

Daniel Kaplan

Curriculum Vitae

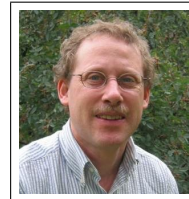
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Education

- 1989 **Ph.D.**, *Harvard University*, Cambridge, Massachusetts.
Biomedical Physics, Division of Applied Sciences
- 1986 **M.S.**, *Harvard University*, Cambridge, Massachusetts.
Biomedical Physics, Division of Applied Sciences
- 1982 **M.S.**, *Stanford University*, Stanford, California.
Engineering-Economics Systems
- 1981 **B.A.**, *Swarthmore College*, Swarthmore, Pennsylvania.
Physics with High Honors

Academic Employment

Full-Time Appointments

- 2005–present **DeWitt Wallace Professor of Mathematics & Computer Science**,
Macalester College.
- 2000–2005 **Associate Professor**, *Macalester College*.
Department of Mathematics & Computer Science
- 1996–2000 **Assistant Professor**, *Macalester College*.
Department of Mathematics & Computer Science
- 1994–1996 **Assistant Professor**, *McGill University*.
Department of Physiology
- 1991–1994 **Postdoctoral Fellow**, *McGill University*.
Centre for Nonlinear Dynamics in Physiology and Medicine, Department of Physiology

Part-Time or Visiting Appointments

- 2008 **Visiting Scholar**, *School of Biomedical Sciences, University of Queensland*, Brisbane, Australia.
Faculty of Biological and Chemical Sciences, January-July
- 2001 **Academic Visitor**, *Mathematical Institute, University of Oxford*, Oxford, England.
Oxford Centre for Industrial and Applied Mathematics, January-June

- 1996 **Enseignant Invité, Professeur Biologie**, *Université Paris 7, Denis Diderot*.
June & July
- 1989–1990 **Instructor**, *Massachusetts Institute of Technology*, Cambridge, MA.
Biomedical signal and image processing course in Electrical Engineering and Division of Health Sciences Technology
- 1985–1989 **Visiting Scholar**, *Massachusetts Institute of Technology*, Cambridge, MA.
Division of Health Sciences Technology

Macalester Administrative Positions

- 2007–present **Founding Coordinator**, *Applied Mathematics and Statistics Major*.
- 2008–present **Steering Committee member**, *Concentration in “Community and Global Health”*.
- 2004–present **Director**, *Keck Data Fluency Project*.
Developing and disseminating approaches for sophisticated of statistical data analysis and modeling across the curriculum
- 2004–present **Coordinator**, *Stat Chat*.
Monthly meetings of regional statistics educators to discuss techniques for teaching statistics
- 2008–2009 **Chairman**, *Statistics hiring committee*.
- 2005–2007 **Faculty Assessment Coordinator**.
Design and implementation campus-wide plan for assessing the general education program. Wrote the Macalester Learning Assessment instrument.
- 2006–2007 **Chairman**, *Applied Math hiring committee*.
- 2002–2004 **Chairman**, *Resource Planning Committee*.
General financial planning. Led revision of admissions/financial-aid policy.
- 2004–2005 **Chairman**, *Social Responsibility Committee*.
Evaluation and implementation of policies guiding college investments
- 2002–2005 **Associate Director**, *Quantitative Methods for Public Policy program*.
Development of curriculum leading to the adoption of a college-wide graduation requirement in “quantitative thinking.”
- 2002–2005 **Chairman**, *Faculty Professional Activities Committee*.
Evaluation and awarding of internal grants for faculty development
- 2000 **Chairman**, *Curriculum Committee*.
Campus-wide committee governing creation of new programs, revisions to the curriculum, allocations of faculty positions.
- 1999–present **Coordinator**, *Engineering 3/2 Joint Degree Program*.

Awards, Recognition, and Grants

Professional Awards

- Macalester College annual “Excellence in Teaching” award, April 2008. [link to citation](#)

- With Macalester teammate Stan Wagon, first-prize winner of the SIAM 100-digit challenge posed in January 2002. There were 19 other winning teams internationally, but ours was the only one from a liberal arts college.

Active Grants

- PI, *Achieving Data Fluency*, 2005-2009, W.M. Keck Foundation, \$349,491
- PI, *CCLI Phase II: Building a Community around Modeling, Statistics, Computation, and Calculus*, National Science Foundation (US), DUE 0920350, 2009-2012, \$424,185

Publications

Textbooks

1. Daniel T Kaplan. *Statistical Modeling: A Fresh Approach*. 2009. ISBN 978-1-448-64239-7.
2. Daniel T Kaplan and Leon Glass. *Understanding Nonlinear Dynamics*. Springer-Verlag, 1995.
3. Daniel T Kaplan. *Introduction to Scientific Computation and Programming*. Brooks-Cole, 2003. Internet link.
4. Daniel T Kaplan. *Resampling Statistics in MATLAB*. Resampling Stats, Inc., 1999. PDF link.

Refereed Articles

5. Daniel T Kaplan. Computing and introductory statistics. *Technology Innovations in Statistics Education*, 1(1):Article 5, 2007. repositories.cdlib.org/uclastats/cts/tise/iss1/art5.
6. Mathieu Jospin, Pere Caminal, Erik W. Jensen, Hector Litvan, Montserrat Vallverdú, Michel M.R.F. Struys, Hugo E.M. Vereecke, and Daniel T Kaplan. Detrended fluctuation analysis of eeg as a measure of depth of anesthesia. *IEEE Transactions on Biomedical Engineering*, 54(5):840–846, 2007.
7. N Burioka, M Miyata, G Cornélissen, F Halberg, T Takeshima, DT Kaplan, H Suyama, M Endo, Y Maegaki, T Nomura, Y Tomita, K Nakashima, and E Shimizu. Approximate entropy in the electroencephalogram during wake and sleep. *Clinical EEG and Neuroscience*, 36(1):21–24, 2005.
8. P Caminal, L Domingo, BF Giraldo, M Vallverdú, S Benito, G Vázquez, , and DT Kaplan. Variability analysis of the respiratory volume based on nonlinear prediction methods. *Medical and Biological Engineering and Computing*, 42:86–91, 2004.
9. Daniel T Kaplan. Teaching computation to undergraduate scientists. In *ACM Special Interest Group on Computer Science Education*. ACM SIGCSE, 2004.
10. MS Roulston, DT Kaplan, J Hardenberg, and LA Smith. Using medium-range weather forecasts to improve the value of wind energy production. *Renewable Energy*, 28:585–602, 2003.
11. DL Toweill, WD Kovarik, R Carr, DK Kaplan, S Lai, S Bratton, and B Goldstein. Linear and nonlinear analysis of heart rate variability during propofol anesthesia for short-duration procedures in children. *Pediatric Critical Care Medicine*, 4(3):308–314, 2003.
12. N Burioka, G Cornélissen, F Halberg, DT Kaplan, H Suyama, T Sako, and E. Shimizu. Approximate entropy of human respiratory movement during eye-closed wake and different sleep stages. *Chest*, 123:80–86, 2003.
13. D Barnaby, K Ferrick, DT Kaplan, S Shah, P. Bijur, and E Gallagher. Heart rate variability in emergency department patients with sepsis. *Academic Emergency Medicine*, 9(7):661–670, 2002.

14. N Burioka, G Cornélissen, F Halberg, and DT Kaplan. Relationship between correlation dimension and indices of linear analysis in both respiratory movement and electroencephalogram. *Clinical Neurophysiology*, 112(1147-1153), 2001.
15. CL Bremer and DT Kaplan. Markov chain monte carlo estimation of nonlinear dynamics from time series. *Physica D*, 160(116-126), 2001.
16. P Faure, DT Kaplan, and H Korn. Synaptic efficacy and the transmission of complex firing patterns between neurons. *Journal of Neurophysiology*, 84:3010–3025, 2000.
17. Daniel T Kaplan. Time series and the dynamics of demand pacing. *Technology in Biomedicine and Methods of Information in Medicine*, 39(2):114–117, 2000.
18. DJ Christini and DT Kaplan. Adaptive estimation and control method for unstable periodic dynamics in spike trains. *Physical Review E*, 61(5):5149–5153, 2000.
19. B Pilgram and DT Kaplan. Nonstationarity and $1/f$ noise characteristics in heart rate. *American Journal of Physiology 276, Regulatory, Integrative, and Comparative Physiology* 45(1):R1–R9, 1999.
20. B Pilgram and DT Kaplan. A comparison of estimators for $1/f$ noise. *Physica D*, 114(108-122), 1999.
21. D Hoyer, DT Kaplan M Palus, B Pompe, and H Seidel. New systems-analytical approaches to nonlinear coordination — applications in the cardiorespiratory system. *IEEE Engineering in Medicine and Biology*, 17(6):26–31, 1998.
22. D Hoyer, DT Kaplan F Schaaff, and M Eiselt. Determinism in bivariate cardiorespiratory phase space sets — how to detect nonlinear coordinations. *IEEE Engineering in Medicine and Biology*, 17(6):58–61, 1998.
23. M Richter, T Schreiber, and DT Kaplan. Fetal eeg extraction with nonlinear state-space projections. *IEEE Transactions on Biomedical Engineering*, 45(1):133–137, 1998.
24. WA Barnett, AR Gallant, MJ Hinich, JA Jungeilges, DT Kaplan, and MJ Jensen. A single-blind controlled competition among tests for nonlinearity and chaos. *Journal of Econometrics*, 82:157–192, 1998.
25. DT Kaplan, JR Clay, T Manning, L Glass, MR Guevara, and A Shrier. Subthreshold dynamics in periodically stimulated squid giant axons. *Physical Review Letters*, 76(21):4074–4077, 1996.
26. P So, SJ Schiff, E Ott, DT Kaplan, T Sauer, and C. Grebogi. Detecting unstable periodic orbits in chaotic experimental data. *Physical Review Letters*, 76(25):4705–4708, 1996.
27. T Schreiber and DT Kaplan. Nonlinear noise reduction for electrocardiograms. *Chaos*, 6(87-92), 1996.
28. T Schreiber and DT Kaplan. Signal separation by nonlinear projections: The fetal eeg. *Physical Review E*, 53(5):R4326–4329, 1996.
29. S Little, S Ellner, M Pascual, M Neubert, DT Kaplan, T Sauer, H Caswell, and A Solow. Analyzing samples from spatio-temporal systems: Examples from marine ecological models. *Physica D*, 96(321-333), 1995.
30. FX Witkowski, KM Kavanagh, PA Penkoske, R Plonsey, ML Spano, WL Ditto, and DT Kaplan. Evidence for determinism in ventricular fibrillation. *Physical Review Letters*, 6:1230–1233, 1995.
31. WA Barnett, AR Gallant, MJ Hinich, JA Jungeilges, DT Kaplan, and MJ Jensen. Robustness of nonlinearity and chaos tests to measurement error, inference method, and sample size. *Journal of Economic Behavior and Organization*, 27(2):301–320, 1995.
32. Daniel T Kaplan. Exceptional events as evidence for determinism. *Physica D*, 73:38–48, 1994.
33. Daniel T Kaplan. The analysis of variability. *Journal of Cardiovascular Electrophysiology*, 5(16-19), 1994.

34. Daniel T Kaplan. Evaluating deterministic structure in maps deduced from discrete-time measurements. *International Journal of Bifurcations and Chaos*, 3(3):617–623, 1993.
35. Daniel T Kaplan and Leon Glass. Coarse-grained embeddings of time series: Random walks, gaussian random processes, and deterministic chaos. *Physica D*, 64:431–454, 1993.
36. Daniel T Kaplan and Leon Glass. Direct test for determinism in a time series. *Physical Review Letters*, 68(4):427–430, 1992. reprinted in E Ott, T Sauer, JA Yorke (1993) *Coping with Chaos: Analysis of Chaotic Data and the Exploitation of Chaotic Systems*, John Wiley & Sons.
37. Daniel T Kaplan. Geometrical techniques for analyzing ecg dynamics. *Journal of Electrocardiography*, 24(S):77–81, 1992.
38. DT Kaplan and AL Goldberger. Chaos in cardiology. *Journal of Cardiovascular Electrophysiology*, 2:342–354, 1991.
39. DT Kaplan, MI Furman, SM Pincus, SM Ryan, LA Lipsitz, and AL Goldberger. Aging and the complexity of cardiovascular dynamics. *Biophysical Journal*, 59:945–949, 1991.
40. DS Rosenbaum, DT Kaplan, A Kanai, L Jackson, H Garan, RJ Cohen, and G Salama. Repolarization inhomogeneities in ventricular myocardium change dynamically with abrupt cycle length shortening. *Circulation*, 84:1333–1345, 1991.
41. MI Furman, DT Kaplan, SM Ryan, LA Lipsitz, and AL Goldberger. A nonlinear parameter measures loss of complexity in heart-rate time-series data with aging. *Clinical Research*, 38(2):A491–A491, 1990.
42. DT Kaplan and RJ Cohen. Is fibrillation chaos? *Circulation Research*, 67:886–892, 1990.
43. DS Rosenbaum, DT Kaplan, DS Wilber, JP Saul, and J Ruskin. The precision of electrophysiological mapping: Localizing depolarization wavefronts from digitized extracellular electrograms and the role of sampling rate. *Electrophysiology*, 1:2–14, 1990.
44. DT Kaplan, JM Smith, BEH Saxberg, and RJ Cohen. Nonlinear dynamics in cardiac conduction. *Mathematical Biosciences*, 90(1):19–48, 1988.
45. Daniel T Kaplan. Lasers for missile defense. *The Bulletin of the Atomic Scientists*, May:5–8, 1983.
46. R F Minchin, A Lewis, and D T Kaplan. Meat consumption increases the risk of prostate cancer in an australian population. *submitted to Journal of Nutrition*, 2008.

Edited Book

47. CD Cutler and DT Kaplan, editors. *Nonlinear Dynamics and Time Series: Building a Bridge between the Natural and Statistical Sciences*. American Mathematical Society, 1996. ISBN 0-8218-0521-5.

Book Reviews

48. Daniel T Kaplan. Google's pagerank and beyond: The science of search engine rankings. *American Mathematical Monthly*, 115(8):765–768, 2008. PDF link.
49. Daniel T Kaplan. Review of "environmental mathematics in the classroom". *UMAP Journal*, 25(1):83–85, 2004. PDF link.

Non-Refereed Essays

50. Mathieu Jospin, Pere Caminal, Erik W. Jensen, Montserrat Vallverdú, Michel M.R.F. Struys, Hugo E.M. Vereecke, and Daniel T Kaplan. Depth of anesthesia index using cumulative power spectrum. In *Proceedings 29th Annual International Conference*. IEEE Engineering in Medicine and Biology Society, 2007. PDF link.

51. Daniel T Kaplan. Some mathematics for citizens: Gaining quantitative literacy through public policy debate. In *Proceedings of the NSF-AAAS Invention and Impact Conference*. NSF/AAAS, April 2004.
52. L Domingo, P Caminal, M Vallverdú, M Barbanoj, J Riba, and DT Kaplan. Análisis del efecto de fármacos sobre el eeg mediante técnicas de predicción no lineal. In *Jornades sobre la Situació Actual i Perspectives de L'enginyeria Biomèdica a Catalunya*, Barcelona, Spain, June 8-10 2004.
53. MS Roulston, DT Kaplan, J Hardenberg, and LA Smith. Value of the ecmwf ensemble prediction system for forecasting wind energy production. In *Proc. of the European Wind Energy Conference*, pages 699–702, Copenhagen, Denmark, 2-6 July 2001.
54. Daniel T Kaplan. Finding and characterizing unstable fixed points by controlling system dynamics. In *Chaos in Brain?*, Bonn, Germany, 1999.
55. Daniel T Kaplan. *Frontiers of Blood Pressure and Heart Rate Analysis*, chapter Nonlinearity and nonstationarity: the use of surrogate data in interpreting fluctuations. IOS Press, 1997.
56. Daniel T Kaplan. Nonlinear mechanisms of cardiovascular control: we know they're there, but can we see them? In *IEEE EMBS Proceedings*, Chicago, 1997.
57. WA Barnett, AR Gallant, MJ Hinich, JA Jungeilges, DT Kaplan, and MJ Jensen. An experimental design to compare tests of nonlinearity and chaos. In *Nonlinear Dynamics and Economics: Proceedings of the 10th International Symposium in Economic Theory and Econometrics*, pages 163–190. Cambridge University Press, 1996.
58. FX Witkowski, PA Penkoske, R Plonsey, DT Kaplan, ML Spano, WL Ditto, and KM Kavanagh. Development of a nonlinearly deterministic signal generator for real time chaos control testing. In *Proceedings 17th Annual Meeting*, Montreal, Quebec, Canada, 1995. IEEE EMBS.
59. CM Radu and DT Kaplan. Robust model-based estimators for cardiac nerve activity. In *Proceedings 17th Annual Meeting*, Montreal, Quebec, Canada, 1995. IEEE EMBS.
60. L Galiana, G Tannenbaum, and DT Kaplan. Characterizing pulsatile growth hormone levels. In *Proceedings 17th Annual Meeting*, Montreal, Quebec, Canada, 1995. IEEE EMBS.
61. B Goldstein, K Sonnenthal, and DT Kaplan. Measures of complexity and predictability during acute brain injury. In *Pediatric Critical Care Colloquium*, 9 Oct. 1995.
62. Daniel T Kaplan. A model-independent technique for determining the embedding dimension. In LM Pecora, editor, *Chaos in Communications*, pages 236–240. SPIE, 1993.
63. Leon Glass and Daniel T Kaplan. Time series analysis of complex dynamics in physiology and medicine. In AS Weigend and NA Gershenfeld, editors, *Predicting the Future and Understanding the Past*, volume Volume XVII, pages 115–128. Addison Wesley, Santa Fe Institute Studies in the Sciences of Complexity, 1993. reprinted in *Medical Progress through Technology* (1993) 19, pp. 115-128.
64. Daniel T Kaplan. Time series analysis of complex dynamics in physiology and medicine. In AS Weigend and NA Gershenfeld, editors, *A Statistic for Detecting Deterministic Dynamics*, volume Volume XVII. Addison Wesley, Santa Fe Institute Studies in the Sciences of Complexity, 1993.
65. MS Courtemanche, M Talajic, and DT Kaplan. Multi-parameter quantification of 24-hour heart rate variability. In *Computers in Cardiology*, pages 299–302. IEEE Computer Society Press, 1992.
66. L Glass, DT Kaplan, and JE Lewis. Tests for deterministic dynamics in real and model neural networks. In BH Jansen and ME Brandt, editors, *Proceedings of the Second Annual Conference on EEG and Nonlinear Dynamics*, pages 233–249. World Scientific Publishers, 1993.
67. DT Kaplan. Chaotic statistics of biomedical time series. In *Proceedings IEEE 17th Annual Northeast Bioengineering Conference*, pages 33–34, Hartford, CT, 1991. IEEE.

68. JM Smith, DT Kaplan, and RJ Cohen. The physics of re-entry and fibrillation. In J Jalife and D Zipes, editors, *Cardiac Electrophysiology — Cell to Bedside*, pages 215–233. WB Saunders Co., 1990.
69. Daniel T Kaplan. Simultaneous qrs detection and feature extraction using simple matched filter basis functions. In *Computers in Cardiology*, pages 503–506. IEEE Computer Society Press, 1990.
70. Daniel T Kaplan, MI Furman, and SM Pincus. Techniques for analyzing complexity in heart rate and beat-to-beat blood pressure signals. In *Computers in Cardiology*, pages 243–246. IEEE Computer Society Press, 1990.
71. Daniel T Kaplan. Nonlinear techniques for characterizing heart rate and blood pressure variability. In DC Mikulecky and AM Clarke, editors, *Biomedical Engineering: Opening New Doors*, pages 15–22. NYU Press, 1990.
72. Daniel T Kaplan and Richard J Cohen. Fibrillation vs. random noise: A comparison using dimensionality calculations. In *Proceedings, Engineering in Medicine and Biology Society*, volume 11, pages 92–93. IEEE, 1989.
73. G Salama, DS Rosenbaum, A Kanai, RJ Cohen, and DT Kaplan. Data analysis techniques for measuring spatial inhomogeneity in repolarization using optical transmembrane potentials. In *Proceedings, Engineering in Medicine and Biology Society*, volume 11, pages 222–223. IEEE, 1989.
74. Daniel T Kaplan and Richard J Cohen. Searching for chaos in fibrillation. In J Jalife, editor, *Mathematical Approaches to Cardiac Arrhythmias*, volume 591, pages 367–374. Annals of the New York Academy of Sciences, 1989.
75. JP Saul, DT Kaplan, and RI Kitney. Nonlinear interactions between respiration and heart rate: Classical physiology or entrained nonlinear oscillators? In *Computers in Cardiology*, pages 299–302. IEEE Computer Society Press, 1988.
76. DT Kaplan and RJ Cohen. Refractory period dynamics and cardiac stability: Results from a computer model. In *Computers in Cardiology*, pages 403–406. IEEE Computer Society Press, 1988.
77. DT Kaplan, JM Smith, DS Rosenbaum, and RJ Cohen. On the precision of automated activation time estimation. In *Computers in Cardiology*, pages 101–104. IEEE Computer Society Press, 1988.
78. DT Kaplan and RJ Cohen. Application of nonlinear dynamics to the characterization of cardiac electrical instability. In *Computers in Cardiology*, pages 439–442. IEEE Computer Society Press, 1986.

Other Publications

79. Daniel T Kaplan, Wesley Hart, and Ben Verst. Acroscore: A system for easy collection of survey and homework answers. Technical report, Macalester College, 2008.
80. Resource Planning Committee DT Kaplan (chair). Tuition revenue at macalester. Technical report, Macalester College, 2004.
81. Linh To, Getiro Onsongo, and Daniel T Kaplan. Solutions to the exercises in introduction to scientific computation and programming. Technical report, Macalester College, 2004.
82. MR Risk, AM Cohen, and DT Kaplan. Methods and apparatus for providing an indicator of autonomic nervous system function. US Patent 6,416,473, 2002.
83. KL Ripley and DT Kaplan. Methods and apparatus for ecg signal analysis and cardiac arrhythmia detection. US Patent 5,271,411, 1993.
84. DT Kaplan and RJ Cohen. Methods and apparatus for quantifying beat-to-beat variability in physiologic waveforms. US Patent 4,732,157, 1988.