

DAVID H. BAILEY

9 October 2017

Research website: <http://www.davidhbailey.com>

Affiliations:

1. Senior Scientist (retired), Computational Research Department, Lawrence Berkeley National Laboratory.
2. Research Associate, Department of Computer Science, University of California, Davis (February 2013 to present).

Academic background:

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

Professional society memberships:

1. American Association for the Advancement of Science (AAAS)
2. American Mathematical Society (AMS)
3. Association for Computing Machinery (ACM)
4. IEEE Computer Society (IEEE CS)
5. Mathematical Association of America (MAA)
6. Society for Industrial and Applied Mathematics (SIAM)
7. Australian Mathematical Society (AusMS)

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. 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. https://history.arc.nasa.gov/awards_hjallen.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 <http://www.edge.org/conversation/the-edge-of-computation-science-prize>.

4. *ACM Distinguished Speaker*. Bailey has been designated a “Distinguished Speaker” by the Association for Computing Machinery: http://dsp.acm.org/view_lecturer.cfm?lecturer_id=5123.
5. *2015 Test of Time Award*. This is awarded by the SC Conference (ACM and IEEE CS). See <http://sc15.supercomputing.org/SC15-Selects-ToTA-Award-Winner.html>.
6. *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 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, the Gordon Bell Prize from the Association for Computing Machinery, and the Test of Time Award from the ACM/IEEE Supercomputing Conference.

Computational and experimental mathematics. Bailey is also a leading figure in the field of computational and experimental mathematics. He has written six books and over 100 papers in this area, in addition to 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, who passed away on 2 August 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 more recent papers, Bailey and the late Richard Crandall 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, and the Levi L. Conant Prize from the American Mathematical Society.

Financial mathematics. Bailey, together with his colleagues 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 activities. 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. He has also written articles for the Huffington Post and Conversation – see publication list below for details.

Previous positions:

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 DOD.

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 DOD-funded project.

1984-1998: NASA Ames Research Center, Moffett Field, CA. Bailey worked for a large supercomputer center with hundreds of users nationwide. He published papers on numerical algorithms, parallel computing, computing technology and performance analysis. He also supervised 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 performance of scientific supercomputers. Bailey also participated in (and in one case personally directed) 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 (ISC07) (2007).
23. Program Committee, Intl. Conf. on Parallel and Distributed Computing (IPDPS) (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, 1st International Workshop on Adaptive Self-Tuning Computing Systems for the Exaflop Era (ADAPT2011).
29. Program Committee, EXADAPT 2012, co-located with ASPLOS 2012 (2012).
30. ACM Gordon Bell Prize Committee (1996-2007, 2012, Chair 1998-2002, 2007, 2013).
31. Technical Papers Committee, Supercomputing Conference (1991-1992, 1997-1999, 2002, 2012-2013, Chair 1990, 1999)
32. Test of Time Committee, Supercomputing Conference (2012-2013)
33. Steering Committee, Supercomputing Conference series (2009-2014).
34. ICERM Workshop on Reproducibility in Computational and Experimental Mathematics (2012).
35. ICERM Workshop on Challenges in 21st Century Experimental Mathematical Computation, co-organizer (2013-2014).
36. Symposium on Reproducibility: Principles, Problems, Practices, Zurich, Switzerland, 29 Sep 2014, 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, *Journal of Supercomputing* (1994-present).
41. Board of Editors, *Intl. Journal of Computational Science and Engineering* (2006-present).
42. Board of Editors, *IEEE Transactions on Mathematical Software* (2013-present).
43. Board of Editors, *Experimental Mathematics* (2016-present).
44. Associate Editor, *American Mathematical Monthly* (2016-present).

Citation statistics (as of 9 October 2017):

Google Scholar: Publications = 440; citations = 14,225; h-index = 52; i10 index = 133.
 See: <http://scholar.google.com/citations?user=M2CwO2QAAAAJ>

ResearchGate: Publications = 367; citations = 10,090; RG score = 33.65.
 See: https://www.researchgate.net/profile/David_Bailey3

Social Science Research Network (for papers in mathematical finance):
 Publications = 15; download rank 348; citation rank 33,237.
 See: http://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=1787856

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. Elizabeth Landau, "On Pi Day, one number 'reeks of mystery'," *CNN*, 12 Mar 2010: [HTML](#)
10. David Shiga, "New pi record exploits Yahoo's computers," *New Scientist*, 17 Sep 2010: [HTML](#)
11. [no author] "New book examines scientific application performance tuning," *Inside HPC*, 14 Mar 2011: [HTML](#)
12. [no author] "Today is Pi Day: Celebrating the world's favorite number," *Berkeley Lab Today*, 14 Mar 2011: [HTML](#)
13. Linda Vu, "Supercomputer Cracks 'Impossible' Calculation," *Berkeley Lab Computing Sciences*, 25 Apr 2011: [HTML](#)
14. Linda Vu, "Supercomputers crack sixty-trillionth binary digit of Pi-Squared," *U.S. Department of Energy*, 28 Apr 2011: [HTML](#)
15. Linda Vu, "Experimental mathematics: Computing power leads to insights," *Berkeley Lab Computing Sciences*, 13 Oct 2011: [HTML](#)
16. [no author] "Experimental mathematics: Computing power leads to insights," *Science Daily*, 13 Oct 2011: [HTML](#). Similar articles appeared in [Eurekalert](#), [Physorg](#) and [NewsWise](#).
17. Christian Perfect, "WLTm real number. Must be normal and enjoy long walks on the plane," *Aperiodical*, 7 Jun 2012: [HTML](#)
18. Samuel Arbesman, "A random walk with Pi," *Wired*, 12 Jun 2012: [HTML](#)
19. Garireo Takahashi Tomoko (trans.), "Random walk in Pi visualization" (Japanese translation of previous item), *Wired Japan*, 15 Jun 2012: [HTML](#)
20. [no author] "Algebra is essential in a 21st century economy," *Today at Berkeley Lab*, 13 Aug 2012: [HTML](#)
21. Jean-Paul Delahaye, "Etre normal? Pas si facile!," *Pour la Science* (French edition of *Scientific American*), Dec 2012, pg. 126-131: [HTML](#)
22. Natalie Wolchover, "In computers we trust?," *Simons Foundation*, 22 Feb 2013: [HTML](#)
23. Natalie Wolchover, "As math grows more complex, will computers reign?," *Wired*, 4 Mar 2013: [HTML](#)
24. Lisa M. Krieger, "Supercomputers could generate warning system for stock market crashes," *San Jose Mercury News*, 14 Apr 2013: [HTML](#)
25. Jeffrey Kutler, "The supercomputer solution," *Institutional Investor*, 25 Apr 2013: [HTML](#)
26. [no author] "Just in time for Pi Day," *Newswise*, 4 Mar 2014: [HTML](#)
27. [no author] "Should you trust your financial advisor? Pseudo-mathematics and financial charlatanism," *ScienceDaily*, 10 Apr 2014: [HTML](#)
28. Saijel Kishan, "Computer models often use unsound math, researchers say," *Bloomberg News*, 11 Apr 2014: [HTML](#)
29. Stephen Foley, "Ban pseudo-maths from investing," *Financial Times*, 16 Apr 2014: [HTML](#)
30. Brendon Conway, "Is a too-perfect ETF backtest a fraud?," *Barrons*, 17 Apr 2014: [HTML](#)
31. Cathy Scott, "Interview with David Bailey," *Institutional Investor Journals*, 23 Apr 2014: [HTML](#)
32. Ryan Jacobs, "The dangerous mathematical con of hedge funds and financial advisers," *Pacific Standard*, 28 Apr 2014: [HTML](#)
33. John Rekenhaller, "Voodoo investment strategies: Mathematicians on the attack," *Morningstar*, 8 May 2014: [HTML](#)
34. Jason Zweig "Huge returns at low risk? Not so fast," *Wall Street Journal*, 27 Jun 2014: [HTML](#)

35. Michael P. Regan, “Beware overfitting models even if they win baseball bets,” *Bloomberg News*, 30 Oct 2014; [HTML](#)
36. Frank Acland, “Huffington Post Science Blog Calls for More LENR Research,” *E-Cat World*, 29 Nov 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. Alexander Campbell, “Research uncovers new sources of financial model risk,” *Risk.net*, 20 May 2016; [HTML](#)
47. Saijel Kishan, “Six degrees of quant: Kevin Bacon and the Erdos number mystery,” *Bloomberg*, 11 Nov 2016; [HTML](#)
48. 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](#)
49. Peter Coy, “Lies, damn lies and financial statistics,” *Bloomberg* 6 Apr 2017; [HTML](#)
50. Brett Steenbarger, “Will quant blow up?,” *Trader Feed*, 8 May 2017; [HTML](#)
51. Brett Steenbarger, “3 keys to winning in financial markets,” *Forbes*, 28 May 2017; [HTML](#)
52. Larry Swedroe, “Swedroe: Grading the forecasters,” *ETF.com*, 28 Jul 2017; [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 Automation 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 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](#)

Books (most recent listed last):

1. Jonathan M. Borwein and David H. Bailey, *Mathematics by Experiment: Plausible Reasoning in the 21st Century*, A. K. Peters, Wellesley, MA, 2004; second edition, 2008.
2. Jonathan M. Borwein, David H. Bailey, and Roland Girgensohn *Experimentation in Mathematics: Computational Paths to Discovery*, A. K. Peters, Wellesley, MA, 2004.
3. 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.
4. David H. Bailey, Robert F. Lucas and Samuel W. Williams, ed., *Performance Tuning of Scientific Applications*, CRC Press, New York, 2011.
5. David H. Bailey and Jonathan M. Borwein, *Exploratory Experimentation in Mathematics: Selected Works*, Perfectly Scientific Press, Portland, OR, 2012.
6. David H. Bailey, Heinz H. Bauschke, Peter Borwein, Frank Garvan, Michel Thera, Jon D. Vanderwerff and Henry, Wolkowicz, ed., *Computational and Analytical Mathematics in Honour of Jonathan Borwein’s 60th Birthday*, Springer, 2013.
7. David H. Bailey and Jonathan M. Borwein, ed., *Pi: The Next Generation: A Sourcebook on the Recent History of Pi and Its Computation*, Springer, New York, 2016.

CD-ROM references:

1. Jonathan Borwein, David Bailey and Roland Girgensohn, *Experiments in Mathematics*, CD-ROM, A. K. Peters, Wellesley, MA, 2006.

Publications:

Below is a catalogue of Bailey's publications other than books. It includes:

- Refereed journal articles.
- Refereed conference papers.
- Other unrefereed technical reports.
- Articles published in the *Huffington Post* and the *Conversation*.

This list does **not** include several hundred other articles published in venues such as:

- The [Math Scholar blog](#).
- The [Math Drudge blog](#).
- The [Mathematical Investor blog](#).
- The [SMR blog](#).

Preprint copies are provided below in most cases, or at the website

<http://www.davidhbailey.com/dhbpapers>.

These publications are listed in approximate chronological order, with **most recent listed last**.

1. David H. Bailey, "Vector computer memory bank contention," *IEEE Transactions on Computers*, vol. C-36, no. 3 (Mar. 1987), pg. 293-298. [PDF](#)
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. [PDF](#)
3. David H. Bailey, "A high-performance FFT algorithm for vector supercomputers," *International Journal of Supercomputer Applications*, vol. 2, no. 1 (1988), pg. 82-87. [PDF](#)
4. David H. Bailey, "Numerical results on the transcendence of constants involving Pi, E, and Gamma," *Mathematics of Computation*, vol. 50, no. 181 (Jan 1988), pg. 275-281. [PDF](#)
5. David H. Bailey, "The computation of Pi to 29,360,000 decimal digits using Borweins' quartically convergent algorithm," *Mathematics of Computation*, vol. 50, no. 181 (Jan. 1988), pg. 283-296. [PDF](#)
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. [PDF](#)
7. David H. Bailey, "Extra-high speed matrix multiplication on the Cray-2," *SIAM Journal on Scientific and Statistical Computing*, vol. 9, no. 3, (May 1988), pg. 603-607. [PDF](#)
8. David H. Bailey and Helaman R. P. Ferguson, "A Strassen-Newton algorithm for high-speed parallelizable matrix inversion," *Proceedings of Supercomputing 1988*, Oct 1988, pg. 419-424.
9. Jonathan M. Borwein, Peter B. Borwein and David H. Bailey, "Ramanujan, modular equations, and approximations to Pi," *American Mathematical Monthly*, Mar. 1989, pg. 201-219. The authors of this paper later received both the Chauvenet Prize and the Merten Hesse Prize from the Mathematical Association of America. [PDF](#)
10. David H. Bailey, Horst D. Simon, John T. Barton and Martin J. Fouts, "Floating point arithmetic in future supercomputers," *International Journal of Supercomputer Applications*, vol. 3, no. 3 (1989), pg. 86-90. [PDF](#)
11. David H. Bailey, "Array transposition in SSD," manuscript, 3 Oct 1989. [PDF](#)

12. David H. Bailey and H. R. P. Ferguson, "Numerical results on relations between numerical constants using a new algorithm," *Mathematics of Computation*, vol. 53, no. 188 (Oct 1989), pg. 649-656. [PDF](#)
13. David H. Bailey, "FFTs in external or hierarchical memory," *Journal of Supercomputing*, vol. 4, no. 1 (Mar 1990), pg. 23-35. [PDF](#)
14. David H. Bailey, Eric Barszcz, Rod A. Fatoohi, Horst D. Simon and Sisira Weeratunga, "Performance results on the Intel Touchstone Gamma prototype," *Proceedings of the Fifth Distributed Memory Computing Conference*, Apr 1990, pg. 1236-1245. [PDF](#)
15. David H. Bailey, "In response to the fate of Fortran-8X," *Communications of the ACM*, vol. 33, no. 4 (Apr 1990), pg. 391-392. [PDF](#)
16. David H. Bailey, "Errata to 'The fractional Fourier transform and applications,'" manuscript, 1991. [PDF](#)
17. David H. Bailey, Eric Barszcz, John T. Barton, David S. Browning, Russell L. Carter, Leo Dagum, Rod A. Fatoohi, Paul O. Frederickson, Thomas A. Lasinski, Robert S. Schreiber, Horst D. Simon, Venkat Venkatakrishnan and Sisira Weeratunga, "The NAS Parallel Benchmarks," *International Journal of Supercomputer Applications*, vol. 5, no. 3 (Fall 1991), pg. 66-73. [PDF](#)
18. Helaman R. P. Ferguson and David H. Bailey, "A polynomial time, numerically stable integer relation algorithm," manuscript, 1991. [PDF](#)
19. David H. Bailey, King Lee, and Horst D. Simon, "Using Strassen's algorithm to accelerate the solution of linear systems," *Journal of Supercomputing*, vol. 4., no. 4 (Jan 1991), pg. 357-371. [PDF](#)
20. David H. Bailey, "Twelve ways to fool the masses when giving performance results on parallel computers," *Supercomputing Review*, Aug 1991, pg. 54-55. [PDF](#)
21. David H. Bailey and P. N. Swarztrauber, "The fractional Fourier transform and applications," *SIAM Review*, vol. 33 no. 3 (Sep 1991), pg. 389-404. Please also see the errata note that follows this item. [PDF](#)
22. David H. Bailey, Eric Barszcz, John T. Barton, David S. Browning, Russell L. Carter, Leo Dagum, Rod A. Fatoohi, Paul O. Frederickson, Thomas A. Lasinski, Robert S. Schreiber, Horst D. Simon, Venkat Venkatakrishnan and Sisira Weeratunga, "The NAS Parallel Benchmarks: Summary and preliminary results," *Proceedings of Supercomputing 1991*, ACM/IEEE Computer Society, Nov 1991, 158-165. The paper won the 2015 Test of Time Award from the Supercomputing Conference (sponsored by the ACM and the IEEE Computer Society). [PDF](#)
23. David H. Bailey and Paul O. Frederickson, "Performance of two of the NAS Parallel Benchmarks," *Proceedings of Supercomputing 1991*, ACM/IEEE Computer Society, Nov 1991, pg. 166-173. [PDF](#)
24. David H. Bailey, "Misleading performance reporting in the supercomputing field", *Scientific Programming*, vol. 1., no. 2 (Winter 1992), pg. 141-151. [PDF](#)
25. David H. Bailey, "How useful are today's parallel computers?", *Computers in Physics*, vol. 6, no. 2 (Mar./Apr. 1992), pg. 216. [PDF](#)
26. David H. Bailey, Eric Barszcz, Leo Dagum and Horst D. Simon, "NAS Parallel Benchmark results," *Proceedings of Supercomputing 1992*, Nov 1992, pg. 386-393. [PDF](#)
27. David H. Bailey, R. Krasny and R. Pelz, "Multiple precision, multiple processor vortex sheet roll-up computation," *Proceedings of the Sixth SIAM Conference on Parallel Processing for Scientific Computing*, 1993, SIAM, Philadelphia, pg. 52-56. [PDF](#)
28. David H. Bailey, "Automatic translation of Fortran programs to multiprecision," NASA RNR Technical Report, RNR-91-025, updated 1993. [PDF](#)

29. David H. Bailey, "Experience with parallel computers at NASA Ames", *International Journal of High Speed Computing*, vol. 5, no. 1 (1993), pg. 51-62. [PDF](#)
30. David H. Bailey, "A portable high performance multiprecision package," NASA RNR Technical Report, RNR-90-022, updated 1993. [PDF](#)
31. David H. Bailey, "RISC microprocessors and scientific computing," *Proceedings of Supercomputing '93*, IEEE Computer Society, 1993, pg. 645-654. [PDF](#)
32. David H. Bailey, Eric Barszcz, Leo Dagum and Horst D. Simon, "NAS Parallel Benchmark results," *IEEE Parallel and Distributed Technology*, Feb 1993, pg. 43-51. [PDF](#)
33. David H. Bailey, "Multiprecision translation and execution of Fortran programs," *ACM Transactions on Mathematical Software*, vol. 19, no. 3, Sep 1993, pg. 288-319. [PDF](#)
34. David H. Bailey, Jonathan M. Borwein and Roland Girgensohn, "Experimental evaluation of Euler sums", *Experimental Mathematics*, vol. 3, no. 1 (1994), pg. 17-30. [PDF](#)
35. David H. Bailey, M. Berry, J. Dongarra, Vladimir Getov, T. Haupt, Tony Hey, Roger W. Hockney, D. Walker, "PARKBENCH Report-1: Public International Benchmarks for Parallel Computers," Technical Report: UT-CS-93-213, 1994. [PDF](#)
36. D. Bailey, E. Barszcz, J. Barton, D. Browning, R. Carter, L. Dagum, R. Fatoohi, S. Fineberg, P. Frederickson, T. Lasinski, R. Schreiber, H. Simon, V. Venkatakrishman and S. Weeratunga, "The NAS Parallel Benchmarks," NASA RNR Technical Report, RNR-94-007, updated 1994. [PDF](#)
37. David H. Bailey and P. N. Swarztrauber, "A fast method for the numerical evaluation of continuous Fourier transforms," *SIAM Journal on Scientific Computing*, vol. 15, no. 5 (Sep 1994), pg. 1105-1110. [PDF](#)
38. David H. Bailey, "Unfavorable strides in cache memory systems," *Scientific Programming*, vol. 4 (1995), pg. 53-58. [PDF](#)
39. David H. Bailey and Paul N. Swarztrauber, "Efficient detection of a continuous-wave signal with a linear frequency drift," *SIAM Journal on Scientific Computing*, vol. 16 (1995), pg. 1233-1239. [PDF](#)
40. David H. Bailey, Tim Harris, William Saphir, Rob van der Wijngaart, Alex Woo and Maurice Yarrow, "The NASA Parallel Benchmarks 2.0," manuscript, Dec 1995. [PDF](#)
41. David H. Bailey, "A Fortran-90 based multiprecision system," *ACM Transactions on Mathematical Software*, vol. 21, no. 4 (Dec 1995), pg. 379-387. [PDF](#)
42. David H. Bailey, "On the computational cost of FFT-based linear convolutions", manuscript, Jun 1996. [PDF](#)
43. Subhash Saini and David H. Bailey, "NAS Parallel Benchmark (version 1.0) results 11-96," manuscript, Nov 1996. [PDF](#)
44. Al Globus, David H. Bailey, Steve Langhoff, Andrew Pohorille and Creon Levit, "Computational molecular nanotechnology at NASA Ames Research Center, 1996," manuscript, Dec 1996. [PDF](#)
45. David H. Bailey, Jonathan M. Borwein and Richard E. Crandall, "On the Khintchine constant," *Mathematics of Computation*, vol. 66 (1997), pg. 417-431. [PDF](#)
46. David H. Bailey and Simon Plouffe, "Recognizing numerical constants," *Proceedings of the Workshop on Organic Mathematics*, Canadian Mathematical Society, vol. 20 (1997), pg. 73-88. [PDF](#)
47. David H. Bailey, "Little's Law and high performance computing," manuscript, 1997. [PDF](#)
48. Alan H. Karp, Al Geist and David H. Bailey, "1996 Gordon Bell Prize winners," *IEEE Computer*, Jan 1997, pg. 80-85. [PDF](#)

49. David H. Bailey, Jonathan M. Borwein, Peter B. Borwein and Simon Plouffe, "The quest for Pi," *Mathematical Intelligencer*, vol. 19, no. 1 (Jan 1997), pg. 50-57. [PDF](#)
50. David H. Bailey, Peter B. Borwein and Simon Plouffe, "On the rapid computation of various polylogarithmic constants," *Mathematics of Computation*, vol. 66, no. 218 (Apr 1997), pg. 903-913. [PDF](#)
51. David H. Bailey, "Onward to petaflops computing," *ACM Communications*, vol. 40, no. 6 (Jun 1997), pg. 90-92. [PDF](#)
52. David H. Bailey, Rupak Biswas and Rob Van Der Wijngaart, "NAS applications and advanced architectures," NAS Technical Report NAS-97-031, NASA Ames Research Center (Nov 1997). [PDF](#)
53. David H. Bailey, "Challenges of future high-end computing," in Jonathan Schaeffer, ed., *High Performance Computer Systems and Applications*, Kluwer Academic Press, Boston, 1998. [PDF](#)
54. Al Globus, David H. Bailey, Jie Han, Richard Jaffe, Creon Levit, Ralph Merkle and Deepak Srivastava, "NASA applications of molecular nanotechnology," *Journal of the British Interplanetary Society*, vol. 15 (1998), pg. 145-152. [HTML](#)
55. David H. Bailey, "Finding new mathematical identities via numerical computations," *ACM SIGNUM*, vol. 33, no. 1 (Jan 1998), pg. 17-22 [PDF](#)
56. Alan H. Karp, Ewing Lusk and David H. Bailey, "1997 Gordon Bell Prize winners," *IEEE Computer*, Jan 1998, pg. 86-92. [PDF](#)
57. Ji Wang, P. C. Y. Lee and David H. Bailey, "Thickness-shear and flexural vibrations of linearly contoured crystal strips with multiprecision computation," *Computers and Structures*, vol. 70 (1999), pg. 437-445.
58. David H. Bailey and David J. Broadhurst, "A seventeenth-order polylogarithm ladder," 1999. [PDF](#)
59. Helaman R. P. Ferguson, David H. Bailey and Stephen Arno, "Analysis of PSLQ, an integer relation finding algorithm," *Mathematics of Computation*, vol. 68, no. 225 (Jan 1999), pg. 351-369. [PDF](#)
60. Adrian T. Wong, Leonid Oliker, William T. C. Kramer, Teresa L. Kaltz and David H. Bailey, "Evaluating system effectiveness in high performance computing systems," Nov 1999. [PDF](#)
61. David H. Bailey, "Integer relation detection," *Computing in Science and Engineering*, Jan-Feb, 2000, pg. 24-28. [PDF](#)
62. Adrian T. Wong, Leonid Oliker, William T. C. Kramer, Teresa L. Kaltz and David H. Bailey, "System utilization benchmark on the Cray T3E and IBM SP," *Fifth Workshop on Job Scheduling*, May 1999; also published in *Job Scheduling Strategies for Parallel Processing*, Dror G. Feitelson and Larry Rudolph, ed. Springer, 2000, pg. 56-67. [PDF](#)
63. David H. Bailey and David J. Broadhurst, "Parallel integer relation detection: Techniques and applications," *Mathematics of Computation*, vol. 70, no. 236 (Oct 2000), pg. 1719-1736. [PDF](#)
64. Yozo Hida, Xiaoye S. Li and David H. Bailey, "Quad-double arithmetic: Algorithms, implementation, and application," Oct 2000. [PDF](#)
65. Adrian T. Wong, Leonid Oliker, William T. C. Kramer, Teresa L. Kaltz and David H. Bailey, "ESP: A system utilization benchmark," *Proceedings of SC2000*, Nov 2000. [PDF](#)
66. David H. Bailey and Jonathan M. Borwein, "Experimental mathematics: Recent developments and future outlook," in Bjorn Engquist and Wilfried Schmid, ed., *Mathematics Unlimited -- 2001 and Beyond*, Springer, 2001, pg. 51-66. [PDF](#)
67. Adrian T. Wong, William T. C. Kramer, Leonid Oliker and David H. Bailey, "Comparison of the ESP benchmark with observed system utilization," manuscript, 2001. [PDF](#)

68. Yozo Hida, Xiaoye S. Li and David H. Bailey, "Algorithms for quad-double precision floating point arithmetic," *15th IEEE Symposium on Computer Arithmetic*, IEEE Computer Society, 2001, pg. 155-162. [PDF](#)
69. David H. Bailey, "How fast is my Beowulf?," in Thomas Sterling, ed., *Beowulf Cluster Computing with Linux*, and in *Beowulf Cluster Computing with Windows*, MIT Press, 2001. [PDF](#)
70. David H. Bailey and Richard E. Crandall, "On the random character of fundamental constant expansions," *Experimental Mathematics*, vol. 10, no. 2 (Jun 2001), pg. 175-190. [PDF](#).
71. C. William McCurdy, Horst D. Simon, William G. C. Kramer, Robert F. Lucas, William E. Johnston and David H. Bailey, "Future directions in scientific supercomputing," *Computer Physics Communications*, vol. 147 (2002), pg. 34-39. [PDF](#)
72. David H. Bailey, David Broadhurst, Yozo Hida, Sherry Li and Brandon Thompson, "High performance computing meets experimental mathematics," *Proceedings of SC2002*. [PDF](#)
73. David H. Bailey and Richard E. Crandall, "Random generators and normal numbers," *Experimental Mathematics*, vol. 11, no. 4 (2002), pg. 527-546. [PDF](#)
74. David H. Bailey and Daniel J. Rudolph, "An ergodic proof that rational times normal is normal", Feb 2002. [PDF](#)
75. X. S. Li, J. W. Demmel, D. H. Bailey, G. Henry, Y. Hida, J. Iskandar, W. Kahan, A. Kapur, M. C. Martin, T. Tung, D. J. Yoo, "Design, implementation and testing of extended and mixed precision BLAS," *ACM Transactions on Mathematical Software*, vol. 28, no. 2 (Jun 2002), pg. 152-205. [PDF](#)
76. David H. Bailey, "A reclusive kind of science," *Computing in Science and Engineering*, Sept-Oct 2002, pg. 79-81. [PDF](#)
77. David H. Bailey, Yozo Hida, Xiaoye S. Li and Brandon Thompson, "ARPREC: An arbitrary precision computation package," Sept 2002. [PDF](#)
78. David H. Bailey and Alexei M. Frolov, "Universal variational expansion for high-precision bound-state calculations in three-body systems," *Journal of Physics B: Atomic, Molecular and Optical Physics*, vol. 35, no. 20 (28 Oct 2002), pg. 4287-4298. [PDF](#)
79. Alexei M. Frolov and David H. Bailey, "Highly accurate evaluation of the few-body auxiliary functions and four-body integrals," *Journal of Physics B: Atomic, Molecular and Optical Physics*, vol. 36, no. 9 (14 May 2003), pg. 1857-1867. [PDF](#)
80. David H. Bailey, Bronis de Supinski, Jack Dongarra, Thomas Dunigan, Guang Gao, Adolfo Hoisie, Paul Hovland, Jeffrey Hollingsworth, David Jefferson, Chandrika Kamath, Allen Malony, Boyanna Norris, Daniel Quinlan, Sally McKee, Celso Mendes, Shirley Moore, Daniel Reed, Allan Snavely, Erich Strohmaier, Jeffrey Vetter, Patrick Worley, "Performance technologies for peta-scale systems: A white paper prepared by the Performance Evaluation Research Center and collaborators," manuscript, 14 May 2003. [PDF](#)
81. David H. Bailey and Xiaoye S. Li, "A comparison of three high-precision quadrature schemes," *Proceedings of the Real Numbers and Computing Conference*, Lyon, France, Sep 2003. See revised version below.
82. David H. Bailey, Jonathan M. Borwein, Richard E. Crandall and Carl Pomerance, "On the binary expansions of algebraic numbers," *Journal of Number Theory Bordeaux*, vol. 16 (2004), pg. 487-518. [PDF](#)
83. David H. Bailey, "Java meets numerical analysis," *Scientific Programming*, vol. 12 (2004), no. 1, pg. 59-60. [PDF](#)
84. David H. Bailey, "A Pseudo-random number generator based on normal numbers," Dec 2004.

- [PDF](#)
85. David H. Bailey, Xiaoye S. Li and Karthik Jeyabalan, “A comparison of three high-precision quadrature schemes,” *Experimental Mathematics*, vol. 14 (2005), no. 3, pg 317-329. [PDF](#)
 86. David H. Bailey, “Review of *The Siam 100-Digit Challenge: A Study in High-Accuracy Numerical Computing*,” *Bulletin of the American Mathematical Society*, vol. 42 (2005), no. 4, pg 545-548. [PDF](#)
 87. Horst Simon, William Kramer, William Saphir, John Shalf, David Bailey, Leonid Oliker, Michael Banda, C. William McCurdy, John Hules, Andrew Canning, Marc Day, Philip Colella, David Serafini, Michael Wehner and Peter Nugent, “Science-driven system architecture: A new process for leadership class computing,” *Journal of the Earth Simulator*, vol. 2, no. 1 (Jan 2005), pg 1-9. [PDF](#)
 88. David H. Bailey, “A hot-spot proof of normality for the alpha constants,” Jan 2005. [PDF](#)
 89. Piotr Luszczek, Jack J. Dongarra, David Koester, Rolf Rabenseifner, Bob Lucas, Jeremy Kepner, John McCalpin, David Bailey and Daisuke Takahashi, “Introduction to the HPC Challenge Benchmark Suite,” Apr 2005. [PDF](#)
 90. David H. Bailey, “High-precision floating-point arithmetic in scientific computation,” *Computing in Science and Engineering*, May-Jun, 2005, pg. 54-61. [PDF](#)
 91. David H. Bailey and Jonathan M. Borwein, “Experimental mathematics: Examples, methods and implications,” *Notices of the American Mathematical Society*, vol. 52, no. 5 (May 2005), pg. 502-514. [AMS Notices PDF](#) | [Preprint PDF](#)
 92. David H. Bailey and Alexei M. Frolov, “Positron annihilation in the bpositronium Ps sub 2”, *Physical Review A*, vol. 72 (11 Jul 2005), pg 014501-1 to 014501-4. [PDF](#)
 93. David H. Bailey and Allan S. Snavely, “Performance modeling: Understanding the present and predicting the future,” *Proceedings of Euro-Par 2005*, Lisbon, Portugal, Sep 2005. [PDF](#).
 94. David H. Bailey and Jonathan M. Borwein, “Future prospects for computer-assisted mathematics,” *Notes of the Canadian Mathematical Society*, vol. 37, no. 8 (Dec 2005), pg. 2-6. [PDF](#)
 95. David H. Bailey and Michal Misiurewicz, “A strong hot spot theorem,” *Proceedings of the American Mathematical Society*, vol. 134 (2006), no. 9, pg. 2495-2501. [PDF](#)
 96. David H. Bailey, Jonathan M. Borwein and Richard E. Crandall, “Integrals of the Ising class,” *Journal of Physics A: Mathematical and General*, vol. 39 (2006), pg. 12271-12302. [PDF](#) | Ising data: [PDF](#); [LaTeX](#)
 97. David H. Bailey, Jonathan M. Borwein and David M. Bradley, “Experimental determination of Apery-like identities for zeta(2n+2),” *Experimental Mathematics*, vol. 15 (2006), pg. 281-289. [PDF](#)
 98. David H. Bailey, “Review of *Accuracy and Reliability in Scientific Computing*,” by Bo Einarsson, ed., *Scientific Programming*, vol. 14 (2006), pg. 41-42. [PDF](#)
 99. Leonid Oliker, Rupak Biswas, Rob Van der Wijngaart, David H. Bailey and Allan Snavely, “Performance evaluation and modeling of ultra-scale systems,” *Parallel Processing for Scientific Computing*, SIAM, Philadelphia, PA, 2006. [PDF](#)
 100. David H. Bailey, “Tanh-sinh high-precision quadrature,” Jan 2006. [PDF](#)
 101. David H. Bailey and Jonathan M. Borwein, “Effective error bounds in Euler-Maclaurin-based quadrature schemes,” Jun 2005. [PDF](#) Condensed version in *Proceedings of the 2006 High-Performance Computing Conference (HPCS)*: [PDF](#)
 102. David H. Bailey, Jonathan M. Borwein, Vishal Kapoor and Eric Weisstein, “Ten problems in experimental mathematics,” *American Mathematical Monthly*, vol. 113, no. 6 (Jun 2006), pg.

- 481-509. [PDF](#)
103. David H. Bailey, “The BBP algorithm for Pi,” manuscript, Sep 2006. [PDF](#)
 104. David H. Bailey and Jonathan M. Borwein, “Finding general explicit formulas for Ising integral recursions,” manuscript, Oct 2006. [PDF](#)
 105. Hongzhang Shan, Erich Strohmaier, Ji Qiang, David H. Bailey, and Kathy Yelick, “Performance modeling and optimization of a high energy colliding beam simulation code,” *Proceedings of SC2006*, Nov 2006. [PDF](#)
 106. David H. Bailey, Jonathan M. Borwein and Richard E. Crandall, “Box integrals,” *Journal of Computational and Applied Mathematics*, vol. 206 (2007), pg. 196-208. [PDF](#) | Box integral data: [PDF](#); [LaTeX](#)
 107. David H. Bailey, David Borwein, Jonathan M. Borwein and Richard Crandall, “Hypergeometric forms for Ising-class integrals,” *Experimental Mathematics*, vol. 16 (2007), no. 3, pg. 257-276. [PDF](#)
 108. David H. Bailey and Jonathan M. Borwein, “Solution to Monthly Problem #11515,” manuscript, Feb 2007. [PDF](#)
 109. David H. Bailey and Jonathan M. Borwein, “Solution to Monthly problem #11275,” manuscript, Feb 2007. [PDF](#)
 110. David H. Bailey, Robert Lucas, Paul Hovland, Boyana Norris, Kathy Yelick, Dan Gunter, Bronis de Supinski, Dan Quinlan, Pat Worley, Jeff Vetter, Phil Roth, John Mellor-Crummey, Allan Snavely, Jeff Hollingsworth, Dan Reed, Rob Fowler, Ying Zhang, Mary Hall, Jacque Chame, Jack Dongarra, Shirley Moore, “Performance engineering: Understanding and improving the performance of large-scale codes,” *CT Watch Quarterly*, vol. 3, no. 4 (Nov 2007), pg. 18-23. [PDF](#)
 111. David H. Bailey and Jonathan M. Borwein, “Solution to Monthly problem #11277,” manuscript, Mar 2007. [PDF](#)
 112. David H. Bailey, “A non-normality result,” manuscript, Aug 2007. [PDF](#)
 113. David H. Bailey, Jonathan M. Borwein, Richard E. Crandall and Deirdre K. Manna, “New representations for spin integrals,” manuscript, Aug 2007.
 114. David H. Bailey, “On a tan product conjecture,” manuscript, Aug 2007. [PDF](#)
 115. Natalie J. Durgin, Sofia M. Garcia, Tamara Flournoy and David H. Bailey, “‘Syncing’ Up with the Quinn-Rand-Strogatz constant: Hurwitz-Zeta functions in non-linear physics,” Sep 2007. [PDF](#)
 116. David H. Bailey, Jonathan M. Borwein, David Broadhurst and M. L. Glasser, “Elliptic integral evaluations of Bessel moments,” *Journal of Physics A: Mathematical and General*, vol. 41 (2008), pg. 205203. [PDF](#)
 117. David H. Bailey, “Review of *An Introduction to Parallel and Vector Scientific Computing*,” *Scientific Programming*, vol. 16 (2008), pg. 97-98. [PDF](#)
 118. David H. Bailey and Jonathan M. Borwein, “High-precision computation and mathematical physics,” *XII Advanced Computing and Analysis Techniques in Physics Research*, 2008. [PDF](#)
 119. David H. Bailey, “Resolving numerical anomalies in scientific computation,” manuscript, Jan 2008. [PDF](#) | [Gzipped code file](#)
 120. David Bailey, Jacqueline Chame, Chun Chen, Jack Dongarra, Mary Hall, Jeffrey K. Hollingsworth, Paul Hovland, Shirley Moore, Keith Seymour, Jaewook Shin, Ananta Tiwari, Sam Williams, Haihang You, “PERI auto-tuning,” *Journal of Physics: Conference Series*, vol. 125 (2008), 012089. [PDF](#); journal copy: [PDF](#)
 121. David H. Bailey and Jonathan M. Borwein, “Highly parallel, high-precision numerical

- integration,” manuscript, Apr 2008. [PDF](#)
122. Yozo Hida, Xiaoye S. Li and David H. Bailey, “Library for double-double and quad-double arithmetic,” manuscript, 8 May 2008. [PDF](#)
 123. David H. Bailey and Jonathan M. Borwein, “Computer-assisted discovery and proof,” Tewodros Amdeberhan and Victor H. Moll, ed., *Tapas in Experimental Mathematics*, Contemporary Mathematics, American Mathematical Society, May 2008, pg. 21-52. [PDF](#)
 124. Samuel Williams, Kaushik Datta, Jonathan Carter, Leonid Oliker, John Shalf, Kathy Yelick and David H. Bailey, “PERI -- Auto-tuning memory-intensive kernels for multicore,” *Journal of Physics: Conference Series*, vol. 125 (2008), Nov. 2008. [IOP PDF](#) | [Preprint PDF](#);
 125. Lin-Wang Wang, Byounggak Lee, Hongzhang Shan, Zhengji Zhao, Juan Meza, Erich Strohmaier, David Bailey, “Linearly scaling 3D fragment method for large-scale electronic structure calculations,” *Proceedings of SC08*, Nov 2008. Winner of the 2008 ACM Gordon Bell Prize in a special category for “algorithmic innovation.” [PDF](#)
 126. David H. Bailey, Richard E. Crandall and Jonathan M. Borwein, “Resolution of the Quinn-Rand-Strogatz constant of nonlinear physics,” *Experimental Mathematics*, vol. 18 (2009), pg. 107-116. [PDF](#)
 127. David H. Bailey, “Can an evolutionary process generate English text?,” *Biological Theory*, vol. 4, no. 2 (Spring 2009), pg. 125-131. [PDF](#)
 128. David H. Bailey and Jonathan M. Borwein, “Solutions to Monthly Problems 11456 and 11457,” manuscript, 2009. [PDF](#)
 129. David H. Bailey and Jonathan M. Borwein, “Proposed SIAM problem,” manuscript 2009. [PDF](#)
 130. David H. Bailey, Jonathan M. Borwein and Jorg Waldvogel, “Problem proposed for the American Mathematical Monthly,” manuscript, Jan 2009 (appeared in the Monthly’s May 2009 problem section). [PDF](#)
 131. David H. Bailey and Jonathan M. Borwein, “Solution to Monthly Problem #11410,” manuscript, Feb 2009. [PDF](#)
 132. J. Meza, S. Campbell, and D. Bailey, “Mathematical and statistical opportunities in cyber security,” *Lawrence Berkeley National Laboratory Technical Report*, Mar 2009. [PDF](#)
 133. Bronis R. de Supinski, Sadaf Alam, David H. Bailey, Laura Carrington, Chris Daley, Anshu Dubey, Todd Gamblin, Dan Gunter, Paul Hovland, Heike Jagode, Karen Karavanic, Gabriel Marin, John Mellor-Crummey, Shirley Moore, Boyana Norris, Leonid Oliker, Cathie Olschanowsky, Philip C. Roth, Martin Schulz, Sameer Shende, Allan Snively, Wyatt Spear, Mustafa Tikir, Jeff Vetter, Pat Worley and Nick Wright, “Modeling the Office of Science Ten Year Facilities Plan: The PERI architecture tiger team,” *Journal of Physics: Conference Series*, Jun 2009. [PDF](#)
 134. David H. Bailey and Jonathan M. Borwein, “Solution to Monthly Problem #11418,” manuscript, Mar 2009. [PDF](#)
 135. David H. Bailey and Jonathan M. Borwein, “Experimental mathematics and computational statistics,” Edward Wegman, Yasmin H. Said and David W. Scott, editors, *Wiley Interdisciplinary Reviews: Computational Statistics*, Apr 2009. [PDF](#)
 136. David H. Bailey, “Misleading performance claims in scientific computation,” *Proceedings of DAC2009*, May 2009. [PDF](#)
 137. Zhengji Zhao, Juan Meza, Byounggak Lee, Hongzhang Shan, Eric Strohmaier, David Bailey and Lin-Wang Wang, “The linearly scaling 3D fragment method for large scale electronic structure calculations,” *Journal of Physics: Conference Series*, Jun 2009. [PDF](#)

138. David H. Bailey and Jonathan M. Borwein, "PSLQ: An algorithm to discover integer relations," *Computer Algebra Rundbrief*, no 45 (Oct 2009), pg. 8-11. [PDF](#)
139. David H. Bailey, "The NAS Parallel Benchmarks," David Padua, ed., *Encyclopedia of Parallel Computing*, Springer, Nov 2009. [PDF](#)
140. David H. Bailey and Jonathan M. Borwein, "Experimental computation with oscillatory integrals," Tewodros Amdeberhan, Luis A. Medina and Victor H. Moll, ed., *Gems in Experimental Mathematics*, Contemporary Mathematics, American Mathematical Society, vol. 517 (2010), pg. 25-40. [PDF](#)
141. David H. Bailey, Jonathan M. Borwein, David Broadhurst and Wadim Zudilin, "Experimental mathematics and mathematical physics," Tewodros Amdeberhan, Luis A. Medina and Victor H. Moll, ed., *Gems in Experimental Mathematics*, Contemporary Mathematics, vol. 517 (2010), American Mathematical Society, pg. 41-58. [PDF](#)
142. Alex Kaiser, Samuel Williams, Kamesh Madduri, Khaled Ibrahim, David Bailey, James Demmel and Erich Strohmaier, "A principled kernel testbed for hardware/software co-design research," *Proceedings of the 2nd USENIX Workshop on Hot Topics in Parallelism (HotPar)*, Apr 2010. [PDF](#)
143. Erich Strohmaier, Sam Williams, Alex Kaiser, Kamesh Madduri, Khaled Ibrahim, David H. Bailey, James W. Demmel, "A kernel testbed for parallel architecture, language, and performance research," *Proceedings of the International Conference of Numerical Analysis and Applied Mathematics (ICNAAM)*, Jun 2010. [PDF](#)
144. David H. Bailey, Jonathan M. Borwein and Richard E. Crandall, "Advances in the theory of box integrals," *Mathematics of Computation*, vol. 79, no. 271 (Jul 2010), pg. 1839-1866. [PDF](#)
145. Alex Kaiser, Samuel Williams, Kamesh Madduri, Khaled Ibrahim, David H. Bailey, James W. Demmel, Erich Strohmaier, "TORCH computational reference kernels: A testbed for computer science research," manuscript, Dec 2010. [PDF](#)
146. Samuel W. Williams and David H. Bailey, "Parallel computer architecture," in David H. Bailey, Robert F. Lucas and Samuel W. Williams, ed., *Performance Tuning of Scientific Applications*, CRC Press, Boca Raton, FL, 2011, pg. 11-33.
147. David H. Bailey and Jonathan M. Borwein, "High-precision numerical integration: Progress and challenges," *Journal of Symbolic Computation*, vol. 46 (2011), pg. 741-754. [PDF](#)
148. David H. Bailey, Allan Snively and Laura Carrington, "Performance modeling: The convolution approach," in David H. Bailey, Robert F. Lucas and Samuel W. Williams, ed., *Performance Tuning of Scientific Applications*, CRC Press, Boca Raton, FL, 2011, pg. 151-164.
149. David H. Bailey, Lin-Wang Wang, Hongzhang Shan, Zhengji Zhao, Juan Meza, Erich Strohmaier and Byoung-hak Lee, "Tuning an electronic structure code," in David H. Bailey, Robert F. Lucas and Samuel W. Williams, ed., *Performance Tuning of Scientific Applications*, CRC Press, Boca Raton, FL, 2011, pg. 339-354.
150. David H. Bailey, "Introduction," in David H. Bailey, Robert F. Lucas and Samuel W. Williams, ed., *Performance Tuning of Scientific Applications*, CRC Press, Boca Raton, FL, 2011, pg. 1-10.
151. David H. Bailey and Jonathan M. Borwein, "The greatest mathematical discovery?," manuscript, May 2011. [PDF](#)
152. Orianna DeMasi, Juan Meza and David H. Bailey, "Dimension reduction using rule ensemble machine learning methods: A numerical study of three ensemble methods," manuscript, 30 Aug 2011. [PDF](#)
153. Jonathan Borwein and David H. Bailey, "Magic numbers: The beauty of decimal notation,"

- The Conversation*, 23 Aug 2011. [HTML](#)
154. Jonathan Borwein and David H. Bailey, “Where is everybody? Doing the maths on extraterrestrial life,” *The Conversation*, 15 Sep 2011. [HTML](#)
 155. Jonathan Borwein and David H. Bailey, “How far away is everybody? Climbing the cosmic distance ladder,” *The Conversation*, 24 Oct 2011. [HTML](#)
 156. Jonathan Borwein and David H. Bailey, “When things don’t add up: Statistics, maths and scientific fraud,” *The Conversation*, 14 Nov 2011. [HTML](#)
 157. David H. Bailey and Jonathan M. Borwein, “Exploratory experimentation and computation,” *Notices of the American Mathematical Society*, vol. 58 (Nov 2011), pg. 1410-1419. [AMS Notices PDF](#) | [Preprint PDF](#)
 158. Jonathan Borwein and David H. Bailey, “Danger of death: Are we programmed to miscalculate risk?,” *The Conversation*, 8 Dec 2011. [HTML](#)
 159. David H. Bailey, Jonathan M. Borwein, Cristian S. Calude, Michael J. Dinneen, Monica Dumitrescu and Alex Yee, “An empirical approach to the normality of pi,” *Experimental Mathematics*, vol. 21 (2012), pg. 375-384. [PDF](#)
 160. David H. Bailey and Jonathan M. Borwein, “Hand-to-hand combat with thousand-digit integrals,” *Journal of Computational Science*, vol. 3 (2012), pg. 77-86. [PDF](#)
 161. David H. Bailey, Roberto Barrio, and Jonathan M. Borwein, “High precision computation: Mathematical physics and dynamics,” *Applied Mathematics and Computation*, vol. 218 (2012), pg. 10106-10121. [PDF](#)
 162. David H. Bailey and Jonathan M. Borwein, “Nonnormality of Stoneham constants,” *Ramanujan Journal*, vol. 29 (2012), pg. 409-422; DOI 10.1007/s11139-012-9417-3. [PDF](#)
 163. Jonathan Borwein and David H. Bailey, “Make mine a double: Moore’s Law and the future of mathematics,” *The Conversation*, 31 Jan 2012. [HTML](#)
 164. David H. Bailey and Jonathan M. Borwein, “Exploration, Experimentation and Computation” (Chinese translation of similarly titled article above), *International Advances in Mathematics* (ISBN 1003-3092), Chinese Academy of Sciences, vol. 31, no. 1 (Jan 2012), pg. 1-14. [PDF](#)
 165. David H. Bailey, Edward A. Baron, Hemant Shukla and Xiaoye S. Li, “High-precision arithmetic and exascale computing,” manuscript, 9 Feb 2012. [PDF](#)
 166. Jonathan Borwein and David H. Bailey, “Doctor, doctor: why so few scientists in top government jobs?,” *The Conversation*, 29 Feb 2012. [HTML](#)
 167. David H. Bailey, Jonathan M. Borwein, Cristian S. Calude, Michael J. Dinneen, Monica Dumitrescu and Alex Yee, “Normality and the digits of Pi,” in David H. Bailey and Jonathan M. Borwein, *Exploratory Experimentation in Mathematics: Selected Works*, Perfectly Scientific Press, Portland, OR, 2012, 3 Feb 2012. [PDF](#)
 168. Jonathan Borwein and David H. Bailey, “Hot and bothered: The uncertain mathematics of global warming,” *The Conversation*, 17 Feb 2012. [HTML](#)
 169. David H. Bailey and Marcos M. Lopez de Prado, “Balanced baskets: A new approach to trading and hedging risks,” *Journal of Investment Strategies*, vol. 14 (2012). [SSRN PDF](#) | [Preprint PDF](#)
 170. Jonathan Borwein and David H. Bailey, “Just out of Curiosity, did life on Earth come from Mars?” *The Conversation*, 3 Dec 2012. [HTML](#)
 171. Jonathan Borwein and David H. Bailey, “How old is Earth? A word to skeptics on the dating game,” *The Conversation*, 22 Mar 2012. [HTML](#)
 172. David H. Bailey and Marcos M. Lopez de Prado, “The Sharpe ratio efficient frontier,”

- Journal of Risk*, vol. 15 (2012), pg. 3-44. [SSRN PDF](#) | [Preprint PDF](#)
173. Jonathan Borwein and David H. Bailey, "Yes, there's a numeracy crisis -- so what's the solution?," *The Conversation*, 13 Apr 2012. [HTML](#)
 174. David H. Bailey and Jonathan M. Borwein, "Are computers playing games with us?," *Huffington Post*, 2 Apr 2012. [HTML](#)
 175. David H. Bailey and Jonathan M. Borwein, "2001: A Space Odyssey: Art vs. 2012 reality," *Huffington Post*, 9 May 2012. [HTML](#)
 176. David H. Bailey, Orianna DeMasi and Juan Meza, "Feature selection and multi-class classification using a rule ensemble method," manuscript, 25 May 2012. [PDF](#)
 177. Jonathan Borwein and David H. Bailey, "Person or computer: Could you pass the Turing test?," *The Conversation*, 3 May 2012. [HTML](#)
 178. Jonathan Borwein and David H. Bailey, "Bad numbers make for killer headlines -- and dodgy news," *The Conversation*, 26 Jun 2012. [HTML](#)
 179. Jonathan Borwein and David H. Bailey, "How to sell green energy in an era of abundant gas and oil," *The Conversation*, 15 Jun 2012. [HTML](#)
 180. David H. Bailey and Jonathan M. Borwein, "Solution to Monthly problem 11650," manuscript, 14 Jun 2012. [PDF](#)
 181. David H. Bailey and Jonathan M. Borwein, "Is science 'forever tentative' and 'socially constructed'? No way!," *Huffington Post*, 7 Jun 2012. [HTML](#)
 182. Jonathan Borwein and David H. Bailey, "School maths is failing children -- a US and Australian perspective," *The Conversation*, 25 Jul 2012. [HTML](#)
 183. David H. Bailey and Jonathan M. Borwein, "Algebra is essential in a 21st century economy," *Huffington Post*, 1 Aug 2012. [HTML](#)
 184. David H. Bailey and Jonathan M. Borwein, "Numerical nonsense in the U.S. presidential campaign," *Huffington Post*, 20 Aug 2012. [HTML](#)
 185. Jonathan Borwein and David H. Bailey, "Smart meters are about as dangerous as...," *The Conversation*, 10 Sep 2012. [HTML](#)
 186. Jonathan Borwein and David H. Bailey, "How to stop the media reporting science fiction as fact," *The Conversation*, 22 Oct 2012. [HTML](#)
 187. David H. Bailey and Jonathan M. Borwein, "Ancient Indian square roots: An exercise in forensic paleo-mathematics," *American Mathematical Monthly*, vol. 119, no. 8 (Oct 2012), pg. 646-657. [PDF](#)
 188. Jonathan Borwein and David H. Bailey, "Newly calculated: Maths anxiety triggers pain in the brain," *The Conversation*, 1 Nov 2012. [HTML](#)
 189. David H. Bailey and Jonathan M. Borwein, "What on earth do they think? U.S. politicians on the age of the planet," *Huffington Post*, 20 Nov 2012. [HTML](#)
 190. David H. Bailey and Jonathan M. Borwein, "Is believing in climate change an insult to God?," *Huffington Post*, 7 Dec 2012. [HTML](#)
 191. Francisco J. Aragon Artacho, David H. Bailey, Jonathan M. Borwein and Peter B. Borwein, "Walking on real numbers," *Mathematical Intelligencer*, vol. 35 (2013), pg. 42-60. [PDF](#)
 192. David H. Bailey, Jonathan M. Borwein, Richard E. Crandall and John Zucker, "Lattice sums arising from the Poisson equation," *Journal of Physics A: Mathematical and Theoretical*, vol. 46 (2013), pg. 115201. [PDF](#)
 193. David H. Bailey and Jonathan M. Borwein, "Compressed lattice sums arising from the Poisson equation: Dedicated to Professor Hari Sirvastava," *Boundary Value Problems*, vol. 75 (2013), DOI: 10.1186/1687-2770-2013-75. [Boundary Value Problems PDF](#) | [Preprint PDF](#)

194. David H. Bailey and Jonathan M. Borwein, “Normal numbers and pseudorandom generators,” in David H. Bailey, Heinz H. Bauschke, Peter Borwein, Frank Garvan, Michel Thera, Jon D. Vanderwerff and Henry, Wolkowicz, ed., *Computational and Analytical Mathematics in Honour of Jonathan Borwein’s 60th Birthday*, Springer, 2013. [PDF](#)
195. David H. Bailey, Jonathan M. Borwein, Andrew Mattingly and Glenn Wightwick, “The computation of previously inaccessible digits of π^2 and Catalan’s constant,” *Notices of the American Mathematical Society*, vol. 60 (2013), no. 7, pg. 844-854. The authors of this paper were awarded the 2017 Levi L. Conant Prize by the American Mathematical Society. [AMS Notices PDF](#) | [Preprint PDF](#)
196. David H. Bailey, “A New Kind of Science: Ten years later,” in Hector Zenil, ed., *Irreducibility and Computational Equivalence*, Springer, 2013. [PDF](#)
197. Abhinav Sarje, Samuel Williams and David H. Bailey, “MPQC: Performance analysis and optimization,” manuscript, 24 Jan 2013. [PDF](#)
198. Taghrid Samak, Christine Morin and David H. Bailey, “Energy consumption models and predictions for large-scale systems,” *Proceedings of the Ninth Workshop on High-Performance, Power-Aware Computing*, 22 Jan 2013. [PDF](#)
199. Jonathan Borwein and David H. Bailey, “Danger, you’re at serious risk of ... no, sorry, it’s all relative,” *The Conversation*, 15 Feb 2013. [HTML](#)
200. Victoria Stodden, David H. Bailey, Jonathan M. Borwein, Randall J. LeVeque, William Rider and William Stein, “Setting the default to reproducible: Reproducibility in computational and experimental mathematics,” manuscript, 2 Feb 2013. [PDF](#)
201. David H. Bailey and Jonathan M. Borwein, “Smart meters, dumb science,” *Huffington Post*, 28 Feb 2013. [HTML](#)
202. David H. Bailey and Jonathan M. Borwein, “Set the default to ‘Open’: Reproducible science in the computer age,” *Huffington Post*, 7 Feb 2013. [HTML](#)
203. David H. Bailey, Marcos M. Lopez de Prado and Eva del Pozo, “The strategy approval decision: A Sharpe ratio indifference curve approach,” *Algorithmic Finance*, vol. 2 (2013), pg. 99-109. [SSRN PDF](#) | [Preprint PDF](#)
204. Jonathan Borwein and David H. Bailey, “A Higgs, the Higgs ... is maths at the root of reality?,” *The Conversation*, 21 Mar 2013. [HTML](#)
205. David H. Bailey and Marcos Lopez de Prado, “An open-source implementation of the critical line algorithm for portfolio optimization,” *Algorithms*, vol. 6 (2013), pg. 169-196, DOI: 10.3390/a6010169. [SSRN PDF](#) | [Preprint PDF](#) | [CLA-files.zip](#)
206. Cindy Rubio-Gonzalez, Cuong Nguyen, Hong Diep Nguyen, James Demmel, William Kahan, Koushik Sen, David H. Bailey, Costin Iancu and David Hough, “Precimonious: Tuning assistant for floating-point precision,” *Proceedings of SC13*, 26 Apr 2013. [PDF](#)
207. David H. Bailey and Jonathan M. Borwein, “Why E.O. Wilson is wrong,” *Huffington Post*, 18 Apr 2013. [HTML](#)
208. David H. Bailey and Jonathan M. Borwein, “Are the digits of π random?,” *Huffington Post*, 16 Apr 2013. [HTML](#)
209. George Micheliogiannakis, Xiaoye S. Li, David H. Bailey and John Shalf, “Extending summation precision for network reduction operations,” *Proceedings of the International Symposium on Computer Architecture and High Performance Computing*, 26 Apr 2013. [PDF](#)
210. Jonathan Borwein and David H. Bailey, “The Reinhart-Rogoff error -- or how not to Excel at economics,” *The Conversation*, 23 Apr 2013. [HTML](#)
211. Jonathan Borwein and David H. Bailey, “Scientific fraud, sloppy science -- yes, they

- happen,” *The Conversation*, 7 May 2013. [HTML](#)
212. Anubhav Jain, Ivano E. Castelli, Geoffroy Hautier, David H. Bailey and Karsten W. Jacobsen, “Performance of genetic algorithms in search for water splitting perovskites,” *Journal of Materials Science*, DOI 10.1007/s10853-013-7448-9, May 2013. [PDF](#)
213. Jonathan Borwein and David H. Bailey, “Stupid science funding decisions? Australia’s not the only dunce,” *The Conversation*, 13 May 2013. [HTML](#)
214. David H. Bailey and Jonathan M. Borwein, “Hype now, hide later: No way to do scientific research,” *Huffington Post*, 28 May 2013. [HTML](#)
215. David H. Bailey and Jonathan M. Borwein, “The colorful life of the four-color theorem: A tribute to Kenneth Appel,” *Huffington Post*, 8 May 2013. [HTML](#)
216. Victoria Stodden, Jonathan Borwein and David H. Bailey, “‘Setting the default to reproducible’ in computational science research,” *SIAM News*, vol. 46, no. 5 (Jun 2013), pg. 4-6.
217. Orianna DeMasi, Taghrid Samak and David H. Bailey, “Identifying HPC codes via performance logs and machine learning,” *Proceedings of the First Workshop on Changing Landscapes in HPC Security*, ACM, New York, 17-21 Jun 2013, pg. 23-30. [PDF](#)
218. David H. Bailey, Jonathan M. Borwein and Victoria Stodden, “Set the default to ‘open’,” *Notices of the American Mathematical Society*, Jun/Jul 2013, pg. 679. [AMS Notices PDF](#) | [Preprint PDF](#)
219. Jonathan Borwein and David H. Bailey, “You wait ages for number theory results, then two come at once,” *The Conversation*, 3 Jun 2013. [HTML](#)
220. Jonathan Borwein and David H. Bailey, “Glum and glummer: Australia vs US on science literacy results,” *The Conversation*, 19 Jul 2013. [HTML](#)
221. David H. Bailey and Jonathan M. Borwein, “High-precision arithmetic: Progress and challenges,” manuscript, 8 Aug 2013. [PDF](#). An updated version of this manuscript is “High-precision arithmetic in mathematical physics” (see below). [PDF](#)
222. David H. Bailey, Jonathan M. Borwein, Richard E. Crandall and Michael G. Rose, “Expectations on fractal sets,” *Applied Mathematics and Computation*, vol. 220 (1 Sep 2013), pg. 695-721. <http://dx.doi.org/10.1016/j.amc.2013.06.078>. [PDF](#)
223. David H. Bailey and Jonathan M. Borwein, “Please mess with Texas: Textbook fiasco threatens U.S. science,” *Huffington Post*, 18 Sep 2013. [HTML](#)
224. David H. Bailey and Jonathan M. Borwein, “When skepticism becomes denial: The unholy alliance between science denial movements,” *Huffington Post*, 05 Nov 2013. [HTML](#)
225. Jonathan M. Borwein and David H. Bailey, “The recent trademarking of Pi: a troubling precedent,” *Notices of the American Mathematical Society*, vol. 61 (2014), pg. 1224-1227. [AMS Notices PDF](#) | [Preprint PDF](#)
226. David H. Bailey and Jonathan M. Borwein, “Pi day is upon us again, and we still do not know if pi is normal,” (Chinese translation of similarly titled article above), *Mathematical Advances of Translation*, vol. 33 (2014), pg. 222-235. [PDF](#)
227. George Micheliogiannakis, Xiaoye S. Li, David H. Bailey and John Shalf, “Extending summation precision for network reduction operations,” *Springer International Journal of Parallel Programming*, vol. 43 (2014), pg. 1218-1243. [HTML](#)
228. David H. Bailey, Jonathan M. Borwein and Alexander D. Kaiser, “Automated simplification of large symbolic expressions,” *Journal of Symbolic Computation*, vol. 60 (Jan 2014), pg. 120-136. [Science Direct PDF](#) | [Preprint PDF](#) | [Code](#)
229. David H. Bailey and Jonathan M. Borwein, “Why mathematics is beautiful and why it

- matters,” *Huffington Post*, 18 Feb 2014. [HTML](#)
230. David H. Bailey and Jonathan M. Borwein, “Pi day is upon us again, and we still do not know if pi is normal,” *American Mathematical Monthly*, Mar 2014, pg. 191-206. [MAA PDF](#) | [Preprint PDF](#)
231. David H. Bailey, Stephanie Ger, Marcos Lopez de Prado, Alexander Sim and Kesheng Wu, “Statistical overfitting and backtest performance,” manuscript, 07 Oct 2014. [SSRN PDF](#) | [Preprint PDF](#)
232. Jonathan Borwein and David H. Bailey, “We still can’t get enough pi ... but why?,” *The Conversation*, 14 Mar 2014. [HTML](#)
233. David H. Bailey, Jonathan M. Borwein, Marcos Lopez de Prado and Qiji Jim Zhu, “Pseudo-mathematics and financial charlatanism: The effects of backtest overfitting on out-of-sample performance,” *Notices of the American Mathematical Society*, May 2014, pg. 458-471. [AMS Notices PDF](#) | [SSRN PDF](#) | [Preprint PDF](#)
234. David H. Bailey and Marcos Lopez de Prado, “The deflated Sharpe ratio: Correcting for selection bias, backtest overfitting and non-normality,” *Journal of Portfolio Management*, vol. 40 (2014), pg. 94-107. [SSRN PDF](#) | [Preprint PDF](#)
235. David H. Bailey and Jonathan M. Borwein, “Pi Day 3.14 (14),” *Huffington Post*, 14 Mar 2014. [HTML](#)
236. David H. Bailey, Jonathan M. Borwein, Olga Caprotti, Ursula Martin, Bruno Salvy, Michela Taufer, “Opportunities and challenges in 21st century mathematical computation: ICERM workshop report,” manuscript, 31 Jul 2014. [PDF](#) | [Comments by Nelson H. F. Beebe \(PDF\)](#)
237. Jonathan Borwein and David H. Bailey, “When science and philosophy collide in a ‘fine-tuned’ universe,” *The Conversation*, 02 Apr 2014. [HTML](#)
238. David H. Bailey and Jonathan M. Borwein, “Can Pi be trademarked?,” *Huffington Post*, 20 Jun 2014. [HTML](#)
239. David H. Bailey, Jonathan M. Borwein and Richard E. Crandall, “Computation and theory of extended Mordell-Tornheim-Witten sums,” *Mathematics of Computation*, vol. 83, no. 288 (Jul 2014), pg. 1795-1821. [PDF](#)
240. David H. Bailey and Jonathan M. Borwein, “How financially literate is the investing public?,” *Huffington Post*, 29 Jul 2014. [HTML](#)
241. David H. Bailey and Jonathan M. Borwein, “To frack or not to frack: That is the question,” *Huffington Post*, 09 Sep 2014. [HTML](#)
242. David H. Bailey and Jonathan M. Borwein, “Fusion energy: Hope or hype?,” *Huffington Post*, 23 Oct 2014. [HTML](#)
243. David H. Bailey and Jonathan M. Borwein, “Opportunities and challenges in experimental mathematics,” *SIAM News*, vol. 47, no. 9 (2014), pg. 4, 8. [Preprint PDF](#)
244. David H. Bailey and Jonathan M. Borwein, “Dubious digits: Is this data really that accurate?,” *Huffington Post*, 10 Nov 2014. [HTML](#)
245. Jonathan Borwein and David H. Bailey, “The significance of digits: just how reliable are reported numbers?,” *The Conversation*, 26 Nov 2014. [HTML](#)
246. David H. Bailey and Jonathan M. Borwein, “Low energy nuclear reactions: Papers and patents,” *Huffington Post*, 28 Nov 2014. [HTML](#)
247. David H. Bailey and Jonathan M. Borwein, “How have 2014 market prophets fared?,” *Huffington Post*, 09 Dec 2014. [HTML](#)
248. David H. Bailey and Jonathan M. Borwein, “Experimental computation as an ontological

game changer: The impact of modern mathematical computation tools on the ontology of mathematics,” in Ernest Davis and Philip J. Davis, ed., *Mathematics, Substance and Surmise: Views on the Meaning and Ontology of Mathematics*, Springer, New York, 2015, pg. 25-67.

[PDF](#)

249. David H. Bailey, David Borwein and Jonathan M. Borwein, “On Eulerian log-gamma integrals and Tornheim-Witten zeta functions,” *Ramanujan Journal*, vol. 36 (2015), 43-68, DOI 10.1007/s11139-012-9427-1. [PDF](#)
250. David H. Bailey and Jonathan M. Borwein, “High-precision arithmetic in mathematical physics,” *Mathematics*, vol. 3 (2015), pg. 337-367. [Journal PDF](#) | [Preprint PDF](#)
251. David H. Bailey and Jonathan M. Borwein, “Experimental mathematics in the society of the future,” 11 Jan 2015. [PDF](#)
252. David H. Bailey and Jonathan M. Borwein, “Experimental applied mathematics,” in N. J. Higham, M. R. Dennis, P. Glendinning, P. A. Martin, F. Santosa and J. Tanner, ed., *Princeton Companion for Applied Mathematics*, Princeton University Press, Princeton, NJ, 2015, pg. 925-933. [PDF](#)
253. David H. Bailey and Marcos Lopez de Prado, “Stop-outs under serial correlation and the ‘triple penance’ rule,” *Journal of Risk*, vol. 18 (2015), no. 2, pg. 61-93. [SSRN PDF](#) | [Preprint PDF](#)
254. David H. Bailey, Jonathan M. Borwein, Amir Salehipour, Marcos Lopez de Prado and Qiji Zhu, “Online tools for demonstration of backtest overfitting,” manuscript, 29 Nov 2015. [Preprint PDF](#) | [SSRN PDF](#)
255. Jonathan Borwein and David H. Bailey, “Prepared for Pi Day? This year it’s a once in a century celebration,” *The Conversation*, 13 Mar 2015. [HTML](#)
256. David H. Bailey and Jonathan M. Borwein, “Where is ET? Fermi’s paradox turns 65,” *Huffington Post*, 10 Apr 2015. [HTML](#)
257. David H. Bailey, “MPFUN2015: A thread-safe arbitrary precision package (full documentation),” manuscript, 30 Apr 2015. [PDF](#)
258. David H. Bailey and Jonathan M. Borwein, “Desperately seeking ET: Fermi’s paradox turns 65 (Part II),” *Huffington Post*, 17 Apr 2015. [HTML](#)
259. David H. Bailey and Jonathan M. Borwein, “Lessons from the ‘Flash Crash’ regulatory fiasco,” *Huffington Post*, 27 Apr 2015. [HTML](#)
260. David H. Bailey and Jonathan M. Borwein, “How well do individuals understand Social Security (and its overseas counterparts)?,” *Huffington Post*, 25 Jun 2015. [HTML](#)
261. Jonathan Borwein and David H. Bailey, “Moore’s Law is 50 years old but will it continue?,” *The Conversation*, 20 Jul 2015. [HTML](#)
262. David H. Bailey and Jonathan M. Borwein, “Cold fusion heats up: Fusion energy and LENR update,” *Huffington Post*, 28 Aug 2015. [HTML](#)
263. David H. Bailey and Jonathan M. Borwein, “Computation and theory of extended Mordell-Tornheim-Witten sums II,” *Journal of Approximation Theory*, vol. 197 (Sept. 2015), pg. 115--140. [JAT PDF](#) | [Preprint PDF](#)
264. David H. Bailey and Jonathan M. Borwein, “Crandall’s computation of the incomplete gamma function and the Hurwitz zeta function with applications to Dirichlet L-series,” *Applied Mathematics and Computation*, vol. 268C (Oct 2015), pg. 462-477. [PDF](#)
265. David H. Bailey and Jonathan M. Borwein, “Interview with Andrea Rossi, LENR energy pioneer,” *Huffington Post*, 06 Oct 2015. [HTML](#)
266. David H. Bailey and Jonathan M. Borwein, “Data vs theory: The mathematical battle for the

- soul of physics,” *Huffington Post*, 30 Dec 2015. [HTML](#)
267. David H. Bailey and Jonathan M. Borwein, “Ancient Indian square roots,” in Helaine Selin, ed., *Encyclopedia of the History of Science, Technology and Medicine in Non-Western Cultures*, third edition, Springer, 2016. [PDF](#)
268. David H. Bailey, Jonathan M. Borwein and Victoria Stodden, “Facilitating reproducibility in scientific computing: Principles and practice,” in Harald Atmanspacher and Sabine Maasen, eds, *Reproducibility: Principles, Problems, Practices and Prospects*, John Wiley and Sons, New York, 2016, pg. 205-232. This book received the 2017 Prose Award (Honorable Mention) in the category “Textbook/Best in Physical Sciences and Mathematics.” [PDF](#)
269. David H. Bailey and Jonathan M. Borwein, “Computation and structure of character polylogarithms with applications to character Mordell-Tornheim-Witten sums,” *Mathematics of Computation*, vol. 85 (2016), no. 297, pg. 295-324. [PDF](#)
270. David H. Bailey, Jonathan M. Borwein, Amir Salehipour, Marcos Lopez de Prado and Qiji Zhu, “Backtest overfitting in financial markets,” *Automated Trader*, to appear, 9 Feb 2016. [Preprint PDF](#) | [SSRN PDF](#)
271. David H. Bailey and Jonathan M. Borwein, “How likely is it that scientists are engaged in a conspiracy?,” *Huffington Post*, 1 Feb 2016. [HTML](#)
272. David H. Bailey and Jonathan M. Borwein, “Pi Day 2016,” *Huffington Post*, 14 Mar 2016. [HTML](#)
273. David H. Bailey and Jonathan M. Borwein, “Space exploration: The future is now,” *Huffington Post*, 15 Apr 2016. [HTML](#)
274. Cuong Nguyen, Cindy Rubio-Gonzalez, Benjamin Mehne, Koushik Sen, Costin Iancu, James Demmel, William Kahan, Wim Lavrijsen, David H. Bailey and David Hough, “Floating-point precision tuning using blame analysis,” 38th International Conference on Software Engineering (ICSE 2016), 14-22 May 2016, Austin, Texas, USA. [PDF](#)
275. David H. Bailey and Jonathan M. Borwein, “Why are so many mathematicians also musicians?,” *Huffington Post*, 3 May 2016. [HTML](#)
276. Jonathan Borwein and David H. Bailey, “Will computers replace humans in mathematics?,” *The Conversation*, 2 Jun 2016. [HTML](#)
277. David H. Bailey, Jonathan M. Borwein, Richard Brent and Mohsen Reisi Ardali, “Reproducibility in computational science: a case study: Randomness of the digits of Pi,” *Experimental Mathematics*, 24 Aug 2016, vol. 26, pg. 298-305. [DOI](#) | [Preprint PDF](#)
278. David H. Bailey, Jonathan M. Borwein, Jason Kimberley and Watson Ladd, “Computer discovery and analysis of large Poisson polynomials,” *Experimental Mathematics*, 27 Aug 2016, vol. 26, pg. 349-363. [DOI](#) | [PDF](#)
279. David H. Bailey, “Why science needs the humanities,” *Huffington Post*, 18 Oct 2016. [HTML](#).
280. David H. Bailey, “A short history of pi formulas,” manuscript, 7 Nov 2016. [PDF](#)
281. David H. Bailey, “A collection of mathematical formulas involving pi,” manuscript, 7 Nov 2016. [PDF](#)
282. David H. Bailey, “Asian tigers roar in latest international test results; will the U.S. respond?,” *Huffington Post*, 5 Dec 2016. [HTML](#).
283. Victoria Stodden, Marcia McNutt, David H. Bailey, Ewa Deelman, Yolanda Gil, Brooks Hanson, Michael A. Heroux, John P.A. Ioannidis and Michela Taufer, “Enhancing reproducibility for computational methods,” *Science*, vol. 356, no. 3617 (3 Dec 2016), pg. 1240-1241. [PDF](#)

284. David H. Bailey, “How qualified, scientifically, are Trump’s appointees?,” *Huffington Post*, 23 Dec 2016. [HTML](#)
285. David H. Bailey, “Jonathan M. Borwein’s Extraordinary Mathematical Career,” *Notes of the Canadian Mathematical Society*, Dec 2016, pg. 14-15. [PDF](#)
286. David H. Bailey and Jonathan M. Borwein, “A computational mathematics view of space, time and complexity,” in Shyam Wuppuluri and Giancarlo Ghirardi, ed., *Space, Time and the Limits of Human Understanding*, Springer, New York, 2017, pg. 403-416. [PDF](#)
287. David H. Bailey, “Jonathan Borwein: Experimental mathematician,” *Experimental Mathematics*, 26 Feb 2017. [PDF](#)
288. David H. Bailey, Jonathan M. Borwein, Amir Salehipour and Marcos Lopez de Prado, “Evaluation and ranking of market forecasters,” *Journal of Investment Management*, to appear, 30 May 2017. [Preprint PDF](#) | [SSRN PDF](#)
289. David H. Bailey, Jonathan M. Borwein and Marcos Lopez de Prado, “Stock portfolio design and backtest overfitting,” *Journal of Investment Management*, vol. 17 (2017), no. 1. [Preprint PDF](#) | [SSRN PDF](#)
290. David H. Bailey and Jonathan M. Borwein, “Computation and experimental evaluation of Mordell-Tornheim-Witten sum derivatives,” *Experimental Mathematics*, published online 17 Mar 2017. [PDF](#)
291. David H. Bailey, Jonathan M. Borwein, Marcos Lopez de Prado and Qiji Jim Zhu, “The probability of backtest overfitting,” *Journal of Computational Finance*, vol. 20, no. 4 (Apr 2017), pg. 39-69. [SSRN PDF](#) | [Preprint PDF](#)
292. David H. Bailey, “A compendium of BBP-type formulas for mathematical constants,” updated 15 Aug 2017. [PDF](#)