

Curriculum Vitae

Name: William G. Faris

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Citizenship: United States of America

Education: University of Washington, Seattle, Washington
B.A., 1960

Princeton University, Princeton, New Jersey
Ph.D., 1965

Specialization: Mathematical physics
Applied probability

Employment: Moscow State University (1963–1964)
Exchange Scholar

Cornell University, Ithaca (1964–1970)
Instructor and Assistant Professor

Battelle Institute, Geneva (1970–1974)
Research Mathematician

University of Arizona, Tucson (1974–2011)
Associate Professor and Professor

University of Arizona, Tucson (2011–)
Professor Emeritus

Visiting Positions: Pontifícia Universidade Católica, Rio de Janeiro (1977–1978)
Visiting Professor

Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette (1980–1981)
Visiting Professor

Independent University of Moscow (1995–1996)
Fulbright Lecturer

National Science Foundation (1996–1997)
Program Director

Courant Institute of Mathematical Sciences, NYU (2002–2003)
Visiting Member

Mathematics Institute, University of Warwick (2008 spring term)
Academic Visitor

Newton Institute, University of Cambridge (2008 summer term)
Visiting Fellow

University of British Columbia (2009–2010)
Visitor

NYU Shanghai (2014 fall term; 2017 spring term)
Visiting Professor

Awards: Faculty of Science Innovation in Teaching Award
May 1993

Fulbright Lecturer
August 1995–June 1996

Publications

William G. Faris

Books

- [1] *Self-Adjoint Operators*, Springer, New York, 1975.
- [2] *Martingale Ideas in Elementary Probability*, IUM Mathematics College Publishing House, Moscow, 1996.
- [3] *Diffusion, Quantum Theory, and Radically Elementary Mathematics*, Princeton University Press, Princeton, NJ, 2006 (editor).

Articles

- [1] “The Trotter product formula for perturbations of semibounded operators,” *Bull. Amer. Math. Soc.* **73** (1967), 211–215. ams.org projecteuclid.org
- [2] “The product formula for semigroups defined by Friedrichs extensions,” *Pacific J. Math.* **22** (1967), 47–70. projecteuclid.org
- [3] “Product formulas for perturbations of linear propagators,” *J. Funct. Anal.* **1** (1967), 93–108. journals.elsevier.com
- [4] “Time decay and the Born series,” *Rocky Mountain J. Math.* **1** (1971), 637–648. projecteuclid.org
- [5] “Perturbations and non-normalizable eigenvectors,” *Helv. Phys. Acta* **44** (1971), 930–936. retro.seals.com
- [6] “Invariant cones and uniqueness of the ground state for fermion systems,” *J. Math. Phys.* **13**, (1972), 1285–1290. jmp.aip.org
- [7] “Quadratic forms and essential self-adjointness,” *Helv. Phys. Acta* **45** (1972), 1074–1088. retro.seals.com
- [8] “Essential self-adjointness of operators in ordered Hilbert space,” *Commun. Math. Phys.* **30** (1973), 23–34. projecteuclid.com link.springer.com
- [9] “Commutators and self-adjointness of Hamiltonian operators” (with Richard B. Lavine), *Commun. Math. Phys.* **35** (1974), 39–48. projecteuclid.com
- [10] “Degenerate and non-degenerate ground states for Schrödinger operators” (with Barry Simon), *Duke Math. J.* **42** (1975), 559–567. projecteuclid.com

- [11] “Product spaces and Nelson’s inequality,” *Helv. Phys. Acta* **48** (1975), 721–730. retro.seals.com
- [12] “Weak Lebesgue spaces and quantum mechanical binding,” *Duke Math. J.* **43** (1976), 365–373. projecteuclid.com
- [13] “Inequalities and uncertainty principles,” *J. Math. Phys.* **19** (1978), 461–466. jmp.aip.org
- [14] “The stochastic Heisenberg model,” *J. Funct. Anal.* **32** (1979), 342–352. journals.elsevier.com
- [15] “The Rayleigh-Schrödinger expansion of the Gibbs state of a classical Heisenberg ferromagnet,” *Trans. Amer. Math. Soc.* **261** (1980), 579–587. ams.org
- [16] “Invariance in calculus,” *Int. J. Math. Educ. Sci. Technol.* **11** (1980), 123–132.
- [17] “Spin correlation in stochastic mechanics,” *Foundations of Physics* **12** (1982), 1–26.
- [18] “A stochastic picture of spin,” in *Stochastic Processes in Quantum Theory and Statistical Physics*, ed. by S. Albeverio, Ph. Combe, and M. Sirugue-Collin, Springer, Berlin, 1982, 154–168.
- [19] “Large fluctuations for a nonlinear heat equation with noise” (with G. Jona-Lasinio), *J. Phys. A* **15** (1982), 3025–3055.
- [20] “Non-linear mechanics of a string in a viscous noisy environment” (with G. Jona-Lasinio), in *Structural Elements in Particle Physics and Statistical Mechanics*, ed. by J. Honerkamp, K. Pohlmeier, and H. Römer, Plenum, New York, 1983, 171–178.
- [21] “Localization estimates for a random discrete wave equation at high frequency,” *J. Stat. Phys.* **46** (1987), 477–491. link.springer.com
- [22] “A localization principle for multiplicative perturbations,” *J. Funct. Anal.* **67** (1986), 105–114. journals.elsevier.com
- [23] “Localization for a random discrete wave equation,” in *Random Media*, IMA Volumes in Mathematics and its Applications, Vol. 7, ed. by G. Papanicolaou, Springer, New York, 1987, 121–127.
- [24] “The value of a random game: The advantage of rationality” (with Robert S. Maier), *Complex Systems* **1** (1987), 235–244.
- [25] “Stochastic mechanics,” in *Encyclopedia of Statistical Sciences* Vol. 8, ed. by S. Kotz and N. L. Johnson, Wiley, New York, 1988, 826–830.

- [26] “Probabilistic analysis of a learning matrix” (with Robert S. Maier), *Advances in Applied Probability* **20** (1988), 695–705.
- [27] “Scattering of a wave packet by an interval of random medium” (with Woody J. Tsay), *J. Math. Phys.* **30** (1989), 2900–2903. jmp.aip.org
- [28] “Localization estimates for off-diagonal disorder,” pp. 391–406 in *Mathematics of Random Media*, ed. by Werner E. Kohler and Benjamin S. White, Lectures in Applied Mathematics, Vol. 27, American Mathematical Society, Providence, R.I., 1991.
- [29] “Order statistics and renormalization,” pp 407–416 in *Mathematics of Random Media*, ed. by Werner E. Kohler and Benjamin S. White, Lectures in Applied Mathematics, Vol. 27, American Mathematical Society, Providence, R.I., 1991.
- [30] “Using associated random variables to determine the reliability of neural networks” (with Robert S. Maier), *J. Neural Network Computing* **2** (1990), 49–52.
- [31] “Reliable evaluation of neural networks” (with Robert M. Burton), *Neural Networks* **4** (1991), 411–415.
- [32] “Wave scattering in random media,” (with Woody J. Tsay), pp. 51–64 in *Probability Models in Mathematical Physics*, ed. by G. J. Morrow and W.-S. Yang, World Scientific, Teaneck, New Jersey, 1991.
- [33] “Confirmation in experimental mathematics: a case study,” (with Robert S. Maier), *Complex Systems* **5** (1991), 259–264.
- [34] “Time delay in random scattering,” (with Woody J. Tsay), *SIAM J. Appl. Math.* **54** (1994), 443–455. siam.org/journals
- [35] “Stability of self-organizing processes,” (with Robert M. Burton), in David Aldous and Robin Pemantle, eds., *Random Discrete Structures*, IMA volumes in Mathematics and its Applications, Volume 76, Springer, New York, 1995, pp. 19–24.
- [36] “Random waves and localization,” *Notices Amer. Math. Soc.* **42** (1995), 848–853. ams.org
- [37] “Probability in quantum mechanics,” appendix to David Wick, *The Infamous Boundary: Seven Decades of Controversy in Quantum Physics*, Birkhäuser, Boston, 1995.
- [38] “A self-organizing cluster process,” (with Robert M. Burton), *Ann. Appl. Prob.* **6** (1996), 1232–1247. projecteuclid.com
- [39] “Does quantum probability predict frequency?” , *Int. J. Quantum Chemistry* **65** (1997), 389–398.

- [40] “A quantum crystal with multidimensional harmonic oscillators,” (with Robert A. Minlos), *J. Statistical Physics* **94** (1999), 365–387. link.springer.com
- [41] Letter on “Consistent Histories and Quantum Measurements” (Griffiths and Omnès article), *Physics Today* **53** (2000), pp. 15, 72, 74.
- [42] “Ornstein-Uhlenbeck and renormalization semigroups,” *Moscow Mathematical J.* **1** (2001), 389–405.
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- [44] “A gentle introduction to cluster expansions,” in *Probability and Partial Differential Equations in Modern Applied Mathematics*, (IMA Volumes in Mathematics and its Applications 140), edited by Edward C. Waymire and Jinqiao Duan, Springer, New York, 2005, pp. 97–115.
- [45] “Martingales,” in *Encyclopedia of Nonlinear Science*, ed. Alwyn Scott, Routledge, New York, 2005, pp. 559–562.
- [46] “Diffusion and where it leads,” in *Diffusion, Quantum Theory, and Radically Elementary Mathematics*, edited by W. G. Faris, Princeton University Press, Princeton, NJ, 2006.
- [47] “A connected graph identity and convergence of cluster expansions,” *J. Math. Phys.* **49**, 113302 (2008). jmp.aip.org
- [48] “Combinatorics and cluster expansions,” *Probability Surveys* **7** (2010), 157–206. projecteuclid.org
- [49] “Outline of quantum mechanics,” pp. 1–52 in *Entropy and the Quantum*, edited by Robert Sims and Daniel Ueltschi, (Contemporary Mathematics 529), American Mathematical Society, Providence, RI, 2010. ams.org
- [50] “Combinatorial species and cluster expansions,” *Moscow Mathematical J.* **10** (2010), 713–727.
- [51] “Combinatorial species and Feynman diagrams,” *Séminaire Lotharingien de Combinatoire* **61A** (2011), Article B61An.
- [52] “Biconnected graphs and the multivariate virial expansions,” *Markov Processes Relat. Fields* **18** (2012), 357–386.

- [53] “The fundamental theorem of calculus for a matroid,” *J. Math. Phys.* 53, 063305 (2012). jmp.aip.org
- [54] “Rooted tree graphs and the Butcher group: Combinatorics of elementary perturbation theory.”
- [55] “Nelson’s early work on probability.”
- [56] “Sliding vectors, line bivectors, and torque.”
- [57] “A groupoid description for plane geometry.”

Book Reviews

- [1] review of *Methods of Modern Mathematical Physics, vols. III, IV*, by M. Reed and B. Simon, in *Bull. Amer. Math. Soc.* **2** (1980), 522–530. ams.org projecteuclid.org
- [2] review of *Operator Methods in Quantum Mechanics*, by M. Schechter, in *Bull. Amer. Math. Soc.* **6** (1982), 105–109. ams.org projecteuclid.org
- [3] review of *One-parameter Semigroups*, by E. B. Davies, in *Acta Applicandae Mathematicae* **2** (1984), 391–394.
- [4] review of *Products of Random Matrices with Applications to Schrödinger Operators*, by P. Bougerol and J. Lacroix, in *J. Amer. Stat. Assoc.* **83** (1988), 1219–1220.
- [5] review of *Spectral Theory and Differential Operators*, by D. E. Edmunds and W. D. Evans, in *Bull. Amer. Math. Soc.* **20** (1989), 232–235. ams.org projecteuclid.org
- [6] review of *Second Year Calculus: From Celestial Mechanics to Special Relativity*, by David M. Bressoud, in *American Mathematical Monthly* **100** (1993), 884–888.
- [7] review of *Hilbert Space Operators in Quantum Physics*, by Jiří Blank, Pavel Exner, and Miloslav Havlíček, *Bull. Amer. Math. Soc.* **32** (1995), 339–344. ams.org
- [8] review of *Shadows of the Mind: A Search for the Missing Science of Consciousness*, by Roger Penrose, *Notices Amer. Math. Soc.* **43** (1996), 203–208. ams.org
- [9] review of *The Interpretation of Quantum Mechanics*, by Roland Omnès, *Notices Amer. Math. Soc.* **43** (1996), 1328–1339. ams.org
- [10] review of *Impostures intellectuelles*, by Alan Sokal and Jean Bricmont, *Notices Amer. Math. Soc.* **45** (1998), 874–876. ams.org
- [11] review of *The Number Sense: How the Mind Creates Mathematics*, by Stanislas Dehaene, *Complexity* **4** (1998), 46–48.
- [12] review of *The Collected Works of Eugene Paul Wigner, Part A The Scientific Papers, Vol. 3*, edited by Arthur S. Wightman, *Studies in History and Philosophy of Modern Physics* **30** (1999), 141–143.
- [13] review of *Philosophy of Mathematics: An Introduction to the World of Proofs and Pictures*, by James Robert Brown, *Notices Amer. Math. Soc.* **47** (2000), 1276–1280. ams.org
- [14] Featured Review: Quantum Field Theory, review of *Quantum Fields and Strings: A Course for Mathematicians*, Volumes I and II, edited by Pierre Deligne et al., *SIAM Review* **43** (2001), 181–195.

- [15] review of *Consistent Quantum Theory*, by Robert B. Griffiths, *SIAM Review* **44** (2002), 726–730.
- [16] review of *It Must Be Beautiful: Great Equations of Modern Science*, edited by Graham Farmelo, *Notices Amer. Math. Soc.* **50** (2003), 361–367. ams.org
- [17] review of *Mathematical Concepts of Quantum Mechanics*, by Stephen J. Gustafson and Israel Michael Sigal, *SIAM Review* **47** (2005), 379–380.
- [18] review of *Probability Theory: The Logic of Science*, by E. T. Jaynes, *Notices of the American Mathematical Society* **53** (2006), 33–42. ams.org
- [19] review of *Large Deviations and Metastability*, by Enzo Olivieri and Maria Eulália Vares, *SIAM Review* **48** (2006), 405–410.
- [20] Featured Review: Quantum Field Theory, review of *Quantum Field Theory I*, by Eberhard Zeidler, *SIAM Review* **50** (2008), 371–410.
- [21] Featured Review: Two books on quantum fields: mathematical guides to a physical theory, review of *Quantum Field Theory*, by Gerald B. Folland and *Quantum Field Theory II*, by Eberhard Zeidler, *SIAM Review* **52** (2010), 381–400.
- [22] review of *Reflections on Quanta, Symmetries, and Supersymmetries*, by V. S. Varadarajan, *SIAM Review* **54** (2012), 185–190.
- [23] review of *The Beginning of Infinity*, by David Deutsch, *Notices Amer. Math. Soc.* **59** (2012), 544–552. ams.org
- [24] review of *Lectures on Quantum Mechanics*, by Steven Weinberg, to appear in *SIAM Review*.