altman**)

### **Theses Supervised (6 Ph.D., 14 M.S.)**

- 1992 Hobert, J. P. M.S. Spatial Analysis of the Fish Species Richness of Adirondack Lakes: Applications of Geostatistics and Nonparametric Regression.
- 1992 Kudrak, K.E. M.S. The Incorporation of Environmental Heterogeneity Into the Analysis of Animal Movement Patterns and Space Use.

- 1995 Tatsuoka, C.M Ph.D. A Latent Class Problem on a Directed Lattice. (with M. Wells)
- 1995 Aragaki, A.K. M.S. A Simple Local Least Squares Approach for Estimating the Regression Function of Binary Response Data and Related Data-Driven Bandwidth Selection Procedures.
- 1995 Johnson, K. M.S. Canonical Correspondence Analysis as a Method for Determining Environmental Gradients: A Simulation Experiment Testing Performance
- 1998 Belue, R. M.S. Link Functions for Binary Response with Low Response Probability
- 1999 Madsen, L. M.S. Comparing Two Parametrizations of the Exponential Variogram in REML Parameter Estimation and Spatial Prediction
- 2000 Jou, Ying-Ming Ph.D. Estimation of Crossover Intensity and its Application to the Mouse Genome (with G. Churchill)
- 2001 Villarreal, J. M.S. Self-Modeling Nonlinear Regression with Random Shifts and a Penalized Regression Spline Shape Function
- 2002 Denogean, L. M.S. Composite Likelihood Methods in the Coalescent
- 2003 Xu, Hong M.S. Nonparametric comparison of two regression curves using the penalized spline method.
- 2003 Walters, E. M.S. Detecting Gene Clustering on Chromosomes
- 2004 Madsen, L. Ph.D. Regression with Spatially Misaligned Data (with D. Ruppert)
- 2004 Han, Bing MS Combining Functional Genomics Data with QTLs
- 2005 Hua, Tony MS Extending Loop Designs for Microarray Experiments
- 2007 Skinner, Jeff MS Power and Sample Size for Balanced Incomplete Block Design (BIBD) Experiments with Dye-Balanced Two-channel Microarray Data
- 2007 Han, Bing Ph.D. A Bayesian Approach to False Discovery Rate for Large Scale Simultaneous Inference (with S. Arnold)
- 2011 Dialsingh, Isaac PhD. False Discovery Rates when the Statistics are Discrete
- 2014 Austin, Stefanie M.S. False Discovery Rates for Discrete Data
- 2016 Wang, Qingyu Ph.D. Evaluation of Whole Exome Sequencing Technology in Cohort Dataset and Quantification of Phenotypic Alterations in a Model Organism (Bioinformatics & Genomics, with Girirajan, Santhosh)
- 2019 Shen, Frank Ph.D. Statistical analysis of chromosome conformation data and other omic data (with Li, Qunhua)

Graduate Committees since 2012:

Michelle Nixon 2020  
 Nabeel Ahmed, May 2019  
 Seth Polydore, Nov. 2018  
 Jun Song, June, 2017

Vijay Kumar 2021  
 Eric Wafula, Oct. 2019  
 Mehmet Ali Doke, July, 2017  
 Hannier Pulido Nov. 2016

Zhenzhen Yang April 2016  
Hanyu Wang Oct. 2014  
Wei Luo May 2014  
Yeting Zhang Oct 2013  
Loren Honaas May 2013  
Xuan Ma April 2012  
Esra Kurum May 2012  
Jialin Xu July 2012

Yuan Huang June 2015  
Jie Xiang Sept 2014  
Xin Lin Dec 2013  
Zhaorong Ma June 2013  
Yazhou Sun Jan 2012  
Xinwei Han April 2012  
Qing Wang May 2012  
Yan Zhang Nov 2012

graduate committees at PSU (2001-2012) - 27

### **Undergraduate Theses Supervised**

1998	Bernstein, Elliot	Quantifying Bird Migration Patterns
1999	Cottrell, Kevin	Statistical Analysis of Bird Migration
2005	Li, Xiao-Yi	Clustering Microarray Data
2008	Zeifman, Lubov	Independent Component Analysis of fMRI data
2015	Megan Gearhart	Analysis of single-cell RNA-seq data

### **Professional Memberships**

American Statistical Association  
Canadian Statistical Society  
Institute of Mathematical Statistics

### **Professional Responsibilities**

2016 - 2022 Associate Editor, Canadian Journal of Statistics  
2015 Committee on P-values, American Statistical Association  
2013- 2017 Statistical Review Panel, Nature Publishing  
2013- Contributing Editor, Nature Methods  
2012-15 Associate Editor, Journal of the Indian Society of Agricultural Statistics  
2006-09 Associate Editor, Journal of the American Statistical Association  
2002-05 Associate Director, Bioinformatics Consulting Center, PSU  
1998-01 Member, Genomics Task Force, Cornell  
1997-00 Chair, Department of Biometrics, Cornell  
1998-00 Chair, Computational Genomics Curriculum Committee, Cornell  
1996-99 Representative to the Council on Sections, Statistical Computing Section of the American Statistical Association.  
1992-97 Associate Editor, Journal of Computational and Graphical Statistics  
1991-92 Member, Program Advisory Committee, Institute of Mathematical Statistics  
1988-91 Chair, New Researchers Committee, Institute of Mathematical Statistics  
1988-91 Member, Ad Hoc Committee for Outreach, Institute of Mathematical Statistics

### **Reviewer for:**

Nature Publishing Group, Journal of the American Statistical Association, The Canadian Journal of Statistics, The American Statistician, The Annals of Statistics, Biometrics, Journal of Statistical Planning and Inference, National Science Foundation, Natural Sciences and Engineering Research Council (Canada), Australian Journal of Statistics, Journal of the Royal Statistical Society, Bioinformatics, Statistics and Probability Letters, Plant Physiology, Proceedings of the National Academy of Science, Genomics, Proteomics & Bioinformatics, The Iranian Journal of Animal Science, Genome Biology, Revista Brasileira de Zootecnia, Environmental and Ecological Statistics, Pakistan Journal of Statistics, Journal of Experimental Marine Biology and Ecology, Psychological Methods

### **Teaching (at Penn State)**

Stat 414	Introduction to Probability Theory	F07, F08, S10,F11
Stat 440	Statistical Computing for Undergraduates	S09
Stat 503	Design of Experiments II	F09, F13 (WD)
Stat 511	Regression Analysis and Modeling	F01-06
Stat 512	Design and Analysis of Experiments	S02-08, S12
Stat 540	Statistical Computing for Graduate Students	F08-10
Stat 580	Statistical Consulting	F07, F14 (WD)
Stat 597C	Computing Environments	F05-07
Stat 598A/IBIOS 598E	Current Research in Statistical Genomics	F05-07
Stat/CSE 598D/Bio 597D	Bioinformatics II	S06, S11, S14
Stat 555	High Throughput Genomics Data	S15, F15 (WD), S16, F17, S17, F18

### **Departmental Duties at Penn State**

2001 – 12	Faculty Advisory Board of Statistical Consulting Center (chair 2007-2011)
2001 -	Promotion and Tenure Committee
2002-06	representative, Eberly College of Science Climate Committee
2002-06	chair, departmental Climate Committee
2002-07	Undergraduate Program Committee Statistics
2002- 15	Graduate Admissions Committee Statistics (chair 2006 - 15)
2002- 09	Undergraduate advisor
2006- 07	Computing Committee
2006- 09,	Graduate Program Committee
2006-14	Graduate Peer Advising Co-ordinator
2006-10	Schreyer Honors advisor
2006- 18	Graduate Admissions Chair, Statistics
2010- 11	Faculty Search Committee
2013- 19	CBIOS Program co-director
2015- 19	CBIOS Program Graduate Selection Committee
2015-19	Graduate Admissions Committee, Bioinformatics
2016	Chair, B2D2K Training Grant Evaluation Committee
2018	Graduate Program Chair, Statistics

### **Other Activities**

2001-05	organizer, Statistical Genomics Journal Club
2004-06	Martin Luther King Celebration Coordinator (ECoS) prepared a week-long program for the college
2002-05	Associate Director of the Bioinformatics Consulting Center