

# DAVID L. DONOHO

## University Address

Statistics Department  
Stanford University  
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## Home Address

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## Personal

Born 1957; Pasadena, California. U.S. Citizen.  
Married to Miriam Gasko, 1984. Son, Daniel, born 1985.

## Professional Interests

### *Mathematical Sciences:*

Wavelets, Information Theory, Mathematical Statistics

### *Technology:*

Emerging Internet Applications, Internet Appliances,  
Internet Privacy and Security Models, Wireless Communications,  
Signal and Image Processing, Image and Video Coding.

### *Science Applications:*

Statistics of Natural Images, Statistics of Internet Traffic,  
Inverse Problems in Geophysics, Extragalactic Astronomy.

## Education

A.B. (Statistics) Princeton University, 1978, *Summa Cum Laude*. Undergraduate thesis adviser: J. W. Tukey.

Ph.D. (Statistics) Harvard University, 1984. Thesis adviser: P. J. Huber.

## Commercial Activities

Co-founder of BigFix.com, a Berkeley, CA start-up aiming to fundamentally change the practice of technical support for computers and associated network-connected devices. As disclosed in several US Patents, BigFix has developed a new internet communications model with profound implications for the high tech sector, implications reaching far beyond the initial applications in technical support.

## Citation Analysis

Donoho was named most highly-cited author in the field of Mathematics in the decade 1990-2000 by Institute for Scientific Information, ([www.isinet.com](http://www.isinet.com)) makers of Science Citation Index and associated citation services. The ISI methodology counted citations in all fields of science and engineering to the 200 most-cited papers in mathematics in each year 1990-1999. Donoho was the author of ten such highly-cited papers, also the most among mathematicians. Source: Jennifer Minnick, editor of ISI Essential Science Indicators (ESI). Publication details: First edition of ESI, Fall 2000.

## Awards

SIGEST Best Paper, Soc. Ind. App. Math., March 2001.  
Sackler Fellow, Tel Aviv University, 2000.  
Outstanding Achievement Award, Soc. Photo. Instr. Eng., 2000.  
Elected to U.S.A. National Academy of Sciences, 1998  
Presidents' Award, Committee of Presidents of Statistical Societies, 1994  
Elected to American Academy of Arts and Sciences, 1992  
John D. and Catherine T. MacArthur Fellowship, 1991-1996  
Fellow, Institute of Mathematical Statistics, 1990  
"MacSpin – Best Scientific/Engineering Software of 1987," *MacUser Magazine*,  
February 1988.  
Cecil B. and Ida M. Green Fellow, Scripps Oceanographic Institute, 1986  
Prof. Assoc. au CNRS, Univ. de Paris XI, May-June 1986  
Presidential Young Investigator Award, 1985–1991  
National Science Foundation Postdoctoral Fellowship, 1984-1986  
National Science Foundation Graduate Fellowship, 1979-1984  
Election to Sigma Xi as undergraduate, 1978

## Special Lectures

Von Neumann Lecturer, Society for Industrial and Applied Mathematics, July 2001  
A.J. Duncan Memorial Lecture, Johns Hopkins University, April 2001.  
Plenary Lecturer, *Mathematical Challenges of the 21st Century*, AMS, August 2000  
Plenary Lecture, *Independent Component Analysis 2000*, Helsinki, Finland.  
Main Lecturer, Swedish National Mathematics Summer School, Stockholm, June 2000  
Main Lecturer, *Beyond Wavelets*, NSF-CBMS Lecture Series, St. Louis, May 2000  
P.R. Krishnaiah Memorial Lecture, Pennsylvania State University, May 2000.  
Principal Lecture, *Scale Space '99*, Corfu, Greece.  
Plenary Lecture, *Curves and Surfaces '99*, Saint-Malo, France.  
Principal Lecturer, Trimestre "Images", Centre Émile Borel, Paris, Fall 1998.  
1997 Wald Memorial Lecturer, Institute of Mathematical Statistics  
Principal Lecturer, 19th Finnish Summer School on Probability Theory, 1997  
Bernoulli Lecturer, Fourth Bernoulli Society World Congress, September 1996  
Invited 10-lecture DMV Seminar, Oberwolfach, March 1995.  
Invited 45-Minute Lecture, International Congress of Mathematicians, Zurich, 1994  
Hotelling Memorial Lecturer, University of North Carolina, 1994  
Keynote Speaker, IEEE Time-Frequency/Time-Scale Conference, Philadelphia, 1994  
Institute of Mathematical Statistics, Special Invited Paper, 1991  
Principal Lecturer, Ecole d'Été de Probabilités (Saint Flour), Summer 1990

## Professional Responsibilities

Associate Editor, *Applied and Computational Harmonic Analysis, Inverse Problems*.  
Class Membership Committee, National Academy of Sciences, 1999, 2000.  
Referee for: *Annals of Statistics, JASA, Annals of Probability, SIAM Journal of Mathematical Analysis, IEEE Computer Graphics and Applications, IEEE Trans. Info. Theory, IEEE Trans. Acoustics, Speech, Signal Proc.*  
Councilmember, Institute of Mathematical Statistics, 1994-1996.

Chair of IMS Committee to Select Special Invited Papers, Wald and Rietz Lecturers, 1993-1994.

Formerly Associate Editor, *Annals of Statistics* 1992-1995, *Probability Theory and Related Fields* 1988-1992, *Advances in Computational Math.*, 1992-1994. *Bull. Amer. Math. Soc. Research Expository Papers* (1993- 1996); *Inverse Problems* (1994-96)

Co-Principal Investigator for NSF ITR *Multiresolution Analysis of the Global Internet*, 2000-2003.

Co-Principal Investigator for NSF KDI *Towards Ideal Data Representation*, 1998-2002.

Lead Subcontractor *Efficient Mathematical Algorithms for Signal Processing*, DARPA BAA 98-4. 1998-2000.

Subcontractor with Center for Research in Applied Signal Processing, 1994-1997, 2000.

Co-Principal Investigator for AFOSR Multi-University Research Initiative, 1995-2000.

Co-Principal Investigator for NSF DMS 95-05150, *Adaptive Statistical Procedures*, 1995-2000.

Co-Principal Investigator for NSF DMS 92-09130, *Exploiting Hidden Sparsity in Statistical Estimation*, 1992-1994.

Co-Principal Investigator for NSF DMS 88-10192, *Inference in Curved-Ray Tomography*, 1989-1992.

Co-Principal Investigator for NASA NCA2-488, *Algorithms to Analyze Random and Chaotic Time Series Data*, 1989-1991.

Principal Investigator for NSF DMS 84-517573, *Signal Processing and Inverse Problems*, 1985-1990.

Organizer of various special sessions and meetings, such as Colloquium on Asymptotic Methods in Statistical Decision Theory, Berkeley, November 1989, featuring lecturers from Moscow, Berlin, Paris, and USA.

Organizer of “The Wavelet Transform” session at National Academy of Sciences *Frontiers of Science* symposium, Nov. 1992.

## Employment

- |              |  |
|--------------|--|
| 1998         | Professeur Associé, Université de Paris XI (visitor)   |
| 1992         | Professeur Associé, Université de Paris VII (visitor)  |
| 1991-present | Professor, Department of Statistics, Stanford University   |
| 1990-1997    | Professor, Department of Statistics, Univ. of California, Berkeley   |
| 1987–1990    | Associate Professor, Department of Statistics, Univ. of Calif., Berkeley.  |
| 1984–1986    | Assistant Professor, Department of Statistics, Univ. of Calif., Berkeley.  |
| 1983–1985    | NSF Postdoctoral Fellow, Department of Statistics, Univ. of Calif., Berkeley. Research in robustness, nonparametrics, computer graphics.   |
| 1983         | Postdoctoral Fellow, Math. Sciences Research Institute, Berkeley. Research in robust and nonparametric statistical methods.  |
| 1979-1983    | Research assistant for P.J. Huber. Worked on advanced display techniques for multivariate data. Developed statistics and graphics software; compiled databases; produced, directed, and narrated videotapes. |
| 1978-1979    | Research Geophysicist for Western Geophysical Co. Worked on robust methods for very large linear models and on deconvolution of impulsive time series.   |
| 1976-1978    | Programmer for Statistics Dept., Princeton Univ. Wrote initial version of ISP (Interactive Statistical Processor), used by Statistics departments at Toronto, Berkeley, Stanford, etc.                       |
| 1977(summer) | Programmer for University of Texas Marine Science Institute. Programmed minicomputer for real-time detection and location of seismic events using seismic array in Costa Rica.                               |

## Consulting

- 2000- Consultant to InfoWrap, Inc. Data compression/bandwidth management.  
2000- Member of Project JASON. DoD/DARPA/Mitre Corporation.  
2000 Consultant to Recipio.com. Web consumer opinion sampling.  
2000 Expert Witness in *Phillips Petroleum v. Exxon*. Patent litigation in Wilmington, Delaware Federal District Court. NMR Signal Processing.  
1999-present Consultant to Xamplify.com. Web Community Development.  
1997-present Consultant to Clairvoyant Software, Inc. Internet Software Development.  
1996-present Consultant to BigFix, Inc. Internet Software Development.  
1991-1998 Consultant to Statistical Science, Inc. Wavelet Analysis. Wavelet Software.  
1979-1981 Consultant to Western Geophysical Co. Inverse problems.

## Publications

Donoho, D.L. Huber, P.J. and Thoma, H.M. (1981) The use of kinematic displays to represent high-dimensional data. in *Proceedings of the Interface between Computer Science and Statistics*, ed. W.F. Eddy. New York: Springer-Verlag, 274-278.

Donoho, D.L. (1981) On minimum entropy deconvolution. In *Applied Time Series Analysis II*, ed. D.F. Findlay. New York: Academic Press, 565-608.

Donoho, D.L. Huber, P.J., Ramos, E.A. and Thoma, H.M. (1982) Kinematic display of multivariate data. In *Proceedings of the Third Annual Conference of the National Computer Graphics Association*. Washington: NCGA, 393-400. Reprinted in *Dynamic Graphics for Statistics* W.S. Cleveland and M.E. McGill, eds. Wadsworth, 1988.

Donoho, D.L. and Gasko, M. (1982) Influential observations in data analysis. In *Proceedings of the Business and Economics Statistics Section*, American Statistical Association. Washington: ASA.

Donoho, D.L. and Huber, P.J. (1982) The notion of breakdown point. In *Festschrift for Erich Lehmann*, K.A. Doksum and L.L. Hodges, Jr., eds. Belmont, CA: Wadsworth.

Donoho, D.L., Huber, P.J., Ramos, E.A. and Thoma, H.M. (1983) The man-machine graphics interface for statistical data analysis. In *Statistical Image Processing and Graphics*, E. J. Wegman and D. J. DePriest, eds. New York: Dekker.

Donoho, A. W., Donoho, D.L. and Gasko, M. (1985) *MacSpin: Graphical Data Analysis*. Monterey, CA: Wadsworth and Austin, TX: D2 Software (book and computer graphics system).

Donoho, D.L., Johnstone, I.M., Rousseeuw, P.J. and Stahel, W.A. (1985) Discussion of "Projection Pursuit" by P.J. Huber. *Annals of Statistics*, **13**, June 1985, pp. 496-500.

Artemis Systems. (1986) *PC-ISP: Interactive Scientific Processor*. Chapman and Hall: London and New York. (Computer software for data analysis.) [Author of public domain version of software and documentation upon which this commercial version was based.]

Donoho, D.L. and Johnstone, I.M. (1986) Regression approximation using projections and isotropic kernels. *Contemporary Mathematics*, **59**, 153-167.

- Donoho, D.L. and Liu, R.C. (1988) Pathologies of some minimum distance estimators. *Annals of Statistics*, **16**, June 1988, pp. 567-608.
- Donoho, D.L. (1988) One-sided inference about functionals of a density. *Annals of Statistics*, **16**, December 1988, pp. 1390-1420.
- Donoho, D.L. and Liu, R.C. (1988) The “automatic” robustness of Minimum Distance Functionals. *Annals of Statistics*, **16**, June 1988, pp. 552-586.
- Donoho, D.L. and Liu, R.C. (1988) Pathologies of some minimum distance estimators. *Annals of Statistics*, **16**, June 1988, pp. 587-608.
- Donoho, A.W., Donoho, D.L. and Gasko, M. (1988) MacSpin: Dynamic Graphics on a desktop computer. *IEEE Computer Graphics and Applications*, June 1988, pp. 51-58.
- Donoho, D.L. and Johnstone, I.M. (1989) Projection-based approximation, and a duality with kernel methods. *Annals of Statistics*, **17**, March 1989, pp. 58-106.
- Donoho, D.L. and Stark, P.B. (1989) Uncertainty principles and signal recovery. *SIAM J. Appl. Math.*, June 1989, **49**, pp. 906-931.
- Hoch, J.C., Stern, A.S., Donoho, D.L. and Johnstone, I.M. (1990) Maximum entropy reconstruction of complex phase-sensitive spectra. *Journal of Magnetic Resonance*, **86**, 236-246.
- Donoho, D.L., Liu, R.C. and MacGibbon, B. (1990) Minimax risk over hyperrectangles and implications. *Annals of Statistics*, **18**, Sept., 1990, 1416-1437.
- Donoho, D.L. and Nussbaum, M. (1990) Minimax Quadratic Estimation of a Quadratic Functional. *Journal of Complexity* **6**, June 1990, 290-323.
- Donoho, D.L. and Johnstone, I.M., Stern, A.S. and Hoch, J.C. (1990) Does the Maximum Entropy Improve Sensitivity? *Proc. Nat. Acad. Sci. U.S.A.*, **87**, July 1990, 5066-5068.
- Donoho, D.L. and Liu, R.C. (1991) Geometrizing rates of convergence II. *Annals of Statistics*, **19**, June 1991, 633-667.
- Donoho, D.L. and Liu, R.C. (1991) Geometrizing rates of convergence III. *Annals of Statistics*, **19**, June 1991, 668-701.
- Donoho, D.L. and Gasko, M. (1992) Breakdown Properties of Estimators based on halfspace depths and projected outlyingness. *Annals of Statistics*, December 1992, **20**, 4.
- Donoho, D.L., Johnstone, I.M., Stern, A.S. and Hoch, J.C. (1992) Maximum Entropy and the Nearly Black Object (with discussion). *Journal of the Royal Statistical Society, Series B*, (1992) **54** 1, 41-81.
- Donoho, D.L. and Logan, B.F. (1992) Signal Recovery and the Large Sieve. *SIAM Journal of Applied Math.* April 1992, **52**, 577-591.
- Donoho, D.L. and M.G. Low (1992) Renormalization Exponents and Optimal Pointwise Rates of Convergence. *Annals of Statistics*, June 1992, **20**, 944-970.

- Donoho, D.L. (1992) Superresolution via Sparsity Constraints. *SIAM J. Math. Anal.* Sept. 1992, **23**, 1309-1331.
- Donoho, D.L. and Stark, P.B. (1993) A note on rearrangements, spectral concentration, and the zero-order prolate spheroidal function. *IEEE Trans. Info. Thry*, Jan. 1993, **39**, 257-259.
- Donoho, D.L. (1993) Unconditional Bases are Optimal Bases for Data Compression and for Statistical Estimation. *Applied and Computational Harmonic Analysis*, **1**, Dec. 1993, pp. 100-115.
- Donoho, D.L. (1993) Wavelet Shrinkage and W.V.D.: a 10-minute tour. in *Progress in Wavelet Analysis and Applications*, Y. Meyer and S. Roques, Eds. Paris: Frontières, 1993.
- Donoho, D.L. (1993) Smooth wavelet decompositions with blocky coefficient kernels. *Recent Advances in Wavelet Analysis*, L.L. Schumaker and G. Webb eds. pp. 259-308. Boston: Academic Press.
- Donoho, D.L. (1993) Nonlinear wavelet methods for recovery of signals, densities and spectra from indirect and noisy data. *Proc. Symposia Appl. Math.* **47**, 173-205, I. Daubechies Ed, Providence: AMS.
- Donoho, D.L. (1994) Minimum Entropy Segmentation. *Wavelets: Theory, Algorithms and Applications*, C.K. Chui, L. Montefusco and L. Puccio, Eds. pp. 233-270. San Diego: Academic Press, 1994
- Donoho, D.L. and Johnstone I.M. (1994) Minimax Risk over  $l_p$  balls. *Prob. Thry. and Rel. Fields*, September 1994, **99**, 277-303.
- Donoho, D.L. and Johnstone, I.M. (1994) Ideal spatial adaptation via wavelet shrinkage. *Biometrika*, **81**, pp. 425-455, Sept. 1994.
- Donoho, D.L., Johnstone I.M. (1994) Ideal DeNoising in an orthogonal basis chosen from a library of bases, *Comptes Rendus Acad. Sciences Paris A.* **319**, 1317-1322.
- Donoho, D.L. (1994) Abstract Statistical Estimation and Modern Harmonic Analysis, *Proc. 1994 Int. Cong. Math.* pp. 997-1005.
- Donoho, D.L. (1994) Statistical Estimation and Optimal Recovery. *Annals of Statistics*, **22**, March 1994, pp. 238-270.
- Donoho, D.L. (1994) Asymptotic Minimax Risk for sup norm loss: Solution via Optimal Recovery. *Probability Theory and Related Fields*, Sept. 1994, **99**, 145-170.
- Donoho, D.L. (1995) Nonlinear solution of linear inverse problems by wavelet-vaguelette decomposition. *Applied and Computational Harmonic Analysis*. **2**, May 1995, pp. 101-126.
- Donoho, D.L. (1995) De-Noising via Soft-Thresholding. *IEEE Trans. Info. Thry*. **41**, May 1995, pp. 613-627.
- Donoho, D.L. and Johnstone, I.M. (1995) Adapting to unknown smoothness via wavelet shrinkage. *Journ. Amer. Statist. Assn.* vol. 90 no. 432, December 1995, pp. 1200-1224.

- Donoho, D.L., Johnstone I.M., Kerkyacharian, G., and Picard, D. (1995) Wavelet Shrinkage: Asymptopia? *Journ. Roy Stat. Soc. Ser B*, **57**, no. 2, 1995, pp. 301-369.
- Coifman, R.R. and D.L. Donoho (1995) Translation Invariant De-noising. *Wavelets in Statistics*, A. Antoniadis and G. Oppenheim Ed. pp. 125-150. New York: Springer-Verlag.
- Buckheit, J.B. and D.L. Donoho (1995) WaveLab and Reproducible Research. *Wavelets in Statistics*, A. Antoniadis and G. Oppenheim Ed. pp 55-82. New York: Springer-Verlag.
- D.L. Donoho (1996) Unconditional Bases and Bit-Level Compression. *Applied and Computational Harmonic Analysis* **3** 388-392.
- D. L. Donoho, I. M. Johnstone, G. Kerkyacharian and D. Picard, Density estimation by wavelet thresholding. *Annals of Statistics* **24** 508-539.
- Bruce, A., Donoho, D.L. and Gao, H.Y. (1996) Wavelet Analysis. *IEEE Spectrum* October, 26-36.
- Donoho, D.L., Johnstone I.M. (1996) New Minimax Theorems, Thresholding, and Adaptation. *Bernoulli*, **2**, 1996, 39-62.
- Donoho, D.L. CART and Best-Ortho-Basis: A connection. *Ann. Statist.* **25** September 1997, 1870-1911.
- Donoho, D.L. (1997) Renormalizing Experiments for Nonlinear Functionals, in *Festschrift for Lucien Le Cam*, D.L. Pollard, E.N. Torgersen and G.L. Yang, Eds. pp. 167-182. New York: Springer-Verlag.
- Donoho, D.L., Johnstone I.M., Kerkyacharian, G., and Picard, D. (1997) Universal Near-Minimaxity of Wavelet Shrinkage Estimators, *Festschrift for Lucien Le Cam* D.L. Pollard, E.N. Torgersen and G.L. Yang, Eds. pp. 183-218. New York: Springer-Verlag.
- Donoho, D.L. and Johnstone, I.M. (1998) Minimax estimation via wavelet shrinkage. *Ann.Statist.* **26**, 3, 879-921.
- Chen, S. , Donoho, D.L., and Saunders, M.A. (1999) Atomic Decomposition by Basis Pursuit. *SIAM J. Sci Comp.*, **20**, 1, 33-61.
- Donoho, D.L., Vetterli, M., DeVore, R.A., and Daubechies, I. (1998) Data Compression and Harmonic Analysis. *IEEE Trans. Info. Thry.* **44**, 6, 2435-2476.
- Donoho, D.L. (1998) Tight Frames of  $k$ -Plane Ridgelets and the Problem of Representing  $d$ -dimensional singularities in  $\mathbf{R}^n$ . *Proc. Nat. Acad. Sci. USA*, **96**, 1828-1833.
- Donoho, D.L. and Johnstone, I.M. (1999) Asymptotic Minimaxity of Wavelet estimators based on sampled data. *Statist. Sinica*. pp. 1-32.
- Donoho, D.L. and Yu, T.P.Y. (1999) Deslauriers-Dubuc: Ten Years After. *Spline Functions and Wavelets*. S. Dubuc and G. Deslauriers, eds. pp. 353-370. Providence, Amer. Math. Soc.

Candès, E. J., and D. L. Donoho, Ridgelets: The key to High-Dimensional Intermit-  
tency? in *Phil. Trans. R. Soc. Lond. A.* **357** (1999), 2495-2509.

Donoho, D.L. (1999) Wedgelets: nearly-minimax estimation of edges. *Ann. Statist.*  
**27**, 859-897.

Candès, E.J. and Donoho, D.L. (2000) Curvelets: a surprisingly effective nonadaptive  
representation of objects with edges. in *Curve and Surface Fitting: Saint-Malo 1999*  
Albert Cohen, Christophe Rabut, and Larry L. Schumaker (eds.) Vanderbilt University  
Press, Nashville, TN. ISBN 0-8265-1357-3

Donoho, D.L. and Yu, T.P.Y.(2000) Robust nonlinear ‘wavelet transform’ based on  
median interpolation. *SIAM J. Math. Anal.*. Vol. 31 Number 5 pp. 1030-1061

Donoho, D.L. (2000) Orthonormal Ridgelets and Linear Singularities. *Siam J. Math*  
*Anal.* Vol. 31 Number 5 pp. 1062-1099.

Donoho, D.L., and Duncan, M.R. (1999) Digital Curvelet Transform: Strategy, Im-  
plementation, Experiments. in *Wavelet Applications VII*, H.H. Szu, M. Vetterli, W.  
Campbell, and J.R. Buss, eds. (Proc. Aerosense 2000, Orlando, Fla.), SPIE vol 4056,  
pp. 12-29. SPIE: Bellingham Washington, 2000.

Donoho, D.L., Dyn, N., Levin, D., and Yu, T.P.Y. (1997) Smooth Multiwavelet Duals  
of Alpert Bases by Moment-Interpolating Refinement *Appl. Comput. Harm. Anal.*,  
Vol. 9, No. 2, Sep 2000, pp. 166-203.

### **Accepted for Publication or In Press**

Donoho, D.L. (1998) Sparse Components of Images and Optimal Atomic Decomposi-  
tion. To appear *Constructive Approximation*.

Donoho, D.L. and Huo, Xiaoming (1999) Uncertainty Principles and Ideal Atomic  
Decomposition. To appear, *IEEE Trans. Info. Thry*.

Donoho, D.L. (1998) Ridge Functions and Orthonormal Ridgelets. To appear, *J. Ap-  
prox. Theory*.

Abramovich, F., Benjamini, Y., Donoho, D.L. and Johnstone, I.M. (2000) Adapting to  
Unknown Sparsity by Controlling the False Discovery Rate. To appear, *Ann. Stat.*

### **Manuscripts in Submission**

Donoho, D. L., Mallat, S. and von Sachs, R. (1998) Locally Stationary Covariance  
Estimation: Consistency of Best Basis Methods.

Donoho, D.L. (1998) Counting Bits with Kolmogorov and Shannon.

Candès, E.J. and Donoho, D.L.(2000) Edge-Preserving Denoising in Linear Inverse  
Problems: Optimality of Curvelet Frames.

Candès, E.J. and Donoho, D.L. (2000) Curvelets and Curvilinear Integrals.



Averbuch, A. Coifman, R., Donoho, D. Israeli, M. and Waldén, J. (2001) Fast Slant Stack: A notion of Radon Transform for Data in a Cartesian Grid which is Rapidly Computible, Algebraically Exact, Geometrically Faithful and Invertible. Technical Report, Department of Statistics, Stanford University.

## Manuscripts

Donoho, D. (1977) Documentation for ISP. Department of Statistics, Princeton University.

Donoho, D. (1978) Estimation of time delay at poor S/N. Technical Report, Western Geophysical Co.

Donoho, D. (1978) Differential equations for stiff streamers. Technical Report, Western Geophysical Co.

Donoho, D. (1979) Preliminary investigations using exploratory analysis on Saudi Arabian data. Technical Report, Western Geophysical Co.

Donoho, D. (1979) Tomographic velocity inversion by FFT. Technical Report, Western Geophysical Co.

Donoho, D. (1981) Evaluation of Pulse Compression Methods. Technical Report, Western Geophysical Co.

Donoho, D. (1981) User's guide to ISP on the VAX. Department of Statistics, Harvard University.

Donoho, D. (1981) ISP v. 1.2. Command Reference. Department of Statistics, Harvard University.

Donoho, D. (1981) Getting Started with PRIM-H. Department of Statistics, Harvard University.

Donoho, D. and Ramos, E.A. (1982) PRIMDATA: Datasets for use with PRIM-H. Department of Statistics, Harvard University.

Gasko, M. and Donoho, D. (1983) Hunting for quanta in some biochemical data. Graduate School of Business, Univ. of Chicago. Statistics Research report number 9.

Donoho, D.L., Larner, K. and Chambers, R.E. (1986) Robust estimation of automatic statics corrections. Technical report, Western Geophysical Co.

Donoho, D.L. and Liu, R.C.(1987) Minimax Estimation of Linear Functionals. Technical Report 105, Department of Statistics, University of California, Berkeley.

Donoho, D.L., and Liu, R.C. (1989) Hardest One-Dimensional Subfamilies. Technical Report 178, Department of Statistics, University of California, Berkeley.

Donoho, D.L., Johnstone, I.M., Stern, A.S., and Hoch, J.C. (1988) Understanding Maximum Entropy.

Donoho, D.L., and Stark, P.B. (1989) Recovery of a sparse signal from noisy data missing low frequencies. Technical Report 179, Department of Statistics, University of California, Berkeley.

Donoho, D.L. (1992) Interpolating Wavelet Transforms. Technical Report, Department of Statistics, Stanford University.

Buckheit, J., and Donoho, D. L. (1995) Wavelab Architecture. Technical Report 490, Department of Statistics, Stanford University, California.

Buckheit, J., Chen, S., Donoho, D., Johnstone, I., Scargle, J. (1995) About Wavelab. Technical Report 491, Department of Statistics, Stanford University, California.

Buckheit, J., Chen, S., Donoho, D., Johnstone, I., Scargle, J. (1995) Wavelab Reference Manual. Technical Report 492, Department of Statistics, Stanford University, California.

Donoho, D.L. (1997) Fast Ridgelet Transforms in Dimension 2. Technical Report, Department of Statistics, Stanford University.

### **Videotapes**

Donoho, D.L. and Thoma, H.M. "Kinematic Display of high-dimensional data." 15 mins. Color, Sound. June, 1981.

Donoho, D.L., Ramos, E.A. and Thoma, H.M. "Exploring multidimensional point clouds." 13 mins. B/W, Sound. June, 1982.

Donoho, D.L. and Thoma, H.M. "Projection Pursuit revisited." 35 mins. B/W, Sound. July, 1982.

Donoho, D.L., Ramos, E.A. and Thoma, H.M. "Data analysis with PRIM-H". 20 Mins. B/W, Sound. June, 1983.

### **Presentations**

"Estimation of time delay at poor S/N", 39th meeting European Assoc. Expl. Geophys., Hamburg, June, 1979.

"Robust estimation of residual statics corrections", 49th mtng Soc. Expl. Geophys., New Orleans, Nov., 1979.

"Minimum entropy deconvolution", 2nd Applied Time Series conference, Tulsa, March, 1980.

"Kinematic display of high-dimensional data", Classification Society annual meeting, Toronto, June, 1981.

"Evaluation of pulse compression methods", (invited) Workshop on Seismic Deconvolution, 51st meeting Soc. Expl. Geophys., Los Angeles, Oct., 1981.

"Kinematic display of multivariate data", 3rd National Computer Graphics Assoc., Anaheim, June, 1982.

"Breakdown properties of multivariate location estimators", IMS Annual Meeting, Cincinnati, August, 1982.

"Data analysis and PRIM-H", (invited) at Joint Statistical Meetings, Toronto, August, 1983.

“Statistical Languages 10 years from now”, (invited) IMS meeting on “Computers and Statistics”, State College, PA, October, 1983.

“Properties of Projection Pursuit Regression”, (invited) AMS summer conference on “New Methods in Multivariate Statistics”, Brunswick, Me., June, 1984.

“Computing-intensive deconvolution methods, and super-resolution” (invited) National Bureau of Standards, Gaithersburg, MD, May, 1985.

“Minimum Complexity Estimates”, (invited) AMS Summer conf. “Function Estimates”, Arcata, CA, July, 1985.

“What is Asymptotic Theory Really Good For?”, (invited) conf. on Foundations of Applied Statistics, Israel, Dec. 1985.

“Interactive Graphical Data Analysis”, (invited) 18th Symposium on the Interface of Statistics and Computer Science, Fort Collins, Colorado, March, 1986. Series of 6 2-hour lectures at Univ. de Paris, XI. (Orsay). May-June, 1986.

Series of six 2-hour lectures at Univ. de Paris, XI (Orsay). May-June 1986

“Historical Perspectives on Graphics”, Joint Statistical Meetings, Chicago, August 1986.

“Dynamic Graphics”, Opening Address, Statistical Society of Ottawa, March, 1987.

“Dynamic Graphics for Data Analysis”, Keynote Speech, Compstat '87, Melbourne, Australia, May 1987.

“Geometrizing Rates of Convergence”, at fifth European Young Statisticians meeting, Aarhus, August, 1987.

“Geometrizing Rates of Convergence”, plenary address, Las Cruces mtng Amer. Math. Soc., April, 1988.

“Hardest 1-Dimensional Subfamilies”, (invited) Fourth Prague Symposium on Asymptotic Statistics, Sept. 1988.

“Statistical Estimation and Optimal Recovery”, (invited) Symposium on Complexity of Approximately Solved Problems, Columbia Univ., April 1989.

“Quantitative Robustness, Signal Recovery and Asymptotic Decision Theory.” Invited lecture, Institute for Mathematics and its Applications, Symposium on Robustness, Diagnostics, and Graphics, July, 1989.

“Two controversies in Inverse Theory, and Their Resolution”, invited lecture, 49th meeting of International Statistical Institute, Paris, August, 1989.

“You can get something for nothing: Three surprises in Nonlinear Signal Recovery”, Plenary address, Symposium on the Interface between Computer Science and Statistics, May 1989.

“Function Estimates in the White Noise model”. Course of 10 1 1/2 Hour Lectures, Saint Flour, France, July 1990.

“Renormalization” and “Wavelet Smoothing” (invited) Lunteren Conference, Netherlands, November 1990.

“Wavelets + Decision Theory = Optimal Function Estimates.” (invited) Luminy Conf. on Wavelets, March, 1991.

“Maximum Entropy and the Nearly Black Object” (w/ discussion) Royal Statistical Society, London, April, 1991.

“Nonlinearity+ Sparsity” Symp. Complexity Approximately-Solved Problems. Schloss Dagstuhl, April, 1991.

“Surprising Nonlinear Phenomena in the Recovery of Signals, Images, Fields” (invited) IMS Special Topics Meeting, Philadelphia, June 1991.

“Superresolution via Sparsity Constraints” (invited) ICIAM, Washington, July 1991.

“Wavelets and Optimal Function estimates” (special invited paper) IMS Annual Meeting. Atlanta, Aug. 1991.

“Wavelet-Vaguelette Decomposition of Inverse Problems” (invited) Toulouse Conf. Wavelets & Applications, Jun 91.

“The Wavelet Triple Threat” (invited) NATO ASI Conf. Wavelets and Applications, Il Ciocco, Italy, Aug '92

“Wavelet Shrinkage: Asymptopia?” (with discussion) Royal Statistical Society, Chapel Hill, June 1994.

“Statistical Estimation and Harmonic Analysis”: International Congress of Mathematicians, Zürich, 1994.

“Adaptive Signal Representation: How much is Too much?” Keynote Address, IEEE Time Frequency/ Time-Scale Conference, October 1994

Hotelling Lectures, Chapel Hill, NC, Dec. 1994

“Wavelets, Signals, and Noise” DMV Seminar (10 lectures) Oberwolfach, Germany, March 1995.

“Tukey vs. Scheffé in the Wavelet Domain” Tukey Conference, Princeton, June, 1995.

“Superresolution and Curve Estimation”, 4 lectures, IAC Rome, May 1996.

Principal Lecturer, 10-th Finnish Summer School on Probability, Mikkola, June 1997.

Bernoulli Lecture, 4th World Congress Bernoulli Soc., Vienna, Aug. 1996.

Wald Memorial Lectures, Inst. Mathematical Statistics, Park City Utah, July 1997.

Plenary Lecture, “Independent Components of Images, and Computational Harmonic Analysis”. IEEE Automated Speech Recognition and Understanding, Santa Barbara. December 1997.

Plenary Lecture, “Edgelets, Wedgelets, and Ridgelets”. Approximation Theory IX, Nashville, Tenn. January 1998.

“The Dream of Ideal Representation” w/Ingrid Daubechies, MacArthur Fellows Reunion, March 1998.

Invited Lecture: “Counting Bits with Kolmogorov and Shannon”. European Meeting of Statisticians '98, Vilna, Lithuania.

Principal Lecturer, Trimestre “Images”, Centre Émile Borel, Institut Henri Poincaré, Paris, Fall 1998.

Plenary Lecture, Curves and Surfaces '99, Saint Malo, France.

Principal Lecture, Scale Space '99, Corfu, Greece.

Plenary Lecture, Wavelet Applications, SPIE Aerosense 2000, Orlando, Florida.

P.R. Krishnaiah Memorial Lecturer, Pennsylvania State University, May 2000.

Principal Lecturer, NSF-CBMS 10 lecture series. Univ. Missouri St. Louis 2000.

Principal Lecturer, Swedish National Mathematics Summer School 10 Lecture Series, Royal Institute of Technology, Stockholm, 2000.

Plenary Lecture, Independent Components Analysis 2000, Helsinki Finland.

Plenary Lecture, Multiple Comparisons Procedures 2000, Berlin Germany.

Plenary Lecture, Amer. Math. Soc. *Mathematical Challenges of the 21st Century*, Los Angeles CA.

Dean's Special Lecture, Ben Gurion University of the Negev, 2000.

Sackler Lectures, Tel-Aviv University, 2000.

Invited Lecture, Contemporary Data Analysis, Academy of Exact Sciences, Buenos Aires, Argentina, March 2001.

A.J. Duncan Lecture, Department of Mathematical Sciences, Johns Hopkins University, April 2001.

### **Ph.D. Qualifying Paper**

“Breakdown properties of multivariate location estimators.” Exhibits coordinate-free estimators of multivariate location which can withstand up to 50% contamination of the data before breaking down. These include affine- equivariant generalizations of trimmed means and W-estimates, and a new minimum-distance estimator. (70 pages, including figures. Accepted April, 1982).

### **Dissertation**

“DART – a tool for research in data analysis”. The author describes the design and implementation of a compact data analysis language. The uses of the language for constructing advanced systems for multivariate graphics are described. (418 pages. Accepted September, 1983).