

PUBLICATIONS OF JEFFREY C. LAGARIAS

A. Books and Book Chapters

1. *Mathematical Developments Arising from Linear Programming* (J. C. Lagarias and M. J. Todd, Eds), Contemporary Math. Vol. 114, Amer. Math. Soc. 1990.
2. Point Lattices, Chapter 19 in: *Handbook of Combinatorics*, Amsterdam: Elsevier Science Publ. 1995, pp. 919–966.
3. *The Ultimate Challenge: The $3x + 1$ Problem* (J. C. Lagarias, Ed.), Amer. Math. Society, Providence, RI 2010 (in press).
4. *The Kepler Conjecture. The proof by T. C. Hales with S. P. Ferguson.* (J. C. Lagarias, Ed.), Springer-Verlag: New York 2011 (anticipated).

B. Papers in Refereed Journals

1. Discrete Balancing Games, Bulletin of the Institute of Mathematics, Academia Sinica **5** (1977), 363–373.
2. Effective Versions of the Chebotarev Density Theorem, in: *Algebraic Number Fields, L-Functions and Galois Properties, Proceedings of the 1975 Durham Symposium*, (A. Fröhlich, Ed.), Academic Press (1977), 409–464 (with A. M. Odlyzko).
3. Minimum Range Sequences of all k -subsets of a Set, Discrete Mathematics **19** (1977), 257–264 (with F. K. Hwang).
4. Signatures of Units and Congruences (mod 4) in Certain Real Quadratic Fields, J. reine angew. Math. **301** (1978), 142–146.
5. On Computing Artin L -functions in the Critical Strip, Mathematics of Computation **33** (1979), 1081–1095 (with A. M. Odlyzko).
6. A bound for the least prime ideal in the Chebotarev density theorem, Inventiones math. **54** (1979), 271–296 (with H. L. Montgomery and A. M. Odlyzko).
7. On determining the 4-rank of the ideal class group of a quadratic field, J. Number Theory, **12** (1980), 191–196.
8. Worst-case complexity bounds in the theory of integral quadratic forms, J. of Algorithms **1** (1980), 142–186.
9. On the computational complexity of determining the solvability or unsolvability of the equation $X^2 - DY^2 = -1$, Trans. Amer. Math. Soc. **260** (1980), 485–508.
10. Signatures of Units and Congruences (mod 4) in Certain Real Quadratic Fields II, J. reine angew. Math. **320** (1980), 115–126.
11. Signatures of Units and Congruences (mod 4) in Certain Totally Real Fields, J. reine angew. Math. **320** (1980), 1–5.

12. Divisibility Properties of Some Cyclotomic Sequences, *Amer. Math. Monthly* **87** (1980), 561–564 (with A. M. Odlyzko).
13. A complement to Ridout’s p -adic generalization of the Thue-Siegel-Roth theorem, in: *Analytic Number Theory*, Proceedings, Philadelphia 1980 (M.I. Knopp. Ed.), Springer Lecture Notes in Mathematics No. 899 (1981), 264–275.
14. Fibonacci and Lucas Cubes, *Fibonacci Quarterly* **19** (1981), 39–43 (with D. P. Weisser).
15. Best Simultaneous Diophantine Approximations I. Growth rates of best approximation denominators, *Trans. Amer. Math. Soc.*, **272** (1982), 545–554.
16. Best Simultaneous Diophantine Approximations II. Behavior of consecutive best approximations, *Pacific J. Math*, **102** (1982), 61–88.
17. On the density of sets of integers the sum of no two of which is a square I. Arithmetic Progressions, *J. Combinatorial Theory, Series A*, **33** (1982), 167–185 (with A. M. Odlyzko and J. B. Shearer).
18. Optimal pairs of score vectors for positional scoring rules, *Applied Mathematics and Optimization*, **8** (1982), 309–324 (with P. C. Fishburn, W. V. Gehrlein and B. Gopinath).
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20. Best Diophantine approximations to a set of linear forms, *J. Australian Math. Soc., Series A*. **34** (1983), 114–122.
21. Multi-stage planning and the extended linear-quadratic-gaussian control problem, *Mathematics of Operations Research* **8** (1983), 42–63 (with F. Aminzadeh).
22. On the density of sets of integers the sum of no two of which is a square II. General sequences, *J. Combinatorial Theory, Series A*, **34** (1983), 123–139 (with A. M. Odlyzko and J. B. Shearer).
23. Sets of primes determined by systems of polynomial congruences, *Illinois Journal of Mathematics* **27** (1983), 224–239.
24. Approximation Algorithms for Maximizing the Number of Squares Packed in a Rectangle, *SIAM J. on Algebraic and Discrete Methods*, **4** (1983), 383–397 (with B. Baker, A. R. Calderbank, E. G. Coffman).
25. On the existence of fields governing the 2-invariants of the class group of $\mathbf{Q}(\sqrt{dp})$ as p varies, *Math. Comp.* **37** (1983), 711–730 (with H. Cohn).
26. On the tightest packing of sums of vectors, *European J. Combinatorics* **4** (1983), 231–236 (with J. Griggs, A. M. Odlyzko, J. B. Shearer).
27. Is there a density for the set of primes p such that the class number of $\mathbf{Q}(\sqrt{-p})$ is divisible by 16?, in: *Topics in Classical Number Theory*, (G. Halasz, Ed.), Colloquium Societatum Janos Bolyai No. 34 (1984), 257–279 (with H. Cohn).

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33. Realizable Traffic Patterns and Capacity of Disjointly Shared Networks, *Computer Networks and ISDN Systems*, **10** (1985), 275–285 (with A. M. Odlyzko and D. B. Zagier).
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39. One-way functions and circuit complexity, *Information and Computation*, **74** (1987), 226–240 (with R. Boppana).
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78. On the thermodynamic formalism for multifractal functions, *Rev. Math. Phys.* **6** (1994), 1033–1070 (with I. Daubechies).
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B*. Preprints and papers in preparation

166. Counting smooth solutions to the equation $A + B = C$, (with K. Soundararajan), submitted.
167. Level sets of the Takagi function: Local level sets (with Z. Maddock), submitted. [arXiv:1009.0855]
168. Level sets of the Takagi function: Generic level sets, (with Z. Maddock), submitted. [arXiv:1011.3183]
169. Succinct certificates for the solvability of binary quadratic Diophantine equations, SIAM J. Computing, submitted. [arXiv:math.NT/0611209]
170. The Lerch zeta function III. Polylogarithms and Special Values, preprint. (with W.-C. Winnie Li)
171. The Lerch zeta function IV. Hecke Operators, in preparation (with W.-C. Winnie Li)
172. Convergence of the restricted Nelder-Mead simplex algorithm in two dimensions, in preparation. (with B. Poonen and M. H. Wright).
173. The Relation Between Effective Frequency and S -Shaped Aggregate Advertising Response, preprint. (with M. Koschat).
174. The $3x + 1$ problem: An annotated bibliography (1963–1999), arXiv version, ordered by author’s surname (differs from [D13]), [arXiv:math/0309224]
175. The $3x + 1$ problem: An annotated bibliography II (2000–2009), arXiv version preprint. [arXiv:math/0608208]
176. George Boole’s general method in the theory of probabilities and the moment map, in preparation

C. Conference Papers

- C1. Succinct certificates for the solvability of binary quadratic Diophantine equations (Extended Abstract), Proc. 20th Annual IEEE Symposium on the Foundations of Computer Science, IEEE Computer Society (1979), 42–46.
- C2. Some New Results in Simultaneous Diophantine Approximation, in: Proc. of the Queen’s Number Theory Conference 1979 (P. Ribenboim, Ed.), Queen’s Papers in Pure and Applied Math. No. 54 (1980), 453–474. (see [16], [17])
- C3. On the Space Requirements of Navigational Relationship Representations, Proc. ACM-SIGMOD 1981 International Conf. on the Management of Data (Y. E. Lien, Ed.), 1–9. (with D. Swartwout). (see [19])

- C4. The Computational Complexity of Simultaneous Diophantine Approximation Problems, Proc. 23rd Annual IEEE Symposium on Foundations of Computer Science, IEEE Computer Society (1982), 32–39. (see [30])
- C5. Solving Low-Density Subset Sum Problems, Proc. 24th Annual IEEE Symposium on Foundations of Computer Science, IEEE Computer Press (1983), 1–10. (with A. M. Odlyzko). (see [31]).
- C6. New Algorithms for Computing $\pi(x)$, Proc. of 1982 New York Number Theory Seminar (G. V. Chudnovsky, ed.), Springer Lecture Notes in Mathematics, No. 1052 (1984), 176–193. (with A. M. Odlyzko). (see [32], [36])
- C7. Knapsack Public Key Cryptosystems and Diophantine Approximation, in: *Advances in Cryptology, Proc. of CRYPTO-83 Conference* (D. Chaum, Ed.), Plenum Press, New York (1984), 3–24.
- C8. Performance Analysis of Shamir’s Attack on the Basic Merkle-Hellman Knapsack Cryptosystem, in: ICALP 1984, Automata, Languages and Programming, Eleventh Colloquium, Antwerp, Belgium, July 1984, Springer Lecture Notes in Computer Science No. 172 (1984), 312–323.
- C9. Evaluation of the Adleman attack on multiply iterated knapsack cryptosystems, in: *Advances in Cryptology; Proc. of CRYPTO-83 Conference* (D. Chaum, Ed.), Plenum Press, New York (1984), 25–28 (with E. F. Brickell and A. M. Odlyzko).
- C10. Linear congruential generators do not produce random sequences, Proc. 25th IEEE Symp. on Foundations of Computer Science, (1984), 480–484, (with A. Frieze and R. Kannan). (see [41])
- C11. Polynomial time algorithms for finding integer relations among real numbers, STACS ‘86, Lecture Notes in Computer Science, No. 210, Springer-Verlag, New York (1986), 105–118. (with J. Håstad, B. Helfrich, C. P. Schnorr). (see [44])
- C12. One-way functions and circuit complexity, in: Structure in Complexity Theory, Lecture Notes in Computer Science, No. 223, Springer-Verlag, New York (1986), 51–65. (with R. Boppana). (see [39])
- C13. On Lasker’s Card Game, Proc. 3rd Intl. Conf. on Differential Games and Applications (T. Basar and P. Bernard, Ed.), Lecture Notes in Control and Info. Science No. 117, Springer-Verlag (1989), 1–8. (with J. Kahn, H. S. Witsenhausen). (see [38], [42], [46])
- C14. On the thermodynamic formalism for multifractal functions. In: *The state of matter (Copenhagen 1992)*, (M. Aizenmann and H. Araki, Eds.) World Scientific: River Edge, NJ 1994, pp. 213–264. (with I. Daubechies). (see [78]).
- C15. The Parameter Space of the d -Step Conjecture, Proc. Foundatons of Software Technology and Theoretical Computer Science (Hyderabad, 1996), Lecture Notes in Computer Science No. 1180, Springer-Verlag: Berlin 1996, pp. 52–63. (with N. Prabh, J. A. Reeds). (see [99], [102])

- C16. Bounds for the number of DC operating points of transistors, Proc. ISCAS 1997, Volume II, IEEE Circuits and Systems Society, pp. 857–860. (with L. Trajkovic). (see [117])
- C17. The Computational Complexity of Knotting and Linking Problems. Preliminary Report, Proc. 38th Annual IEEE Symposium on Foundations of Computer Science, IEEE Computer Society (1997), 172–181 (with J. Hass and N. Pippenger). (See [113])
- C18. Saddle Point and Hamiltonian Structure in Excitatory-Inhibitory Networks, in: *Advances in Neural Information Processing Systems 10*, (M. I. Jordan, M. J. Kearns and S. A. Solla, Eds.) MIT Press: Cambridge 1998, pp. 329–335. (with S. Seung, T. J. Richardson and J. J. Hopfield).
- C19. Delone set models for quasicrystals, pp. 99–101 in: (J.-P. Gazeau et al., Eds) *Group 24: Physical and Mathematical Aspects of Symmetries* (J.-P. Gazeau, R. Kerner, J-P Antoine, S. Metens and J-Y. Thibon, Eds), Conference Series Number 173, Institute of Physics Publishing: Philadelphia 2003. (see [110], [111], [134], [136]).
- C20. Hilbert spaces of entire functions and Dirichlet L-functions, in: *Frontiers in Number Theory, Physics and Geometry: On Random Matrices, Zeta Functions and Dynamical Systems*, (P. E. Cartier, B. Julia, P. Moussa and P. van Hove, Eds.) Springer-Verlag, 2006, pp. 367–379.

D. Expository and Survey Papers

- D1. The van der Waerden Conjecture: Two Soviet Solutions, Notices of the A.M.S. **29** (1982), 130–132.
- D2. Pseudorandom number generators in cryptography and number theory, in: *Cryptology and Computational Number Theory*, (C. Pomerance, Ed.), Proc. Symp. Applied Math. No. 42, (1990), 114–144.
- D3. Number Theory and Dynamical Systems, in: *The Unreasonable Effectiveness of Number Theory* (S. A. Burr, Ed.), Proc. Symp. Applied Math., No. 46 (1992), 35–72.
- D4. Probabilistic Algorithms for Speedup, in: *Probability and Algorithms*, National Research Council, Natl. Acad. Sci. Press 1992, 49–60 (with J. Feigenbaum). [Reprinted in: *Statistical Science* **8** (1993), 20–25].
- D5. Pseudorandom Numbers, in: *Probability and Algorithms*, National Research Council, Natl. Acad. Sci. Press 1992, 61–82. [Reprinted in: *Statistical Science* **8** (1993), 31–39].
- D6. Multivariate Descartes’ Rule of Signs and Sturm’s Challenge Problem, *Math Intelligencer* **19** No. 3 (1997). 9–15 (with T. J. Richardson).
- D7. Who wins Misère Hex?, in: *The Mathematician and Pied Puzzler*, (E. Berlekamp and T. Rogers, Eds.), A. K. Peters: Natick, MA 1999, pp. 237–240. (with Daniel Sleator).
- D8. How Random are $3X + 1$ Function Iterates?, in: *The Mathematician and Pied Puzzler*, (E. Berlekamp and T. Rogers, Eds.), A. K. Peters: Natick, MA 1999, pp. 253–266.

- D9. The impact of aperiodic order on mathematics, *Materials Science & Engineering A*, **294–296** (2000), 186–191.
- D10. The Riemann hypothesis: Arithmetic and Geometry, in: *Surveys in Noncommutative Geometry*, Clay Institute Monographs No. 6, CMI/AMS: Providence, RI 2006, pp. 127–139.
- D11. The $3x + 1$ problem: An overview, pp. 3–29 in : *The Ultimate Challenge: The $3x + 1$ Problem* (J. C. Lagarias, Ed.), Amer. Math. Society, Providence, RI 2010.
- D12. Stochastic models for the $3x + 1$ and $5x + 1$ problems and related problems, pp. 131–188 in : *The Ultimate Challenge: The $3x + 1$ Problem* (J. C. Lagarias, Ed.), Amer. Math. Society, Providence, RI 2010. (with A. V. Kontorovich)
- D13. The $3x + 1$ problem: An annotated bibliography (1963–1999), pp. 267–344 in : *The Ultimate Challenge: The $3x + 1$ Problem* (J. C. Lagarias, Ed.), Amer. Math. Society, Providence, RI 2010 (in press).
- D14. The Kepler conjecture and its proof, Chapter 1 in: *The Kepler Conjecture, by T. C. Hales with S. P. Ferguson*. (J. C. Lagarias, Ed.), Springer-Verlag: New York 2011 (anticipated).

E. Miscellaneous papers

- E1. Oids and their ilk, in: *Dopo le Parole aangebotoden aan Dr. A. K. Lenstra*, (H. W. Lenstra, Jr., J. K. Lenstra and P. van Emde Boas, Eds.), Amsterdam 1984, privately printed.
- E2. Review of: Prof. J. Moriarty, M. A. *A Treatise on the Binomial Theorem*, Revised and Enlarged Edition, Privately Printed, Cork 1885, *Math. Intelligencer*, **23**, No. 3 (2001) 70–72.

F. Problems and Solutions

1. Solution to 6035, A subseries of $\sum \mu(n) \log n/n$, *American Math. Monthly* **84** (1977), 225.
2. Solution to 6049, Subgroups of the symmetric group, *American Math. Monthly* **84** (1977), 397.
3. Solution to 6053, Density of arguments of powers of Gaussian integers, *American Math. Monthly* **84** (1977), 493.
4. Problem E2877, A sequence with variable rules of succession, *American Math. Monthly* **88** (1981), 209 (with A. M. Odlyzko). [Solution: **89** (1982), 698–699.]
5. Problem 6341, Collinear algebraic units, *American Math. Monthly* **88** (1981), 294 (with H. W. Lenstra, Jr.). [Solution **90** (1983), 61.]
6. Problem 6352, *American Math. Monthly* **88** (1981), 540–541. [Unsolved]

7. Problem 6401, Triples of integers with identical ratios, *American Math. Monthly* **89** (1982), 603 (with D. S. Sturtevant). [Partial Solution: See #10 below.]
8. Problem 82–16, Malevolent traffic lights, *SIAM Review* **24** (1982), 477. [Solution: **25** (1993), 571–572.]
9. Problem 83–15, An inequality for walks in a graph, *SIAM Review* **25** (1983), 403 (with B. McKay, J. E. Mazo, L. A. Shepp). [Solution: See #11 below.]
10. Partial solution to 6401, Triples of integers with identical ratios, *American Math. Monthly* **91** (1984), 443–444 (with D. S. Sturtevant).
11. Solution to Problem 83–15, An inequality for walks on a graph, *SIAM Review* **26** (1984), 580–582 (with B. McKay, J. E. Mazo, L. A. Shepp).
12. Elementary Problem E 3129, Partitioning the unit square, *American Math. Monthly*, **93** (1986), 131 (with D. J. Kleitman, R. Kannan). [Solution: **94** (1987), 797–799.]
13. Problem 6661, A curious property of $1/7$, *American Math. Monthly* **98** (1991), 559 (with T. Zaslavsky). [Solution: **100** (1993), 191–194.]
14. Problem 10305, Prime real algebraic integers, *American Math. Monthly* **100** (1993), 402. [Solution: **103** (1996) 274.]
15. Problem 10351, Zeros of a geometric series with random signs, *American Math. Monthly* **100** (1993), 952 (with L. Flatto). [Solution: **104** (1997), 173–174.]
16. Problem 10479, Modular Fekete polynomials, *American Math. Monthly* **102** (1995), 746 (with B. Poonen). [Solution: **105** (1998), 370–371.]
17. Problem 10500, Boundedness along subsequences, *American Math. Monthly* **103** (1996), 75 (with P. W. Shor). [Solution: **104** (1997), 372.]
18. Problem 10555, Rationals to and only to rationals, *American Math. Monthly* **103** (1996), 809. (with E. Rains). [Solution: **105** (1998), 277–278.]
19. Problem 10591, *American Math. Monthly* **104** (1997), 457 (with T. J. Richardson) [Unsolved].
20. Problem 10656, Large values of tangent, *American Math. Monthly* **105** (1998), 366 (with D. P. Bellamy and F. Lazebnik). [Solution: **106** (1999), 782–784.]
21. Problem 10822, When periodic points are real, *American Math. Monthly* **107** (2000), 653 (with J. P. Vinson). [Solution: **108** (2001), 876–877.]
22. Problem 10927, The EKG sequence, *American Math. Monthly* **109** (2002), 202. (with E. Rains and N. J. A. Sloane). [Solution: **111** (2004), 167–168.]
23. Problem 10941, Decay of a Markov chain, *Amer. Math. Monthly* **109** (2002), 393. [Solution: **110** (2003), 547–548.]
24. Problem 10949, A generous bound for divisor sums, *American Math. Monthly* **109** (2002), 569. [Solution: **111** (2004), 264–265.]

25. Problem 11334, Very composite numbers, American Math. Monthly, **116** (2008), 71 (with Jon Bober). [Solution: **116** (2009), 847–848.]
26. Problem 11355, A Reciprocal Diophantine equation, American Math. Monthly, **116** (2008), 365. [Solution: **117** (2010), 279–280.]
27. Problem 11389, Distinct multiset sums, American Math. Monthly, **116** (2008), 758. (with Elizabeth R. Chen). [Solution: **117** (2010), 747–748.]
28. Problem 11390, Path reversals in functional equation, American Math. Monthly **116** (2008), 855.

G. Patents

1. No. 4,744,027, May 10, 1988. Method and apparatus for optimizing system operational parameters (with D. A. Bayer, N. Karmarkar).
2. No. 4,894,773, Jan. 16, 1990. Method and apparatus for optimizing system operational parameters through projective transformations.
3. No. 4,914,563, Apr. 3, 1990. Method and apparatus for optimizing system operational parameters through affine scaling (with N. Karmarkar).
4. No. 5,892,775, Apr. 6, 1999. Method and apparatus for providing error-tolerant storage of information (with N. S. Jayant).
5. No. 5,999,566, Dec. 7, 1999. Method and apparatus for providing error-tolerant communication of information (with N. S. Jayant)