

December, 2003

DAVID O. SIEGMUND
CURRICULUM VITAE

Born: November 15, 1941
Citizenship: USA
Marital Status: Married, 3 children

Education

B.A., Southern Methodist University, 1963
Ph.D., Columbia University, 1966

Experience

Part-time Instructor, Stevens Institute, 1965
Teaching Assistant, Purdue University, 1965-66
Assistant Professor, Columbia University, 1966-67
Assistant Professor, Stanford University, 1967-69
Associate Professor, Columbia University, 1969-71
Professor, Columbia University, 1971-76
Visiting Professor, Hebrew University, 1971-72
Visiting Professor, University of Zurich, 1974-75
Professor, Stanford University, 1976- ; John D. and Sigrid Banks Professor, 2002-
Visiting Professor, University of Heidelberg, 1980-81
Chairman, Department of Statistics, Stanford University, 1982-85, 1997-2001
Visiting Professor, Hebrew University and University of Heidelberg, 1985-86
Christensen Fellow, University of Oxford, Spring 1993
Associate Dean, School of Humanities and Sciences, Stanford University, 1993-1996
Visiting Scholar, University of Cambridge, 1998-99

Honors

Woodrow Wilson Fellow
Danforth Fellow
NSF Postdoctoral Fellow, 1971-72
Guggenheim Fellow, 1974-75
Dean's Award for Teaching, 1978
Humboldt Prize, 1980
Principle Lecturer, Regional Conference in Sequential Analysis at University of Kentucky, 1981
Wald Lecturer, Institute of Mathematical Statistics, Tahoe, California, 1984
Einstein and Fulbright Fellowships, 1985-86, Hebrew University
Taiwan National Science Council Lecturer, 1989

American Academy of Arts and Sciences, 1994
Hotelling Lecturer, University of North Carolina, 1995
Wilks Medal of the American Statistical Association, 1998
President, Bernoulli Society, 1999-2001
National Academy of Sciences of the USA, 2002
Bahadur Lecturer, University of Chicago, 2003

Membership

Phi Beta Kappa
Sigma Xi
Institute of Mathematical Statistics (Fellow)
American Society of Human Genetics
International Statistical Institute/Bernoulli Society

Service

Associate Editor, *Annals of Statistics*, 1975-82, 1986-1993
Associate Editor, *Annals of Probability*, 1976-81, 1991-1993
Scientific Advisory Board, Mathematical Sciences Research Institute, 1981-83
Visiting Committee, Rutgers University
Visiting Committee, University of California, San Diego
Visiting Committee, Institute for Mathematics and Applications, 1985
External Examiner, University of Singapore, 1985-89; 1997-99
President, Institute of Mathematical Statistics, 1990-91
Scientific Program Committee, Mathematical Sciences Research Institute, 1991-92
Committee for *Pilot Assessment of the Mathematical Sciences*, 1991
Advisory Committee for *What's Happening in Mathematics*, 1992
Organizer, AMS-IMS Summer Research Conference, Mount Holyoke, 1992
CIES Advisory Committee on Statistics, 1993
Visiting Committee, University of Chicago, 1993
NRC Committee on DNA Forensic Science: An Update, 1994-96
President, Bernoulli Society, 1999-2001
External Examiner, National Institute of Education, Singapore, 1999-2002
Associate Editor, *Bernoulli*, 2000-
Advisory Committee, Mathematics and Physical Sciences Directorate, National Science Foundation, 2000-2003
Scientific Advisory Board, Institute of Mathematical Sciences, National University of Singapore, 2001-

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Articles

1. "Some problems in the theory of optimal stopping rules," *Ann. Math. Statist.* **38** (1967), 1627–1640.
2. "Some one-sided stopping rules," *Ann. Math. Statist.* **38** (1967), 1641–1646.
3. "On a stopping rule and the central limit theorem," (with R. F. Gundy), *Ann. Math. Statist.* **38** (1967), 1915–1917.
4. "Existence of optimal stopping rules for rewards related to S_n/n ," (with G. Simons and P. Feder), *Ann. Math. Statist.* **39** (1968), 1228–1235.
5. "Iterated logarithm inequalities and related statistical procedures," (with H. Robbins), in *Lectures in Applied Mathematics*, Vol. 12, Mathematics of the Decision Sciences Part 2, Amer. Math. Soc. (1968), 267–279.
6. "On the asymptotic normality of one-sided stopping rules," *Ann. Math. Statist.* **39** (1968), 1493–1497.
7. "The limiting distribution of the last time $s_n \geq n\epsilon$," (with H. Robbins and J. Wendel), *Proc. Nat. Acad. Sci.* **61** (1968), 1228–1230.
8. "On the moments of the maximum of normed partial sum," *Ann. Math. Statist.* **40** (1969), 527–531.
9. "Some first passage problems for $S_n/n^{1/2}$," (with R. Olshen), *Ann. Math. Statist.* **40** (1969), 648–652.
10. "The variance of one-sided stopping rules," *Ann. Math. Statist.* **40** (1969), 1074–1077.
11. "Limiting distributions related to the law of the iterated logarithm," (with H. Robbins), *Proc. Nat. Acad. Sci.* **62** (1968), 11–13.
12. "Confidence sequences and interminable tests," (with H. Robbins), *Bull. Int. Statist. Inst.* **43** (1969), 379–387.
13. "Boundary crossing probabilities for the Wiener process and sample sums," (with H. Robbins), *Ann. Math. Statist.* **41** (1970), 1410–1429.
14. "On the maximum likelihood estimate of cell probabilities," (with R. Olshen), *Zeit. f. Wahr. und Verw. Geb.* **19** (1971), 52–56.
15. "A convergence theorem for non-negative almost super-martingales and some applications," (with H. Robbins), in *Optimizing Methods in Statistics*, Academic Press, New York (1971), 233–257.
16. "A class of stopping rules for testing parametric hypotheses," (with H. Robbins), *Proc. Sixth Berkeley Symp. Math. Statist. and Prob.*, Univ. of California Press, Berkeley and Los Angeles, Vol. IV (1972), 37–41.

17. "On the law of the iterated logarithm for maxima and minima," (with H. Robbins), *Proc. Sixth Berkeley Symp. Math. Statist. and Prob.*, Univ. of California Press, Berkeley and Los Angeles, Vol. III (1972), 51–70.
18. "Statistical tests of power one and the integral representation of solutions of certain partial differential equations," (with H. Robbins), *Bulletin of the Institute of Mathematics Academica Sinica*, **1** (1973), 93–120.
19. "Sequential estimation of p in Bernoulli trials," (with H. Robbins), in *Studies in Probability and Statistics*, Jerusalem Academic Press (1974), 103–107.
20. "The expected sample size of some tests of power one," (with H. Robbins), *Ann. Statist.* **2** (1974), 415–436.
21. "On sequential tests involving two populations," (with H. Robbins), *Jour. Amer. Statist. Assoc.* **69** (1974), 132–139.
22. "Large deviation probabilities in the strong law of large numbers," *Zeit. Wahr. und Verw. Geb.* **31** (1975), 107–113.
23. "Approximations to the expected sample size of certain sequential tests," (with M. Pollak), *Ann. Statist.* **3** (1975), 1267–1282.
24. "Importance sampling in Monte Carlo studies of sequential tests," *Ann. Statist.* **4** (1976), 673–684.
25. "The time until ruin in collective risk theory," *Mitteilungen der Vereinigung Schweizerischer Vericherungsmathematiker*, **75** (1975), 157–166.
26. "Error probabilities and average sample number of the sequential probability ratio test," *Jour. Roy. Statist. Soc. B*, **37** (1975), 394–401.
27. "The equivalence of absorbing and reflecting barrier problems for stochastically monotone Markov processes," *Ann. Prob.* **4** (1976), 914–924.
28. "Sequential decision about a normal mean," (with T. L. Lai and H. Robbins), *Statistical Decision Theory and Related Topics* (1977), 213–222.
29. "A non-linear renewal theory with applications to sequential analysis I," (with T. L. Lai), *Ann. Statist.* **5** (1977), 946–954.
30. "Repeated significance tests for a normal mean," *Biometrika* **64** (1977), 177–190.
31. "Estimation following sequential tests," *Biometrika* **65** (1978), 341–349.
32. "A non-linear renewal theory with applications to sequential analysis II," (with T. L. Lai), *Ann. Statist.* **7** (1979), 60–76.
33. "Confidence intervals related to sequential tests for the exponential distribution," *Naval Res. Logistics Quarterly* **26** (1979), 57–67.
34. "Corrected diffusion approximations in certain random walk problems," *Adv. Appl. Prob.* **11** (1979), 701–719.

35. "A sequential clinical trial for testing $p_1 = p_2$," (with P. Gregory), *Ann. Statist.* **8** (1980), 1219–1228.
36. "Sequential χ^2 and F tests and the related confidence intervals," *Biometrika* **67** (1980), 389–402.
37. "Sequential medical trials," (with T. L. Lai, B. Levin, and H. Robbins), *Proc. Nat. Acad. Sci.* **77** (1980), 3135–3138.
38. "A sequential confidence interval for the odds ratio," *Probability and Mathematical Statistics* **2** (1982), 149–156.
39. "Brownian approximations to first passage probabilities," (with Y.-S. Yuh), *Zeit. Wahrschein. und Verw. Geb.* **59** (1982), 239–248.
40. "Maximally selected chi-squares," (with R. G. Miller, Jr.), *Biometrics* **38** (1982), 1011–1016.
41. "Large deviations for boundary crossing probabilities," *Ann. Prob.* **10** (1982), 581–588.
42. "Continuous intravenous vasopressin in active upper gastrointestinal bleeding: A placebo-controlled trial," (with M. Fogel, C. M. Knauer, L. Andres, A. Mahal, D. Stein, M. J. Kemeny, M. Rinki, J. Walker, and P. Gregory), *Annals of Internal Medicine* **96** (1982), 565–569.
43. "Fixed accuracy estimation of an autoregressive parameter," (with T. L. Lai), *Ann. Statist.* **11** (1983), 478–485.
44. "Sequential analysis of the proportional hazards model," (with T. Sellke), *Biometrika* **70** (1983), 315–326.
45. "Allocation rules for sequential clinical trials," in *Mathematical Learning Models – Theory and Algorithms*, Herkenrath, Kalin, and Vogel, eds., Springer, Heidelberg-Berlin-New York (1983), 203–212.
46. "Sequential design of comparative clinical trials," (with T. L. Lai and H. Robbins), in *Recent Advances in Statistics*, Academic Press, New York (1983), 51–68.
47. "Convergence of quasi-stationary to stationary distributions for stochastically monotone Markov processes," (with M. Pollak), *J. Appl. Probab.* **23** (1986), 215–220.
48. "A diffusion process and its application to detecting a change in the drift of Brownian motion," (with M. Pollak), *Biometrika* **72** (1985), 267–280.
49. "Optimal stopping rules," in *Encyclopedia of Statistical Sciences*, Vol. 6 (1985), S. Kotz, N. L. Johnson, and C. Read, eds., John Wiley and Sons, New York.
50. "Corrected diffusion approximations and their applications," *Proceedings of the Berkeley Conference in Honor of Jerzy Neyman and Jack Kiefer* (1985), L. LeCam and R. Olshen, eds., Wadsworth, Belmont, 599–618.
51. "Boundary crossing probabilities and statistical applications," *Ann. Statist.* **14** (1986), 361–404.
52. "The contributions of Herbert Robbins to statistics and probability: a review on the occasion of his 70th birthday," (with T. L. Lai), *Statist. Sci.* **1** (1986), 276–284.

53. "Large deviations for the maxima of some random fields," (with M. Hogan), *Adv. Appl. Math.* **7** (1986), 2-22.
54. "Conditional boundary crossing probabilities, with applications to change-point problems," (with B. James and K. L. James), *Ann. Probab.* **16** (1988), 825-839.
55. "Tests for a change-point," (with B. James and K. L. James), *Biometrika* **74** (1987), 71-84.
56. "The reflection principle and hearing the shape of a drum," *Mathematical Medley: Singapore Mathematical Society* **15** (1987) 60-66.
57. "Approximate tail probabilities for the maxima of some random fields," *Ann. Probab.* **16** (1988), 487-501.
58. "Confidence sets in change-point problems," *Internat. Statist. Rev.* **56** (1988), 31-48.
59. "Approximate exit probabilities for a Brownian Bridge on a short time interval, and applications," (with H. R. Lerche), *Adv. Appl. Probab.* **21** (1989), 1-19.
60. "On Hotelling's formula for the volume of tubes and Naiman's inequality," (with I. M. Johnstone), *Ann. Statist.* **17** (1989), 184-194.
61. "On Hotelling's approach to testing for a nonlinear parameter in regression," (with M. Knowles), *Internat. Statist. Rev.* **57** (1989), 205-220.
62. "The likelihood ratio test for a change-point in simple linear regression," (with H. J. Kim), *Biometrika* **76** (1989), 409-423.
63. "Probability theory," *Encyclopaedia Britannica* 15th Ed., Chicago (1991), Vol. 26, 135-148.
64. Sequential detection of a change in a normal mean when the initial value is unknown (with M. Pollak), *Ann. Statist.* **19** (1991), 394-416.
65. Tail approximations for maxima of random fields, *Probability Theory: Proceedings of the 1989 Singapore Probability Conference*, Edited by L.H.Y. Chen, K.P. Choi, K. Hu, and J.H. Lou (1992), 147-158.
66. Confidence regions in semilinear regression (with M. Knowles and Heping Zhang), *Biometrika* **79** (1991), 15-31.
67. Confidence regions in broken line regression (with Heping Zhang), *Change-point Problems: Proceedings of the 1992 Conference at Mount Holyoke*, Edited by E. Carlstein, H.-G. Müller and D. Siegmund, Institute of Mathematical Statistics, Hayward, California (1994), 292-316.
68. Asymptotic approximations for likelihood ratio tests and confidence regions for a change-point in the mean of a multivariate normal distribution (with B. James and K.L. James), *Statistica Sinica* **2** (1992) 69-90.
69. A sequential clinical trial for comparing three treatments, *Ann. of Statist.* **21** (1993) 464-483.
70. The expected number of local maxima of a random field and the volume of tubes (with Heping Zhang), *Ann. Statist.* **21** (1993) 1948-1966.
71. Using the generalized likelihood ratio statistic for sequential detection of a change-point (with E.S. Venkatraman), *Ann. Statist.* (1995) **23** 255-271.

72. Gaussian models for genetic linkage analysis using complete high resolution maps of identity by descent (with E. Feingold and P.O. Brown), *Am. J. Hum. Genet.* (1993) **53** 234-251.
73. Testing for a signal with unknown location and scale in a stationary Gaussian random field (with K. Worsley), *Ann. Statist.* (1995) **23** 608-639.
74. Statistical methods for linkage analysis of complex traits from high resolution maps of identity by descent (with J. Dupuis and P.O. Brown), *Genetics* (1995) **140** 843-856.
75. The approximate distribution of the maximum of a smoothed Poisson random field (with Daniel Rabinowitz) *Statistical Sinica* (1997) **7** 167-180.
76. Strategies for mapping heterogeneous recessive traits by allele sharing methods (with Eleanor Feingold) *Am. J. Hum. Genet.* (1997) **60** 965-978.
77. Combining information within and between pedigrees for mapping complex traits (with Jun Teng) *Am. J. Hum. Genet.* (1997) **60** 979-992.
78. Statistical methods for mapping quantitative trait loci from a dense set of markers (with José Dupuis) *Genetics*, (1999) **151** 373-386.
79. Multipoint linkage analysis using affected relative pairs and partially informative markers (with discussion) (with Jun Teng) *Biometrics* (1998) **54** 379-411.
80. Searching for signals against a noisy background *Bull. Int. Statist. Inst.* (1997).
81. The maximum of a function of a markov chain and application to linkage analysis (with I-Ping Tu), *Advances in Applied Probability* (1999) **31**, 510-531.
82. Tail probabilities for the null distribution of scanning statistics (with B. Yakir), *Bernoulli* (2000) **6**, 191-213.
83. Boundary crossing probabilities in linkage analysis (with J. Dupuis). *Game Theory, Optimal Stopping, Probability and Statistics*, Edited by F. Thomas Bruss and L. Le Cam, Institute of Mathematical Statistics, Hayward, California (2000), 141-152.
84. Genetic linkage analysis: an irregular statistical problem *Documenta Mathematica* (1998) Extra Volume ICM **3**, 291-300.
85. Approximate p-values for local sequence alignments (with B. Yakir) (2000), *Ann. Statist.* **28**, 657-680.
86. Note on a stochastic recursion (2001), in *Festschrift for Willem van Zwet*, Institute of Mathematical Statistics, Hayward, California.
87. Mapping quantitative trait loci in oligogenic models (2001), (with H. K. Tang), *Biostatistics* **2**, 147-162.
88. Approximate p-values for local sequence alignments: numerical results (with John Storey) (2001). *J. Computational Biology* **8**, 549-556.
89. Is peak height sufficient? (2001) *Genetic Epidemiology* **20**, 403-408.
90. Rotation space random fields with an application to fMRI data (2003) (with K. Shafie, S. Sigal and K. Worsley), to appear in *Ann. Statist.*

91. Frequentist estimation of coalescence times from nucleotide sequence data using a tree-based partition (with H. Tang, P. Shen, P. J. Oefner, and M. Feldman) (2001), *Genetics* **161**, 447-459.
92. Mapping multiple genes for quantitative and complex traits (with H. K. Tang) (2002), *Genetic Epidemiology* **22**, 313-327.
93. Genome wide significance (2002), in *Biostatistical Genetics and Genetic Epidemiology*, R. Elston, J. Olson, L. Palmer, eds., John Wiley and Sons, Ltd., Chichester.
94. Herbert Robbins and sequential analysis (2003), *Ann. Statist.*, **31**, 349-365.
95. Upward bias in estimation of genetic effects, *Am. J. Hum. Genet.* **71**, 1183-1188.
96. Statistical analysis of direct identity-by-descent mapping (with Benjamin Yakir) (2003), *Ann. Hum. Genet.*, **67** 464-470.
97. A unified estimation approach to false discovery rates (with John D. Storey and Jonathan E. Taylor) (2003), to appear in *Jour. Roy. Statist. Soc. B*.
98. Correction Note: Approximate p-values for local sequence alignments, (with B. Yakir) (2003) *Ann. Statist.* **31**, 1027-1031.
99. The admixture model in linkage analysis, (with Jie Peng) (2004), *J. Statist. Planning and Inference*, to appear.
100. Model selection in irregular problems: applications to mapping QTLs (2003), submitted for publication.
101. Mapping quantitative traits with ascertained sibships (with Jie Peng) (2003), in preparation.
102. Significance level in interval mapping (with B. Yakir) (2003), in *Development of modern statistics and related topics in celebration of Yaoting Zhang's 70th birthday*, edited by Heping Zhang and Jian Huang, pp. 10-19.
103. Gene expression patterns and gene expression copy number changes in dermatofibrosarcoma protuberans (with S. Linn, R. West, J. Pollack, S. Zhu, T. Hernández- Boussard, T. Nielsen, B. Rubin, R. Patel, J. Goldblum, D. Botstein, P. O. Brown, C. B. Gilks, M. van de Rijn) (2003), *Am. J. Pathology*, in press.
104. On the power for linkage detection of using tests based on scan statistics (with S. Hernández) (2003), submitted for publication.
105. Role of localization in signaling processes in large cells (with N. Batada and L. Shepp) (2003), submitted for publication.

Reviews

1. Review of William Feller's *An Introduction to Probability Theory and Its Applications*, Volume 2, *SIAM Review*.
2. Review of Eugene Lukac's *Stochastic Convergence*, *American Scientist*, Volume 58, 267.
3. Review of M. DeGroot's *Optimal Statistical Decisions*, *Jour. Amer. Statist. Assoc.* **67**, 956.
4. Review of A. N. Shirayev's *Optimal Stopping Rules*, *Bull. Amer. Math. Soc.* **1**, 570–573.
5. Review of A. Gut's *Stopped Random Walks*, *SIAM Rev.*
6. Review of D. Aldous' *Probability Approximations via the Poisson Clumping Heuristic*, *SIAM Rev.*

Books

1. *Great Expectations: The Theory of Optimal Stopping* (with Y. S. Chow and H. Robbins), Houghton Mifflin, Boston (1971).
2. *Sequential Analysis: Tests and Confidence Intervals*, Springer, Heidelberg-Berlin-New York (1985).

Books Edited

1. *Recent Advances in Statistics: Papers in Honor of Herman Chernoff on His Sixtieth Birthday* (with M. H. Rizvi and J. Rustagi), Academic Press, New York (1985).
2. *Herbert Robbins: Selected Papers* (with T. L. Lai), Springer-Verlag, New York-Heidelberg-Berlin (1985).
3. *Change-point Problems* (with H.-G. Müller and E. Carlstein), Institute of Mathematical Statistics, Hayward, CA (1994).

PH.D. STUDENTS

1. Arthur Nadas (1967). On the asymptotic theory of estimating the mean by sequential confidence intervals of prescribed accuracy.
2. R. Stanley (1970). Boundary crossing probabilities for the Kolmogorov-Smirnov statistics.

3. Perry Gluckman (1970). Applications of diffusion approximations to the collective theory of risk.
4. T. L. Lai (1971). Confidence sequences and martingales.
5. Naomi Robbins (1971). Some characteristics of Page's procedure for detecting changes in a location parameter.
6. Judah Frankel (1972). On the law of the iterated logarithm for order statistics.
7. Chiung-siung Kao (1972). On the time and the excess of linear boundary crossings of the sample sums.
8. Moshe Pollak (1973). Asymptotic problems related to boundary crossings of one-dimensional shifted Brownian motion. (The Hebrew University).
9. Hsiu-huang Peter Cheng (1976). Two problems in sequential analysis.
10. Neng-rong Lee (1977). Sequential tests for finite populations.
11. Hajime Takahashi (1978). On the truncated test of power one and the nonlinear renewal theorem.
12. S. Lalley (1980). Repeated likelihood ratio tests for curved exponential families.
13. Yi-shyh Yu (1980). Corrected diffusion approximations for Brownian motion approximations.
14. Thomas Sellke (1982). Large sample theory for sequential analysis of the proportional hazards model.
15. Michael Hogan (1984). Problems in boundary crossings for random walks.
16. Inchi Hu (1985). Repeated significance tests for exponential families.
17. Qi-wei Yao (1986). Boundary crossing probabilities and applications in sequential analysis and change-point problems. (Wuhan University).
18. Hyuneju Kim (1988). Change-point problems in regression.
19. Jia-yang Sun (1989). P -values in projection pursuit.
20. Joseph Chang (1989). Random walks, moderate deviations, and the CUSUM procedure.
21. Yanning Zhang (1989). Expected sample size of truncated sequential tests.
22. Clive Loader (1990). Change point problems for Poisson processes.
23. Dan Rabinowitz (1990). Estimating undiscovered resources using exploration history.
24. Heping Zhang (1991). Confidence regions in nonlinear regression and geometry.
25. Hang Paul Zhang (1991). A study of change-point problems.
26. E.S. Venkatraman (1992). Consistency results in multiple change-point problems.
27. Rebecca Betensky (1992). A study of sequential procedures for comparing three treatments.
28. Eleanor Feingold (1993). Modeling a new genetic mapping method.

29. Yoichi Kuwana (1993). Optimal consumption/investment decisions with partial observations.
30. Josée Dupuis (1994). Statistical problems associated with mapping complex and quantitative traits from genomic mismatch scanning data.
31. Jun Teng (1996). Statistical methods in linkage analysis.
32. I-Ping Tu (1997). Theory and application of scan statistics.
33. Bronislava Sigal (1998). Detection of a smooth signal in fixed sample and sequential problems.
34. Kai Fai Ho (2000). Mathematical frameworks for population growth modeling.
35. David Elashoff (2000). Linkage mapping in *S. Cerevisiae* with hidden Markov models.
36. Hsiu-Khuern Tang (2000). Using variance components to map quantitative trait loci in humans.
37. Hua Tang (2002). Statistical methods for two problems in DNA sequence comparisons.