

CURRICULUM VITAE
HENRY P. McKEAN

BORN: December 14, 1930
Wenham, Massachusetts

EDUCATION: Dartmouth A.B. 1952
Graduate Study 1952-53
Cambridge, England
Princeton University Ph.D. 1955

POSITIONS: Instructor 1955-57
Princeton University
Visiting Professor 1957-58
Kyoto University
Instructor to Professor 1958-63
Massachusetts Institute of Technology
Visiting Professor 1963-64
Rockefeller University
Professor 1964-66
MIT
Professor 1966-70
Rockefeller University
George Eastman Professor 1979-80
Balliol College
Oxford University
Professor 1970-Present
Deputy Director; Chairman 1984-88
Department of Mathematics
Director 1988-92
Courant Institute of
Mathematical Sciences
New York University

MEMBERSHIPS: American Academy of Arts and Sciences
National Academy of Sciences

PUBLICATIONS:

Books:

Diffusion Processes and Their Sample Paths (with K. Ito), Berlin, 1965.

Stochastic Integrals, New York, 1969.

Fourier Series and Integrals (with H. Dym), New York, 1972.

Stationary Gaussian Processes (with H. Dym), New York, 1976.

Elliptic Curves (with V. Moll), Cambridge, 1997.

Papers:

1. "A new proof of the completeness of the Hermite functions" *American Math. Monthly* 59 (1952) 621–622.
2. "Hausdorff-Besicovitch dimension of Brownian motion paths" *Duke Math. J.* 22 (1955) 229–234.
3. "Sample functions of stable processes" *Ann. Math.* 61 (1955) 564–579.
4. "A diffusion equivalent to a countable Markov chain" (with W. Feller) *Proc. Nat. Acad. Sci.* 42 (1956) 351–354.
5. "Elementary solutions for certain parabolic partial differential equations" *Trans. Amer. Math. Soc.* 82 (1956) 519–548.
6. "Potentials and the random walk" (with K. Ito) *Ill. J. Math.* 4 (1960) 119–132.
7. "Brownian motion on the 3-dimensional rotation group" *Mem. Coll. Sci. Kyoto* 33 (1960) 25–38.
8. "The Bessel motion and a singular integral equation" *Mem. Coll. Sci. Kyoto* 33 (1960) 317–322.
9. "A problem about prime numbers and the random walk" *Ill. J. Math.* 5 (1961) 351.
10. "Additive functionals of the Brownian path" (with H. Tanaka) *Mem. Coll. Sci. Kyoto* 33 (1961) 479–506.
11. "Spectral distribution of a differential operator" (with D. B. Ray) *Duke Math. J.* 29 (1962) 281–292.
12. "A Holder condition for Brownian local time" *J. Math. Kyoto* 1 (1962) 197–201.
13. "Markov processes with identical hitting distributions" (with R. Blumenthal and R. Gettoor) *Ill. J. Math.* 6 (1962) 402–420.
14. "Excursions of a nonsingular diffusion" *Z. Wahrschein* 1 (1963) 230–239.
15. "A winding problem for a resonator driven by a white noise" *J. Math. Kyoto* 2 (1963) 228–235.
16. "Brownian motions on a half-line" (with K. Ito) *Ill. J. Math.* 7 (1963) 181–231.
17. "A. Skorohod's stochastic integral equation for a reflecting barrier diffusion" *J. Math. Kyoto* 3 (1963) 85–88.
18. "Brownian motion with a several-dimensional time" *Theor. Prob. Appl.* 8 (1963) 335–354.
19. "A supplement to 'Markov processes with identical hitting distributions'" *Ill. J. Math.* 7 (1963) 540–542.
20. "Entropy is the only increasing functional of Kac's one-dimensional caricature of a Maxwellian gas" *Z. Wahrschein* 2 (1963) 167–172.
21. "Weighted trigonometrical approximation on R with application to the germ field of a stationary Gaussian noise" (with N. Levinson) *Acta Math.* 112 (1964) 99–143.
22. "Weighted trigonometrical approximation on R with application to the germ field of stationary Gaussian noise" *Bull. Amer. Math. Soc.* 70 (1964) 99–143.
23. "Kramers-Wannier duality for a 2-dimensional Ising model as an instance of the Poisson summation formula" *J. Math. Phys.* 5 (1964) 775–776.
24. "A probabilistic interpretation of equilibrium charge distributions" *J. Math. Kyoto* 4 (1965) 617–625.

25. "Isoperimetric problem with application to the figure of cells" (with M. Schreiber and G. Weiss) *J. Math. Phys.* 6 (1965) 479–484.
26. "A free boundary problem for the heat equation arising from a problem in mathematical economics" *Ind. Management Rev.* 6 (1965) 32–40.
27. "Speed of approach to equilibrium for Kac's caricature of a Maxwellian gas" *Arch. Rat. Mech. Anal.* 21 (1966) 343–367.
28. "A class of Markov processes associated with nonlinear parabolic equations" *Proc. Nat. Acad. Sci.* 56 (1966) 1907–1911.
29. "Curvature and the eigenvalues of the Laplacian" (with I. M. Singer) *J. Diff. Geom.* 1 (1967) 43–69.
30. "An integral equation arising in connection with Markov chains" *Z. Wahrschein* 8 (1967) 298–300.
31. "An exponential formula for solving Boltzmann's equation for a Maxwellian gas" *J. Comb. Th.* 2 (1967) 358–382.
32. "Chapman-Enskog-Hilbert expansion for a class of solutions of the telegraph equation" *J. Math. Phys.* 8 (1967) 547–552.
33. "Propagation of chaos for a class of nonlinear parabolic equations" *Lecture Series in Differential Equations*, A. K. Aziz (ed.) 2 (1968).
34. "A simple model of the derivation of fluid mechanics from the Boltzmann equation" *Bull. Amer. Stat.* 41 (1970) 1817–1844.
35. "Extrapolation and interpolation of stationary Gaussian processes" (with H. Dym) *Ann. Math. Stat.* 41 (1970) 1817–1844.
36. "An upper bound to the spectrum of Δ on a manifold of negative curvature" *J. Diff. Geom.* 4 (1970) 359–366.
37. "Nagumo's equation" *Adv. Math.* 4 (1970) 209–223.
38. "Application of de Branges spaces of integral function to the prediction of stationary Gaussian processes" (with H. Dym) *Ill. J. Math.* 14 (1970) 299–343.
39. "Selberg's trace formula as applied to a compact Riemann surface" *Comm. Pure Appl. Math.* 25 (1972) 225–246.
40. "Boundary conditions for the heat equation in a several-dimensional region" (with G. Gallavotti) *Nagoya Math. J.* 47 (1972) 1–14.
41. "Geometry of differential space" *Ann. Prob.* 1 (1973) 197–206.
42. "Wiener's theory of nonlinear noise" *SIAM-AMS Symp. Appl. Math.* 6 (1973) 191–209.
43. "Brownian local times" *Adv. Math.* 16 (1975) 91–111.
44. "Applications of Brownian motion to the equation of Kolmogorov-Petrovski-Piscounov" *Comm. Pure Appl. Math.* 28 (1975) 323–331.
45. "The central limit theorem for Carleman's equation" *Israel J. Math.* 21 (1975) 54–92.
46. "Fluctuations in the kinetic theory of gasses" *Comm. Pure Appl. Math.* 28 (1975) 435–455.
47. "Spectrum of Hill's equation" (with P. van Moerbeke) *Invent. Math.* 30 (1975) 217–274.

48. “Hill’s operator and hyperelliptic function theory in the presence of infinitely many branch points” (with E. Trubowitz) *Comm. Pure Appl. Math.* 29 (1976) 143–276.
49. “Sur le spectre de quelques operateurs et les variétés de Jacobi” *Sem. Bourbaki, Lect. Notes in Math.* 567 (1977) 54–68.
50. “Stability for the Korteweg-de Vries equation” *Comm. Pure Appl. Math.* 30 (1977) 347–353.
51. “Two queues in parallel” (with L. Flatto) *Comm. Pure Appl. Math.* 30 (1977) 255–263.
52. “A plus a bad potential” *J. Math. Phys.* 18 (1977) 1277–1279.
53. “Rational and elliptic solutions of the Korteweg-de Vries equation and a related many-body problem” (with H. Airault and J. Moser) *Comm. Pure Appl. Math.* 30 (1977) 95–148.
54. Norbert Weiner. *American Scientist* 65 (1977) 220–221.
55. “Hill’s surfaces and their theta functions” (with E. Trubowitz) *Bull. Amer. math. Soc.* 84 (1978) 1042–1085.
56. “Boussinesq’s equation as a Hamiltonian system” *Adv. Math. Suppl. Studies* 3 (1978) 217–226.
57. “Algebraic curves of infinite genus arising in the theory of nonlinear waves” *Proc. Int. Cong. Math., Helsinki* (1978) 777–784.
58. “Some questions about Hardy functions” *Problems in Linear Operators and the Theory of Functions, Sem. LOMI* 81 (1978) 68–69.
59. “Polynomial approximation and Hill’s equation” *Problems in Linear Operators and the Theory of Functions, Sem. LOMI* 81 (1978) 89–91.
60. “Theta functions, solitons and singular curves” *Partial Differential Equations and Geometry* C. Brynes and M. Dekker (eds.), New York (1979) 237–254.
61. “Units of Hill curves” *Geometry and Analysis*, Tata Inst. Fund. Res., Bombay (1980) 81–94.
62. “Hill and Toda curves” (with P. van Moerbeke) *Comm. Pure Appl. Math.* 33 (1980) 23–42.
63. “Integrable systems and algebraic curves” *Lect. Notes in Math.* 755 (1980) 83–200.
64. “Boussinesq’s equation on the circle” *Joint US–USSR Conf. on Solitons and Turbulence*, Kiev, Sept. 1979.
65. “The sine-Gordon and Sinh-Gordon equation on the circle” *Comm. Pure Appl. Math.* 34 (1980) 197–257.
66. “Boussinesq’s equation on the circle”, *Comm. Pure Appl. Math.* 34 (1981) 599–691.
67. “The spectral class of the quantum-mechanical oscillator” (with E. Trubowitz) *Comm. Math. Phys.* 82 (1982) 471–495.
68. “Winding of the plane Brownian motion” (with T. J. Lyons) *Adv. Math.* (1981) 212–225.
69. “Brownian motion and harmonic functions on the thrice-punctured sphere” (with D. Sullivan) *Adv. Math.* 51 (1981) 203–211.

70. “Time substitution based upon signed additive functionals” (with C. Rogers and D. Williams) *Z. Wahrschein* (1981).
71. “The irrotational Benney equations: symplectic geometry” (with J. Cavalcante) *Physica D* (1981).
72. “Curvature of an ∞ -dimensional manifold related to Hill’s equation” *J. Diff. Geom.* 17 (1982) 523–529.
73. “Boussinesq’s equation: how it blows up” *J. C. Maxwell Sesquicentennial Symp.*, ed. M. Berger, North-Holland (1984).
74. “The inverse Sturm-Liouville problem” (with E. Isaacson and E. Trubowitz) *Comm. Pure Appl. Math.* 37 (1984) 1–11.
75. “Stabilization of solutions of caricature of the Fitzhugh-Nagumo equation” *Comm. Pure Appl. Math.* 36 (1983) 291–324.
76. “Stabilization of solutions of caricature of the Fitzhugh-Nagumo equation” *Comm. Pure Appl. Math.* 37 (1984) 299–301.
77. “Variation on a theme of Jacobi” *Comm. Pure Appl. Math.* 38 (1985) 669–678.
78. “A threshold for a caricature of the nerve equation” (with V. Moll) *Bull. Amer. Math. Soc.* 12 (1985) 255–259.
79. “Stabilization to the standing wave in a simple caricature of the nerve equation” (with V. Moll) *Comm. Pure Appl. Math.* 39 (1986) 485–529.
80. “Geometry of some nonlinear differential operators” *Ann. Scuola Norm. Sup. Pisa* 13 (1986) 299–346.
81. “Singularities of a simple elliptic operator” *J. Diff. Geom.* 25 (1987) 157–165.
82. “Geometry of KdV (1): addition and the unimodular spectral classes” *Rev. Mat. Iberoamer.* 2 (1986) 235–261.
83. “Geometry of KdV (2): three examples” *J. Stat. Phys.* 46 (1987) 1115–1143.
84. “Is there an infinite-dimensional algebraic geometry? Hints from KdV” *AMS Summer Conf. on Theta Functions*, Bowdoin College, New Brunswick, Maine (1987).
85. “Geometry of KdV (4): theta function in the scattering case” (with N. Ercolani) *Invent. Math.* 99 (1990) 483–544.
86. “A quick proof of Fay ’s secant identities” (with N. Ercolani) *Analysis, etc.*, Academic Press (1990) 301–307.
87. “Geometry of KdV (5): Scattering from the Grassmanian point of view” *Comm. Pure Appl. Math.* 42 (1989) 687–701.
88. Marc Kac, 1914-1984. “Biographical Memoirs,” *Natl. Acad. Sci. USA* 59 (1990) 215–235.
89. “The nonlinear Schrödinger equation and the nonlinear heat equation: reduction to linear form” (with J. Shatah) *Comm. Pure Appl. Math.* 44 (1991) 1057–1066.
90. “Curvatura integra, handle-number, and genus of transcendental curves” *Comm. Pure Appl. Math.* 44 (1991) 1057–1066.
91. “Geometry of KdV (3): determinants and unimodular isospectral flows” *Comm. Pure Appl. Math.* 45 (1992) 389–415.
92. “Curvature integra for curves of infinite genus” *Collection of unsolved problems of linear and complex analysis, Lecture Notes Math.* 34 (1992) Springer-Verlag, New York.

93. “Compatible brackets in Hamiltonian mechanics”, *Important Developments in Soliton Theory*, ed. A. Fokas and V. Zakharov, Springer-Verlag, New York, 1993.
94. “A quicker proof of Fay’s identity” *Comm. Pure Appl. Math.* 46 (1993) 501–503.
95. “Baker-Akhiezer functions in the scattering case” *Comm. Pure Appl. Math.* 46 (1993) 783–785.
96. “The rigidity of sine-Gordon breathers” (with B. Birnir and A. Weinstein), *Comm. Pure Appl. Math.* 47 (1994) 1043–1051.
97. “Statistical mechanics of nonlinear wave equations” (with K. Vaninsky), *Trends and Perspectives Appl. Math.* ed. L. Sirovich. (1994) 239–264, Springer-Verlag, New York; see also *Proc. Symp. Pure Math. AMS* 57 (1995) 457–463.
98. “Brownian motion with restoring drift: the micro-canonical ensemble” (with K. Vaninsky) *Comm. Math. Phys.* 160 (1994) 615–630.
99. “Statistical mechanics of nonlinear wave equations (3): metric transitivity for hyperbolic sine-Gordon” *J. Stat. Phys.* 79 (1995) 731–737.
100. “A limit law for the ground state of Hill’s equation.” *J. Stat. Phys.* 74 (1994) 1227–1232.
101. “Statistical mechanics of nonlinear wave equations (4): cubic Schrödinger” *Comm. Math. Phys.* 168 (1995) 479–491. Erratum: 173 (1995) 675.
102. “Valores propios de Dirichlet asociados a la ecuación de Hill con potencial de ruido blanco.” (with S. Cambroner) *Revistade Matematica* 2 (1995) 1–8.
103. “A Martin boundary connected with the ∞ -volume limit of the focusing cubic Schrödinger equation” *Itô’s Stochastic Calculus and Probability Theory*, ed. Ikeda *et al*, pp. 251–260, Springer-Verlag, Tokyo, 1996.
104. “Trace formulas and the canonical 1-form” *Prog. Nonlinear Diff. Equ.* 26 (1996) 217–235.
105. “Onsager and Machlup’s work on fluctuations in statistical physics.” *Collected Works of Lars Onsager*, ed. Hemmer *et al*, pp. 769–771. World Scientific, Singapore, 1996.
106. “How real is resonance.” *Comm. Pure Appl. Math.* 50 (1997) 317–322.
107. “Action-angle variables for the cubic Schrödinger equation” (with K. Vaninsky), *Comm. Pure Appl. Math.* 50 (1997) 489–562.
108. “Cubic Schrödinger: the petit canonical ensemble in action-angle variables.” (with K. Vaninsky). *Comm. Pure Appl. Math.* 50 (1997) 593–622.
109. Forward to: *Selected Papers of Norman Levinson*. Birkhauser Boton, 1997.
110. “Shallow water and the diffeomorphism group.” *Appl. Indust. Math., Venice* 2. Kluwer, Dordrecht, 1998.
111. “Breakdown of a shallow water equation.” *Asian J. Math.* 2 (1998) 767–774; corrected in *AJM* 3 (1999) 3.
112. “A novel aspect of action-angle variables.” *Proc. Symp. Pure Math. AMS* 65 (1999) 155–160.
113. “A quick proof of Riemann’s mapping theorem.” *Comm. Pure Appl. Math.* 52 (1999) 405–409.
114. “A shallow water equation on the circle (with A. Constantin).” *Comm. Pure Appl. Math.* 52 (1999) 947–982.

115. "Variations on a theme of M.G. Krein." *Comm. Pure Appl. Math* 52 (1999) 453–459.
116. "The ground state eigenvalue of Hill's equation with white noise potential" (with S. Cambronero). *Comm. Pure Appl. Math.* 52 (1999) 1277-1294.
117. "Probability and its applications." pp.90–95. *The Mathematical Sciences after the Year 2000*, Beirut, Lebanon. World Scientific, Singapore, 2000.
118. "Brownian motion and the general diffusion: Scale & Clock." *Mathematical Finance-Bachelier Congress*, June 2000. Springer-Verlag, Berlin, 2001.
119. "Jurgen K. Moser (part 3 of 4)." *Notices Amer. Math. Soc.* 47 (2000).
120. "Addition for the acoustic equation." *Comm. Pure Appl. Math.* 54 (2001) 1271–1288.
121. "Fredholm determinants and the Camassa-Holm hierarchy." *Comm. Pure Appl. Math.* 56 (2003) 638–680.
122. "Loiuville's correspondence between the Korteweg-de Vries and the Camassa-Holm hierarchies." *Comm. Pure Appl. Math.* 56 (2003) 998–1015.
123. Turbulence without pressure: existence of the invariant measure. *Comm. Pure Appl. Math.* to appear.
124. Cubic Schrödinger: the petit canonical ensemble. *Adv. Studies Pure Math.* 4 (2004) to appear.
125. Breakdown of the Camassa-Holm equation. *Comm. Pure Appl. Math.* to appear.
126. "Fourier series and integrals from an elementary standpoint." *Comm. Pure Appl. Math* to appear.
127. *Fredholm Determinants*. Courant Lecture Notes. to appear.