DAVID H. BAILEY
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Affiliation: Senior Scientist (retired), Lawrence Berkeley National Laboratory

Academic background:
1. B.S. 1972, mathematics, Brigham Young University
2. Ph.D. 1976, mathematics, Stanford University

Major professional society awards (most recent listed last):
1. Sidney Fernbach Award, IEEE Computer Society (IEEE CS), 1993
2. Chauvenet Prize, Mathematical Association of America (MAA), 1993
3. Merten Hesse Prize, Mathematical Association of America (MAA), 1993
4. Gordon Bell Prize, Association for Computing Machinery (ACM), 2008
5. SC Test of Time Award (ACM and IEEE CS), 2015
6. Levi L. Conant Prize, American Mathematical Society (AMS), 2017

Bailey is the only person to have received major awards from all four of these professional societies: ACM, AMS, IEEE CS and MAA.

Other significant awards and designations (most recent listed last):
1. *1994 H. Julian Allen Award.* This award is presented annually by NASA Ames Research Center for outstanding research work and papers. See https://history.arc.nasa.gov/awards_h-jallen.htm
2. *CSE Algorithms of the Century.* The PSLQ algorithm, which was defined in a paper co-authored by Bailey, Helaman Ferguson and Stephen Arno, was named one of the ten "algorithms of the century" in 2000 by the editors of *Computing in Science and Engineering*.
3. *Finalist for the 2006 Edge of Computation Prize.* This award was granted in 2006 for a leading-edge contribution in computational science. The list of 48 finalists included many of the world's most distinguished figures in modern computer science and technology. See https://www.edge.org/conversation/the-edge-of-computation-science-prize.
4. *2017 Prose award* (Honorable Mention) in category "Textbook/Best in Physical Sciences and Mathematics." Bailey co-authored a chapter in the book *Reproducibility: Principles, Problems, Practices and Prospects.* See https://proseawards.com/winners/2017-award-winners/.

Overview of research work:

High performance computing. Bailey is a leading figure in the field of high-performance scientific computing, with one book and over 100 published paper in this area. His paper "The NAS parallel benchmarks" (co-authored with several colleagues at NASA Ames Research Center) is widely cited in performance studies of scientific computer systems. His paper "FFTs in external or hierarchical memory" presented a technique for performing the fast Fourier transform (FFT) on parallel and hierarchical memory computers that is now the basis of many FFT implementations on modern computer systems. He has received the Sidney Fernbach Award from the IEEE Computer Society (1993), the Gordon Bell Prize from the Association for Computing Machinery (2008), and the Test of Time Award from the ACM/IEEE Supercomputing Conference (2015).

Computational and experimental mathematics. Bailey is also a leading figure in the field of computational and experimental mathematics. He has written eight books and over 100 papers in this area, together with several widely used high-precision computation packages. Many of his books and papers were co-authored with Jonathan M. Borwein of the University of Newcastle, Australia (deceased 2016). Bailey's best-known paper in this area, "On the rapid computation of various polylogarithmic constants," co-authored with Peter Borwein (Jonathan Borwein's brother) and Simon Plouffe, describes a new formula for pi that permits one to directly calculate binary digits of pi beginning at an arbitrary starting position. In two other papers, Bailey and Richard Crandall (deceased 2012) demonstrated a connection between these formulas and a fundamental question about digit randomness. Bailey has received the Chauvenet Prize and the Merten Hesse Prize from the Mathematical Association of America (1993), and the Levi L. Conant Prize from the American Mathematical Society (2017).

Financial mathematics. Bailey, together with Jonathan Borwein (deceased), Marcos Lopez de Prado and Jim Qiji Zhu, have written a series of papers on mathematical finance. Their best-known paper in this area, "Pseudo-mathematics and financial charlatanism: The effects of backtest overfitting on out-of-sample performance," has attracted significant interest in the field – see press reports below for details.

Other professional activities. In addition to the technical papers mentioned above, Bailey has authored or co-authored over 300 less formal articles in venues such as the *Huffington Post*, the *Conversation* and various blogs. Bailey operates the Math Scholar blog, devoted to mathematics, computing and modern science, and the Mathematical Investor blog, devoted to financial mathematics and abuses of mathematics in the field.

See "Books" below for a list of published books, and "Publications" for a full list of over 600 technical papers and articles.

Previous affiliations:

1972-1976: Stanford University, Stanford, CA. Bailey taught courses in calculus to undergraduate students, in addition to his studies in probability and ergodic theory leading to the Ph.D.

1976-1980: Department of Defense, Washington, DC. Bailey worked on highly mathematical and computationally intensive problems of interest to the federal government.

1980-1982: TRW, Inc., Sunnyvale, CA. Bailey developed computational software for a defense electronics contractor.

1982-1984: SRI International, Menlo Park, CA. Bailey worked on a defense-funded project.

1984-1998: NASA Ames Research Center, Moffett Field, CA. Bailey worked for a NASA super-computer center with hundreds of users in the U.S. and elsewhere. He published papers on numeri-cal algorithms, parallel computing, computing technology and performance analysis. He also su-pervised a research group in computational algorithms and applications. He was a lead author of the NAS Parallel Benchmarks, which was developed to assess and compare the sustained perfor-mance of scientific supercomputers. Bailey also participated in (and in one case personally direct-ed) several large supercomputer procurements.

Professional community activities (since 1989; most recent listed last):

1. Program Co-Chair, 1988 International Conference on Parallel Processing (1989).
2. Deputy Program Chairman, Supercomputing Conference (1990).
3. Program Committee, International Conference on Supercomputing (1991-1993).
4. Editor, *IEEE Transactions on Parallel and Distributed Computing* (1990-1993).
5. Program Committee, SIAM Parallel Processing Conference (1995).
6. Chair, Petaflops Algorithm Workshop (1997).
7. Tutorial Committee, Supercomputing Conference (1997).
8. Board of Governors, Institute for Mathematics and Applications (1996-1998).
9. Sidney Fernbach Award Committee (1995-1998); Chair (1996-1998).
10. Chair, MSRI Parallel Symbolic Computation Workshop (1998).
11. Governing Board, Supercomputing SIG, Association for Computing Machinery (1993-1999).
12. Program Committee, Petaflops-2 Conference (1999).
13. Review Panel, DoE ASCI University Alliance program (1998-2000).
14. Review Committee, NSF Information Technology Research proposal review panel (2000).
15. Program Committee, International Conference on High Performance Computing (2000).
16. Vice Chair, International Parallel and Distributed Processing Symposium (2001).
17. Program Committee, IEEE Conference on Computer Arithmetic (2001-2003).
18. Board of Editors, *International Journal of High Speed Computing* (1992-2004).
19. Co-Chair, Experimental Mathematics Workshop (2004).
20. Co-Chair, "Experimental Mathematics in Action," two-day MAA short course (2006).

21. RIACS Science Council (1999-2007); Chairman (2001-2006).
22. Program Committee, Intl. Conf. on Supercomputing (2007).
23. Program Committee, Intl. Conf. on Parallel and Distributed Computing (2007-2008).
24. Program Committee, Conference on Real Numbers and Arithmetic (2008).
25. Seymour Cray Prize Committee (2002-2007); Chairman (2005-2007).
26. Program Committee, SciDAC 2009 (2009).
27. Program Committee, IEEE International Parallel and Distributed Processing Symposium (IPDPS) (2010).
28. Program Committee, International Workshop on Adaptive Self-Tuning Computing Systems for the Exaflop Era (EXADAPT) (2011, 2012).
29. ICERM Workshop on Reproducibility in Computational and Experimental Mathematics (2012).
30. Board of Editors, *Journal of Supercomputing* (1994-2012).
31. Advisory Board, *International Journal of Computational Science and Engineering* (2006-2012).
32. ACM Gordon Bell Prize Committee (1996-2007, 2012, Chair 1998-2002, 2007, 2013).
33. Technical Papers Committee, Supercomputing Conference (1991-1992, 1997-1999, 2002, 2012-2013, Chair 1990, 1999)
34. Steering Committee, Supercomputing Conference series (2009-2014).
35. ICERM Workshop on Challenges in 21st Century Experimental Mathematical Computation, co-organizer (2013-2014).
36. Symposium on Reproducibility: Principles, Problems, Practices, Zurich, Switzerland, co-organizer (2014).
37. Program Committee, 23rd IEEE Symposium on Computer Arithmetic (ARITH23) (2015-2016).
38. Board of Editors, *Notices of the American Mathematical Society* (2009-2016).
39. Tutorial Committee, Supercomputing Conference (1993-1994, 2011, 2016).
40. Board of Editors, *IEEE Transactions on Mathematical Software* (2013-2019).
41. Board of Editors, *Experimental Mathematics* (2016-2022).
42. Co-organizer, ICERM Workshop on Variable Precision Computing (2019-2020).
43. Test of Time Committee, Supercomputing Conference (2012-2013, 2018-2020), chair (2021).
44. SC22 Workshop Committee Member (2022).
45. Workshop on Software Correctness for HPC Applications (2023).
46. ACM Conference on Reproducibility and Replicability (REP'24) (2024)
47. Associate Editor, *American Mathematical Monthly* (2016-present).
48. Board of Editors, *The Ramanujan Journal* (2020-present).
49. Board of Editors, *Journal of Experimental Mathematics* (2023-present).

Press reports mentioning Bailey (since 2001; most recent listed last):

1. Charles Seife, "Pi keeps 'em guessing," *ScienceNow*, 27 Jul 2001: HTML
2. David Whitehouse, "How random is Pi?" *British Broadcasting Company*, 23 July 2002: HTML
3. Charles Seife, "Randomly distributed slices of Pi," *Science*, 3 Aug 2001, pg. 793: HTML
4. Ivars Peterson, "Pi al a mode," *Science News*, 1 Sep 2001, pg. 136-137 (cover story): HTML

5. W. Wayt Gibbs, "A digital slice of pi," *Scientific American*, May 2003: [HTML](#)

6. Erica Klarreich, "Math lab: Computer experiments are transforming mathematics," *Science News*, (Apr 24, 2004), pg. 266-268: [HTML](#)

7. J. L. Nazareth, "On algorithmic science and engineering: An emerging core discipline of computing," *SIAM News*, 24 March 2006: [HTML](#)

8. Brian Hayes, "Foolproof," *American Scientist*, vol. 95, no. 1 (Jan-Feb 2007), pg. 10-15: [HTML](#)

9. [no author] "Have your pi and eat it too," *Daily Princetonian*, 14 Mar 2008: [HTML](#)

10. Elizabeth Landau, "On Pi Day, one number 'reeks of mystery'," *CNN*, 12 Mar 2010: [HTML](#)

11. David Shiga, "New pi record exploits Yahoo's computers," *New Scientist*, 17 Sep 2010: [HTML](#)

12. [no author] "New book examines scientific application performance tuning," *Inside HPC*, 14 Mar 2011: [HTML](#)

13. [no author] "Today is Pi Day: Celebrating the world's favorite number," *Berkeley Lab Today*, 14 Mar 2011: [HTML](#)

14. Linda Vu, "Supercomputer Cracks 'Impossible' Calculation," *Berkeley Lab Computing Sciences*, 25 Apr 2011: [HTML](#)

15. Linda Vu, "Supercomputers crack sixty-trillionth binary digit of Pi-Squared," *U.S. Department of Energy*, 28 Apr 2011: [HTML](#)

16. Linda Vu, "Experimental mathematics: Computing power leads to insights," *Berkeley Lab Computing Sciences*, 13 Oct 2011: [HTML](#)

17. [no author] "Experimental mathematics: Computing power leads to insights," *Science Daily*, 13 Oct 2011: [HTML](#). Similar articles appeared in [Eurekalert](#), [Physorg](#) and [NewsWise](#).

18. Christian Perfect, "WLTM real number. Must be normal and enjoy long walks on the plane," *Aperiodical*, 7 Jun 2012: [HTML](#)

19. Samuel Arbesman, "A random walk with Pi," *Wired*, 12 Jun 2012: [HTML](#)

20. Garireo Takahashi Tomoko (trans.), "Random walk in Pi visualization" (Japanese translation of previous item), *Wired Japan*, 15 Jun 2012: [HTML](#)

21. [no author] "Algebra is essential in a 21st century economy," *Today at Berkeley Lab*, 13 Aug 2012: [HTML](#)

22. Jean-Paul Delahaye, "Etre normal? Pas si facile!," *Pour la Science* (French edition of *Scientific American*), Dec 2012, pg. 126-131: [HTML](#)

23. Natalie Wolchover, "In computers we trust?," *Simons Foundation*, 22 Feb 2013: [HTML](#)

24. Natalie Wolchover, "As math grows more complex, will computers reign?," *Wired*, 4 Mar 2013: [HTML](#)

25. Lisa M. Krieger, "Supercomputers could generate warning system for stock market crashes," *San Jose Mercury News*, 14 Apr 2013: [HTML](#)

26. Jeffrey Kutler, "The supercomputer solution," *Institutional Investor*, 25 Apr 2013: [HTML](#)

27. [no author] "Just in time for Pi Day," *Newswise*, 4 Mar 2014; [HTML](#)

28. [no author] "Should you trust your financial advisor? Pseudo-mathematics and financial charlatanism," *ScienceDaily*, 10 Apr 2014: [HTML](#)

29. Saijel Kishan, "Computer models often use unsound math, researchers say," *Bloomberg News*, 11 Apr 2014: [HTML](#)

30. Stephen Foley, "Ban pseudo-maths from investing," *Financial Times*, 16 Apr 2014; [HTML](#)

31. Brendon Conway, "Is a too-perfect ETF backtest a fraud?," *Barrons*, 17 Apr 2014; [HTML](#)

32. Cathy Scott, "Interview with David Bailey," *Institutional Investor Journals*," 23 Apr 2014; [HTML](#)

33. Ryan Jacobs, "The dangerous mathematical con of hedge funds and financial advisers," *Pacific Standard*, 28 Apr 2014; [HTML](#)

34. John Rekenthaler, "Voodoo investment strategies: Mathematicians on the attack," *Morningstar*, 8 May 2014; [HTML](#)

35. Jason Zweig "Huge returns at low risk? Not so fast," *Wall Street Journal*, 27 Jun 2014; [HTML](#)

36. Michael P. Regan, "Beware overfitting models even if they win baseball bets," *Bloomberg News*, 30 Oct 2014; [HTML](#)

37. Brett Steenbarger, "Do market prophets bring market profits?," *TraderFeed blog*, 03 Dec 2014; [HTML](#)

38. Shawn Langlois, "This 'hideously expensive' market has given the 'show horse' pundits fits," *MarketWatch*, 04 Dec 2014; [HTML](#)

39. [no author] "Fiddling with figures," *Automated Trader*, Winter 2015, pg. 53-58; [HTML](#)

40. Campbell R. Harvey and Yan Liu, "Evaluating trading strategies," *Journal of Portfolio Management*, which cites our work, featured in "False hope," *Economist*, 19 Feb 2015; [HTML](#)

41. Bradley Hope, "How computers trawl a sea of data for stock picks," *Wall Street Journal*, 1 Apr 2015; [HTML](#)

42. [no author] "SC15 selects Numerical Aerodynamic Simulation program for the Test of Time Award," *Reuters*, 20 May 2015; [HTML](#). Similar report appeared in [Business Wire](#).

43. Nathan Vardi, "Rich formula: Math and computer wizards now billionaires thanks to quant trading secrets," *Forbes*, 29 Sep 2015; [HTML](#)

44. Brett Steenbarger, "How we fall for the greatest con job of all," *Forbes*, 25 Dec 2015; [HTML](#)

45. [no author] "Why smart beta funds will disappoint?," *CXO Advisory Group*, 18 Mar 2016; [HTML](#)

46. Kevin Knudson, "Everything you wanted to know about Pi, Part 5: A formula for finding any digit," *Forbes*, 13 May 2016; [HTML](#)

47. Alexander Campbell, "Research uncovers new sources of financial model risk," *Risk.net*, 20 May 2016; [HTML](#)

48. Saijel Kishan, "Six degrees of quant: Kevin Bacon and the Erdos number mystery," *Bloomberg*, 11 Nov 2016; [HTML](#)

49. Mike Breen and Annette Emerson, "David Bailey, Jonathan Borwein, Andrew Mattingly, and Glenn Wightwick to Receive 2017 AMS Conant Prize," American Mathematical Society, 2 Dec 2016; [HTML](#)

50. Peter Coy, "Lies, damn lies and financial statistics," *Bloomberg* 6 Apr 2017; [HTML](#)

51. Brett Steenbarger, "Will quant blow up?," *Trader Feed*, 8 May 2017; [HTML](#)

52. Brett Steenbarger, "3 keys to winning in financial markets," *Forbes*, 28 May 2017; [HTML](#)

53. [no author] "Silver Bullet Band: (Past awardees)," *DashOfInsight.com*, 20 May 2017; HTML
54. Larry Swedroe, "Swedroe: Grading the forecasters," *ETF.com*, 28 Jul 2017; HTML
55. Brett Steenbarger, "The growing crisis in modern finance," *Forbes*, 25 May 2018; HTML
56. [no author] "Go Fact Yourself Bonus Episode with Ross Blocher and Carrie Poppy," Maximum Fun, 21 Mar 2019; HTML
57. Larry Swedroe, "Swedroe: Measuring value in forecasts," *ETF.com*, 20 May 2019; HTML

Presentations (since 2009; most recent listed last):

1. "High-Precision Arithmetic and Experimental Mathematics," presentation to Sun Microsystems, Berkeley, CA (Jan 2009). PDF
2. "High-Precision Numerical Integration on High-Performance Computers," High-Dimensional Approximation 2009 (HDA'09), invited talk, Sydney, Australia (Feb 2009). PDF
3. "Experimental Mathematics, Multicore Processors and Highly Parallel Computing," SIAM Computational Science and Engineering Conference, invited talk, Miami, FL (Mar 2009). PDF
4. "High-Precision Arithmetic and Mathematical Physics," invited lecture at Computer Algebra and Particle Physics (CAPP) school, DESY, Zeuthen, Germany (Mar 2009); similar talk given at ETH-Zurich, Zurich, Switzerland (Apr 2009). PDF
5. "High-Precision Arithmetic and Experimental Mathematics," invited seminar talk, Grinnell College, Grinnell, Iowa (Apr 2009): PDF
6. "High-Precision Arithmetic and Experimental Mathematics," invited talk, East Coast Computer Algebra Day, Kingstown, RI (May 2009): PDF
7. "High-Precision Arithmetic and Mathematical Physics," invited lecture, ENRAGE09, Max-Planck Institute, Dresden, Germany (May 2009): PDF
8. "Misleading Performance Claims in Parallel Computations," invited talk, 2009 Design Automatation Conference, San Francisco (Jul 2009): PDF
9. "Computing: The Third Mode of Scientific Discovery," invited convocation talk, Grinnell College, Grinnell, Iowa (Apr 2009); updated version given at University of Newcastle, Australia (Aug 2009): PDF
10. "Experimental Mathematics Meets Mathematical Physics," invited lecture, CARMA Workshop on Multidimensional Numerical Integration and Special Function Evaluation, University of Newcastle, Australia (Aug 2009); also given at Macquarie University (Dept. of Mathematics), Sydney, Australia (Aug 2009); updated version presented to Fields Institute Workshop on Experimentation in Number Theory, Simon Fraser University, Burnaby, BC Canada (Sep 2009): PDF
11. "Experimental Mathematics, Multicore Processors and Highly Parallel Computing," University of Sydney (Dept. of Mathematics), Sydney, Australia, invited seminar (Sep 2009), also given at Macquarie University (Dept. of Electrical Engineering), Sydney, Australia (Sep 2009). PDF
12. "Computing as the Third Mode of Scientific and Mathematical Discovery," University of Delaware (Dept. of Computer Science), Wilmington, DE, invited seminar (Mar 2010), also

given as keynote address at SharcNet Users Group Meeting, Toronto, Canada (May 2010); also given at the Barcelona Supercomputer Center (Jun 2010). [PDF](#)

13. "High-Precision Computation: Mathematical Physics and Dynamics," Joint SIAM/RSME-SCM-SEMA Meeting on Emerging Topics in Dynamical Systems and Partial Differential Equations, minisymposium talk Barcelona, Spain (June 2010). [PDF](#)

14. "High-Precision, Highly Parallel Numerical Integration," University of Zaragoza (Dept. of Mathematics), Zaragoza, Spain, invited seminar (Jun 2010). [PDF](#)

15. "A Mathematical and Data-Driven Approach to Cybersecurity," SIAM Annual Conference, minisymposium talk, Pittsburgh, PA (Jul 2010). [PDF](#)

16. "High-Precision Numerical Integration and Experimental Mathematics," University of Newcastle (CARMA center), Newcastle, Australia (18 Aug 2010). [PDF](#)

17. "The PSLQ Algorithm: Techniques for Efficient Computation," University of Newcastle (CARMA center), Newcastle, Australia (24 Aug 2010). [PDF](#)

18. "Hand-to-Hand Combat with Thousand-Digit Integrals," Western Number Theory Conference, Provo, UT (17 Dec 2010). [PDF](#)

19. "12 Ways to Fool the Masses: Fast Forward to 2011," Manycore and Accelerator-based High-performance Scientific Computing Workshop, University of California, Berkeley (26-29 Jan 2011). [PDF](#)

20. "A Quartically Convergent Square Root Algorithm" (talk on Indian mathematics), Workshop on Computational and Analytical Mathematics in Honour of Jonathan Borwein's 60th Birthday, Simon Fraser University, Burnaby, BC, Canada (16-20 May 2011). [PDF](#)

21. "Performance Tuning of Science Applications," Discovery 2015: HPC and Cloud Computing Workshop, Berkeley, CA (15-24 Jun 2011). Also given at Extreme Computing and Its Applications for the Nuclear Physics/Applied Mathematics/Computer Science Interface, Seattle, WA (28-29 Jun 2011). [PDF](#)

22. "Creationism and Intelligent Design: False Friends," International Society for the History, Philosophy, and Social Studies of Biology (ISHPSSB 2011), Salt Lake City, UT (10-15 Jul 2011). [PDF](#)

23. "Performance Research and the SUPER Project," FastMath Workshop, Livermore, CA (7-8 Nov 2011). [PDF](#)

24. "Nonnormality of the Stoneham Constants," West Coast Number Theory Conference, Pacific Grove, CA (17 Dec 2011). [PDF](#)

25. "Normal and Nonnormal Mathematical Constants," University of Newcastle Mathematics Colloquium, Newcastle, NSW, Australia, 29 Aug 2012. [PDF](#)

26. "Hand-to-Hand Combat with Thousand-Digit Integrals," Workshop on Computational and Analytical Mathematics in Honour of Jonathan Borwein's 60th Birthday, Simon Fraser University, Burnaby, BC, Canada (16-20 May 2011); updated version at University of Newcastle Access Grid Colloquium, Newcastle, NSW, Australia (3 Sep 2012). [PDF](#)

27. "High-precision Computation and Reproducibility," Reproducibility in Computational and Experimental Mathematics (ICERM workshop), Brown University, Providence, RI (9-14 Dec 2012). [PDF](#)

28. "Lattice Sums Arising from the Poisson Equation," West Coast Number Theory Conference, Pacific Grove, CA (16-20 Dec 2012). [PDF](#)

29. "Walking on Real Numbers," West Coast Number Theory Conference, Pacific Grove, CA (16-20 Dec 2012). [PDF](#)

30. "Computational Discovery of Number Theory Identities for Mathematical Physics Integrals," AMS-MAA-SIAM Annual Joint Meeting, San Diego, CA (10-14 Jan 2013). [PDF](#)

31. "High-Precision Computation: Applications and Challenges," U. C. Davis Computer Science seminar, Davis, CA (7 Mar 2013). [PDF](#)

32. "High-Precision Computation: Applications and Challenges," keynote talk, 21st IEEE International Symposium on Computer Arithmetic, Austin, TX (7-10 Apr 2013). [PDF](#)

33. "PSLQ: An algorithm to discover mathematical identities," U.C. Davis Mathematics Seminar, Davis, CA (16 Apr 2013). [PDF](#)

34. "Numerical Reproducibility in High-Performance Computing," International Supercomputing Conference, Leipzig, Germany (16-20 Jun 2013). [PDF](#)

35. "Conquering Numerical Error," Mathematics of Planet Earth, Melbourne, Australia (8-12 Jul 2013). [PDF](#)

36. "Lattice sums arising from the Poisson equation," U.C. Berkeley Number Theory Seminar, Berkeley, CA (11 Sep 2013). [PDF](#)

37. "Twelve ways to fool the masses: Fast forward to 2013," Scalable Approaches to High Performance and High Productivity Computing (ScalPerf'13), Bertinoro, Italy (22--27 Sep 2013). [PDF](#)

38. "Conquering Numerical Error," Supercomputing 2013, Session on High-Precision Arithmetic, Denver, CO (20 Nov 2013). [PDF](#)

39. "Computation and theory of extended Mordell-Tornheim-Witten sums," West Coast Number Theory Conference, Pacific Grove, CA (15-18 Dec 2013). [PDF](#)

40. [with Marcos Lopez de Prado] "How to spot backtest overfitting," Battle of the Quants, New York City, 25 Mar 2014. [PDF](#)

41. "Are the digits of pi random?," U.C. Davis Math Club, Davis, CA (30 Apr 2014). [PDF](#)

42. "Using high-precision arithmetic to conquer numerical error," U.C. Davis Mathematics Seminar, Davis, CA (14 May 2014). [PDF](#)

43. "Fooling the masses: Reproducibility in high-performance computing," ACM International Conference on Computing Frontiers 2014, Cagliari, Italy (20-22 May 2014). Similar talk given at the Australian Mathematical Sciences Institute National Seminar Series, University of Newcastle, Australia (15 Jul 2014). [PDF](#)

44. "Big data computing: Science or pseudoscience?," Australian Mathematical Sciences Institute National Seminar Series, University of Newcastle, Australia (11 Jul 2014). [PDF](#)

45. "Scientific integrity in mathematical finance," Workshop on Optimization, Nonlinear Analysis, Randomness and Risk, University of Newcastle, Australia (12 Jul 2014). [PDF](#)

46. "Computational challenges in experimental mathematics," Challenges in 21st Century Experimental Mathematical Computation (ICERM workshop), Brown University (22 Jul 2014). [PDF](#)

47. "Reproducibility in scientific computing," Reproducibility: Principles, Practices, Problems, Zurich, Switzerland (29 Sep 2014). [PDF](#)

48. "Expectations on fractal sets," West Coast Number Theory Conference, Pacific Grove, CA (16-19 Dec 2014). [PDF](#)

49. "Financial mathematics and big data computing: Science and pseudoscience," invited colloquium talk, ETH Zurich, Switzerland (25 Mar 2015). [PDF](#)

50. "Petascale computing and high-precision arithmetic: Applications and challenges," invited colloquium talk, ETH Zurich, Switzerland (26 Mar 2015). [PDF](#)

51. "A thread-safe, high-performance arbitrary precision package," colloquium talk, University of Newcastle, Australia (12 Mar 2015). [PDF](#)

52. "Backtesting in the world of quantitative finance: Limitations, opportunities and scrutiny needed," Quant Invest 2015, London, England (30 Sep 2015). [PDF](#)

53. "Discovery of large Poisson polynomials using a new arbitrary precision package," U.C. Berkeley numerical analysis seminar, Berkeley, CA (13 Oct 2015). Similar talk given at U.C. Davis Computer Science colloquium (5 Nov 2015). [PDF](#)

54. "Numerical reproducibility in high-performance computing," CARMA workshop on reproducibility, University of Newcasatle, Australia (13 Nov 2015). [PDF](#)

55. "Reproducibility and statistical overfitting in mathematical finance," Workshop on Mathematical Aspects of Behavioural Economics and Finance, University of Newcastle, Australia (13 Nov 2015). [PDF](#)

56. "Big data and its sins," Workshop on Mathematical Aspects of Behavioural Economics and Finance, University of Newcastle, Australia (14 Nov 2015). [PDF](#)

57. "The NAS Parallel Benchmarks: History and impact," Test of Time Award talk, Supercomputing 2015, Austin, TX (17 Nov 2015). [PDF](#)

58. "Numerical reproducibility in high-performance computing," Workshop on Numerical Reproducibility, Supercomputing 2015, Austin, TX (20 Nov 2015). [PDF](#)

59. "Computer discovery of large Poisson polynomials with 51,000-digit computations," West Coast Number Theory Symposium, Pacific Grove, CA (16 Dec 2015). [PDF](#)

60. "Computer discovery of large Poisson polynomials," U.C. Berkeley Number Theory Seminar, Berkeley, CA (16 Mar 2016). [PDF](#)

61. "Computer discovery and analysis of large Poisson polynomials," Computationally Assisted Mathematical Discovery and Experimental Mathematics, London, Ontario, Canada (12-15 May 2016). [PDF](#)

62. "Computer discovery and analysis of large Poisson polynomials using 64,000-digit arithmetic," Number Theory Down Under, Newcastle, Australia (23-26 Sep 2016). [PDF](#)

63. "Mathematics, computing and the acceleration of scientific progress," Hamilton College Plant Lecture, Clinton, NY (3 Nov 2016). [PDF](#)

64. "Stock portfolio design and backtest overfitting," Hamilton College, Clinton, NY (3 Nov 2016). [PDF](#)

65. "Computer discovery of new mathematical facts and formulas," Hamilton College, Clinton, NY (3 Nov 2016). [PDF](#)

66. "On the normality of Stoneham numbers, pi and log(2)," Normal Numbers: Arithmetic, Computational and Probabilistic Aspects, Erwin Schrodinger Institute, University of Vienna, Austria (14-18 Nov 2016). [PDF](#)

67. "Computation and experimental evaluation of Mordell-Tornheim-Witten sum derivatives," West Coast Number Theory Conference, Pacific Grove, CA (16-20 Dec 2016). [PDF](#)

68. "Computer discovery and analysis of large Poisson polynomials using 64,000-digit arithmetic," Jonathan Borwein Remembrance Day, Paris, France (10 Feb 2017). [PDF](#)

69. "Experimental mathematics and the omega function," mathematics seminar, U.C. Davis (17 Apr 2017). [PDF](#)

70. "Fooling the masses in 2017: Why the scientific computing community must still be vigilant," IPDPS-17, Orlando, FL (1-2 Jun 2016). [PDF](#)

71. "Computation and analysis of arbitrary digits of Pi and other mathematical constants," Levi Conant Prize lecture, Worcester Polytechnic Institute, Worcester, MA (16 Sep 2017). [PDF](#)

72. "Computer discovery and analysis of large Poisson polynomials," keynote, Jonathan Borwein Commemorative Conference, University of Newcastle, Newcastle, Australia (25-30 Sep 2017). [PDF](#)

73. "Stock portfolio design and backtest overfitting," Jonathan Borwein Commemorative Conference, University of Newcastle, Newcastle, Australia (25-30 Sep 2017). [PDF](#)

74. "What is experimental mathematics?," All-day seminar on experimental mathematics, University of Newcastle, Newcastle, Australia (3 Oct 2017). [PDF](#)

75. "Pi and normality," All-day seminar on experimental mathematics, University of Newcastle, Newcastle, Australia (3 Oct 2017). [PDF](#)

76. "High-precision arithmetic and PSLQ," All-day seminar on experimental mathematics, University of Newcastle, Newcastle, Australia (3 Oct 2017). [PDF](#)

77. "Experimental mathematics and integration," All-day seminar on experimental mathematics, University of Newcastle, Newcastle, Australia (3 Oct 2017). [PDF](#)

78. "Ancient Indian mathematics," All-day seminar on experimental mathematics, University of Newcastle, Newcastle, Australia (3 Oct 2017). [PDF](#)

79. "Computer discovery and analysis of large Poisson polynomials," All-day seminar on experimental mathematics, University of Newcastle, Newcastle, Australia (3 Oct 2017). [PDF](#)

80. "Backtest overfitting in stock fund design and market prediction," Risk Management Seminar, University of California, Berkeley (17 Oct 2017). [PDF](#)

81. "Getting financial predictions right," MediaX Conference, Stanford University, Stanford, CA (1 Nov 2017). [PDF](#)

82. "Fine tuning and Fermi's paradox," A Fractured Universe? Fundamental Physics, Symmetry and Life, University of Sydney, Sydney, Australia (30 Nov - 1 Dec 2017). [PDF](#)

83. "High-performance computing (and the dangers of overfitting) in finance," Artificial Intelligence and Data Science: Capital Markets, New York City, NY (6-7 Dec 2017). [PDF](#)

84. "Computation of the omega function," West Coast Number Theory Conference, Pacific Grove, CA (16-20 Dec 2017). [PDF](#)

85. "Variable precision in modern floating-point computing," ARM seminar, Cambridge, UK (19 Sep 2018). [PDF](#)

86. "Quantum computing performance: Standards now or scandals later?," D-Wave seminar, Burnaby, BC, Canada (20 Jan 2019). [PDF](#)

87. "Reproducibility and variable precision computing," Computational Reproducibility at Exascale 2019 (CRE2019), Denver, CO (17 Nov 2019). [PDF](#)

88. "Variable precision computing: Applications and challenges," ICERM Workshop on Variable Precision in Mathematical and Scientific Computing, ICERM, Brown University (6-8 May 2020). [PDF](PDF)
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2. Jonathan M. Borwein, David H. Bailey, and Roland Girgensohn *Experimentation in Mathematics: Computational Paths to Discovery*, A. K. Peters, Wellesley, MA, 2004.
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4. David H. Bailey, Jonathan M. Borwein, Neil Calkin, Roland Girgensohn, Russell Luke and Victor Moll, *Experimental Mathematics in Action*, A. K. Peters, Wellesley, MA, 2007.
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Below is a catalogue of Bailey's publications (except books and presentations), listed in approximate chronological order, with **most recent listed last**. This includes:

- Refereed journal articles.
- Refereed conference papers.
- Various other unrefereed technical reports.
- Articles published in the Huffington Post.
- Articles published in the Conversation.
- Articles published in the Math Drudge blog (2009-2016).
- Articles published in the Mathematical Investor blog (2013-present).
- Articles published in the Math Scholar blog (2017-present).

For some of the articles listed below as published in the Mathematical Investor blog, as indicated by an asterisk * in the author list, Bailey acknowledges input from a colleague who prefers not to be listed.

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2. David H. Bailey, "A high-performance fast Fourier transform algorithm for the Cray-2," *Journal of Supercomputing*, vol. 1, no. 1 (Jul 1987), pg. 43-60, preprint draft available at PDF .
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6. Don A. Calahan and David H. Bailey, "Measurement and analysis of memory conflicts on vector multiprocessors," in Joanne L. Martin, ed., *Performance Evaluation of Supercomputers*, North-Holland, 1988, pg. 83-106, preprint draft available at PDF.
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