

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).

Books Online

1. *The Science of Proof: Mathematical Reasoning and Its Limitations*. AMS Open Math Notes.
2. *Vector Fields and Differential Forms*. AMS Open Math Notes.
3. *Real Analysis Structures*. AMS Open Math Notes.
4. *Martingales and Random Fluctuations: The Gambling Metaphor in Probability Theory*. AMS Open Math Notes.

Lecture Notes Online

1. *Lectures on Partial Differential Equations*. AMS Open Math Notes. (undergraduate)
2. *Partial Differential Equations*. AMS Open Math Notes. (graduate)
3. *Lectures on Statistics*. AMS Open Math Notes. (undergraduate)
4. *Extremely Advanced Calculus: Multivariable Analysis, Vectors, Forms, Metric*. AMS Open Math Notes. (undergraduate)

Articles

1. “The Trotter product formula for perturbations of semibounded operators,” *Bull.Amer. Math. Soc.* **73** (1967), 211–215. [ams.org projecteuclid.org](https://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.
43. “Non-selfadjoint Ornstein-Uhlenbeck semigroups,” in *Fundamental Mathematics Today*, edited by S. K. Lando and O. K. Sheinman, Independent University of Moscow and Moscow Center for Continuous Mathematical Education, Moscow, 2003, pp. 294–303.
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,” pp. 135–166 in *Sojourns in Probability and Statistical Physics – II: Brownian Web and Percolation*, A Festschrift for Charles M. Newman (Springer Proceedings in Mathematics & Statistics, Volume 299), edited by Vladas Sidoravicius, Springer Nature, Singapore, 2019. [arXiv:2101.09364](https://arxiv.org/abs/2101.09364)
55. “Sliding vectors, line bivectors, and torque” [arXiv:2103.15015](https://arxiv.org/abs/2103.15015)
56. “The SIR model of an epidemic” [arXiv:2104.12029](https://arxiv.org/abs/2104.12029)

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](http://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](http://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](http://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, *SIAM Review* **56** (2014), 196.