

List of Publications for John Milnor

1950

- [1] On the total curvature of knots. *Ann of Math.*, 52(2): 248–257. (Also in [102].)

1953

- [2] (with I.N. Herstein). An axiomatic approach to measurable utility. *Econometrica*, 21: 291–297.
- [3] The characteristics of a vector field on the two-sphere. *Ann. of Math.*, 58(2): 253–257.
- [4] On total curvatures of closed space curves. *Math. Scand.*, 1: 289–296. (Also in [102].)
- [5] Sums of positional games. In *Contributions to the Theory of Games*, Vol. II, H.W. Kuhn and A.W. Tucker, editors, pages 291–301 of *Ann. of Math. Stud.* 28, Princeton University Press, Princeton, N.J.

1954

- [6] Games against nature. In *Decision Processes*, R. M. Thrall, C.H. Coombs and R.L. Davis, editors, pages 49–59, Wiley, New York; Chapman and Hall Ltd., London. (Reprinted in *Game Theory and Related Approaches to Social Behavior*, M. Shubik, editor, Wiley, New York.
- [7] (with G. Kalish, J. Nash, and E.D. Nering). Some experimental n -person games. In *Decision Processes*, R.M. Thrall, C.H. Coombs and R.L. Davis, editors, pages 301–327, Wiley, New York; Chapman and Hall Ltd., London.
- [8] Link groups. *Ann. of Math.*, 59(2): 177–295. (Also in [107].)

1956

- [9] Construction of universal bundles, I. *Ann. of Math.*, 63(2): 272–284. (Also in [133].)
- [10] Construction of universal bundles, II. *Ann. of Math.*, 63(2): 430–436. (Also in [133].)
- [11] On the immersion of n -manifolds in $n + 1$ -space. *Comment. Math. Helv.*, 30: 275–284. (Also in [133].)
- [12] On manifolds homeomorphic to the 7-sphere. *Ann. of Math.*, 64(2): 399–405. (Also in [125].)

1957

- [13] The geometric realization of a semi-simplicial complex. *Ann. of Math.*, 65(2): 357–362. (Also in [133].)
- [14] Groups which act on S^n without fixed points. *Amer. J. Math.*, 79: 623–630. (Also in [107].)
- [15] Isotopy of links. In *Algebraic Geometry and Topology. A Symposium in Honor of S. Lefschetz*, R.H. Fox, D.C. Spencer and A.W. Tucker, editors, pages 280–306, Princeton University Press, Princeton, N.J. (Also in [107].)

- [16] (with L.S. Shapley). On games of survival. In *Contributions to the Theory of Games*, Vol. III, M. Dresher, A.W. Tucker and P. Wolfe, editors. pages 15–45, *Ann. of Math. Stud.* 39, Princeton University Press, Princeton, N.J.

1958

- [17] On the existence of a connection with curvature zero. *Comment. Math. Helv.*, 32: 215–223. (Also in [102].)
- [18] Some consequences of a theorem of Bott. *Ann. of Math.*, 68(2): 444–449. (Also in [125].)
- [19] (with R.Bott). On the parallelizability of the spheres. *Bull. Amer. Math. Soc. (N.S.)*, 64: 87–89. (Also in [125].)
- [20] The Steenrod algebra and its dual. *Ann. of Math.*, 67(2): 150–171. (Also in [133].)
- [21] On simply connected 4-manifolds. In *Symposium Internacional de Topología Algebraica*, pages 122–128, Univ. Nac. Autónoma de México and UNESCO, México City. (Also in [133].)
- [22] On the Whitehead homomorphism. *J. Bull. Amer. Math. Soc. (N.S.)*, 64: 79–82. (Also in [125].)

1959

- [23] Differentiable structures on spheres. *Amer. J. Math.*, 81: 962–972. (Also in [125].)
- [24] Sommes de variétés différentiables et structures différentiables des sphères. *Bull. Soc. Math. France*, 87: 439–444. (Also in [125].)
- [25] On spaces having the homotopy type of a CW-complex. *Trans. Amer. Math. Soc.*, 90: 272–280. (Also in [133].)

1960

- [26] (with M.A. Kervaire). Bernoulli numbers, homotopy groups, and a theorem of Rohlin. In *Proc. Internat. Congress Math. 1958*, pages 454–458, Cambridge University Press. (Also in [125].)
- [27] (with E. Spanier). Two remarks on fibre homotopy type, *Pacific J. Math.*, 10: 585–590. (Also in [133].)
- [28] On the cobordism ring Ω^* and a complex analogue, I. *Amer. J. Math.*, 82: 505–521. (Also in [125].)

1961

- [29] A procedure for killing homotopy groups of differentiable manifolds. In *Differential Geometry Proc. Symposia Pure Math.* Vol. III, pages 39–55, Amer. Math. Soc., Providence, R.I. (Also in [125].)
- [30] Two complexes which are homeomorphic but combinatorially distinct. *Ann. of Math.*, 74(2): 575–590. (Also in [107].)
- [31] (with M.A. Kervaire). On 2-spheres in 4-manifolds. *Proc. Nat. Acad. Sci. U.S.A.*, 47: 1651–1957. (Also in [133].)

- [32] Variedades lisas con frontera. *An. Inst. Mat. Univ. Nac. Autónoma de México*, 1: 82–116. Revised translation in [130].

1962

- [33] A unique decomposition theorem for 3-manifolds. *Amer. J. Math.*, 84: 1–7. (Also in [107].)
- [34] A duality theorem for Reidemeister torsion. *Ann. of Math.*, 76(2): 137–147. (Also in [107].)
- [35] A survey of cobordism theory. *Enseign. Math.*, 8(2): 16–23. Also in [125], together with an Erratum.
- [36] On axiomatic homology theory. *Pacific J. Math.*, 12: 337–341. Reprinted in *Algebraic Topology: A Student's Guide*, by J.F. Adams, Cambridge University Press, 1972. (Also in [133].)
- [37] (with M.G. Barratt). An example of anomalous singular homology. *Proc. Amer. Math. Soc.*, 13: 293–297. (Also in [133].)
- [38] The work of J.H.C. Whitehead. In *The Mathematical Works of J.H.C. Whitehead* Vol. 1, pages xxi–xxxiii, Pergamon Press, Oxford, New York. (Also in [133].)

1963

- [39] Topological manifolds and smooth manifolds. In *Proc. Internat. Congress Math. Stockholm 1962*, pages 132–138, Inst. Mittag-Leffler, Djursholm. (Also in [133].)
- [40] (with M. Spivak and R. Wells). *Morse Theory*. *Ann. Math. Studies* 51, Princeton U. Press. Russian translation 1965; Japanese translation 1968; Korean translation 1999.
- [41] Spin structures on manifolds. *Enseign. Math.*, 9(2): 198–203. (Also in [125].)
- [42] (with M.A. Kervaire). Groups of homotopy spheres. *Ann. of Math.*, 77(2): 504–537. (Also in [125].)

1964

- [43] On the Betti numbers of real varieties. *Proc. Amer. Math. Soc.*, 15: 275–280. (Also in [102].)
- [44] Eigenvalues of the Laplace operator on certain manifolds. *Proc. Nat. Acad. Sci. U.S.A.*, 51: 542. (Also in [102].)
- [45] Microbundles, I. *Topology* 3(1): 53–80. (Also in [133].)
- [46] Most knots are wild. *Fund. Math.*, 54: 335–338. (Also in [107].)
- [47] Differential topology. In *Lectures on Modern Mathematics*, Vol. II, T.L. Saaty, editor, pages 165–183, Wiley, New York. (Russian translation: *Uspehi Mat. Nauk*, 20: 41–54 (1965).) (Also in [125].)
- [48] (with M.W. Hirsch). Some curious involutions of spheres. *Bull. Amer. Math. Soc. (N.S.)*, 70: 372–377. (Also in [107].)
- [49] Some free actions of cyclic groups on spheres. In *Differential Analysis. Bombay Colloquium*, pages 37–42, Oxford University Press, London. (Also in [107].)

1965

- [50] (with L. Siebenmann and J. Sondow). *Lectures on the h -Cobordism Theorem*, Princeton U. Press. (Russian translation 1969; revised edition in preparation.)
- [51] *Topology from the Differentiable Viewpoint*, U. Virginia Press; Princeton University Press 1998. (Russian translation 1972 as part of *Differential Topology: a First Course*; Japanese translation 1998.)
- [52] (with J.C. Moore). On the structure of Hopf algebras. *Ann. of Math.*, 81(2): 211–264. (Also in [139].)
- [53] On the Stiefel-Whitney numbers of complex manifolds and of spin manifolds. *Topology* 3: 223–230. (Also in [125].)
- [54] Remarks concerning spin manifolds. In *Differential and Combinatorial Topology. A Symposium in Honor of Marston Morse*, pages 55–62, Princeton University Press, Princeton, N.J. (Also in [125].)

1966

- [55] Whitehead torsion. *Bull. Amer. Math. Soc. (N.S.)*, 72: 358–426. (Also in [107].)
- [56] (with R.H. Fox). Singularities of 2-spheres in 4-space and cobordism of knots. *Osaka J. Math.*, 3: 257–267. (Also in [107].)

1967

- [57] (with H. Bass and J.-P. Serre). Solution of the congruence subgroup problem for SL_n ($n \geq 3$) and Sp_{2n} ($n \geq 2$). *IHES Publ. Math.*, 33: 59–137. (Erratum: J.-P. Serre, On a functorial property of power residue symbols. *IHES Publ. Math.*, 44 (1974), 241–244.) (Also in [139].)

1968

- [58] *Singular Points of Complex Hypersurfaces*. *Ann. Math. Studies* 61, Princeton U. Press. (Russian translation 1971; Japanese translation 2003.)
- [59] On characteristic classes for spherical fiber spaces. *Comment. Math. Helv.*, 43: 51–77. (Also in [133].)
- [60] A note on curvature and fundamental group. *J. Differential Geom.*, 2: 1–7. (Also in [102].)
- [61] Infinite cyclic covering. In *Conference on the Topology of Manifolds*, J.G. Hocking, editor, pages 115–133, Prindle, Weber and Schmidt, Boston. (Also in [107].)
- [62] Growth of finitely generated solvable groups. *J. Differential Geom.*, 2: 447–449. (Also in [139].)

1969

- [63] On isometries of inner product spaces. *Invent. Math.*, 8: 83–97. (Also in [139].)
- [64] (with G. Lusztig and F.P. Peterson). Semi-characteristics and cobordism. *Topology* 8: 357–359. (Also in [133].)
- [65] A problem in cartography. *Amer. Math. Monthly*, 76: 1102–1112. (Also in [102].)

1970

- [66] (with O. Burlet). Torsion et type simple d'homotopie. In *Essays on Topology and Related Topics, Mémoires dédiés à George de Rham*, pages 12–17, Springer-Verlag, Berlin, New York. (Also in [107].)
- [67] Algebraic K -theory and quadratic forms. *Invent. Math.*, 9: 318–344. (Also in [139].)
- [68] (with P. Orlik). Isolated singularities defined by weighted homogeneous polynomials. *Topology*, 9: 385–393. (Also in [102].)

1971

- [69] *Introduction to Algebraic K-Theory*. *Ann. Math. Studies*, 72, Princeton U. Press. (Russian translation 1974.)
- [70] Symmetric inner product spaces in characteristic 2. In *Prospects in Mathematics*, pages 59–75 of *Ann. of Math. Stud.* 70, Princeton University Press, Princeton, N.J. (Also in [139].)

1972

- [71] On the construction FK . In *Algebraic Topology: A Student's Guide*, by J.F. Adams, pages 119–136, Cambridge University Press. (Also in [133].)

1973

- [72] (with D. Husemoller). *Symmetric Bilinear Forms*, Springer. (Russian translation 1986.)

1974

- [73] (with J. Stasheff). *Characteristic Classes*, Princeton U. Press. (Russian translation 1979; Japanese translation 2001; reprinted Hindustan Book Agency 2005.)

1975

- [74] Isolated critical points of complex functions. In *Differential Geometry. Proc. Symposia Pure Math.* Vol. XXVII, *Part I*, S.S Chern and R. Osserman, editors, pages 381–382, Amer. Math. Soc., Providence, R.I. (Also in [102].)
- [75] On the 3-dimensional Brieskorn manifolds $M(p, q, r)$. In *Knots, groups and 3-manifolds. Papers dedicated to the memory of R.H. Fox*, L.P. Neuwirth, editor. pages 175–225, *Ann. of Math. Stud.* 84, Princeton University Press, Princeton, N.J. (Also in [107].)

1976

- [76] Problems in differential geometry. In *Mathematical Developments Arising from Hilbert Problems, Proc. Symposia Pure Math.* Vol. XXVIII, F. Browder, editor, pages 54–57, Amer. Math. Soc., Providence, R.I. (Also in [102].)
- [77] Hilbert's problem 18: on crystallographic groups, fundamental domains, and on sphere packing. In *Mathematical Developments Arising from Hilbert Problems, Proc. Symposia Pure Math.* Vol. XXVIII, F. Browder, editor, pages 491–506, Amer. Math. Soc., Providence, R.I. (Also in [102].)

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1977

[79] On deciding whether a surface is parabolic or hyperbolic. *Amer. Math. Monthly*, 84: 43–46. (Also in [102].)

[80] On fundamental groups of complete affinely flat manifolds. *Adv. in Math.*, 25: 178–187. (Also in [102].)

[81] (with W. Thurston). Characteristic numbers of 3-manifolds. *Enseign. Math.*, 23(2): 249–254. (Also in [107].)

1978

[82] Analytic proofs of the “hairy ball theorem” and the Brouwer fixed point theorem. *Amer. Math. Monthly* 85: 521–524. (Also in [102].)

[83] (with L.S. Shapley, written in 1961). Values of large games II: oceanic games. *Math. Oper. Res.* 3: 290–307.

1982

[84] Hyperbolic geometry: the first 150 years. *Bull. Amer. Math. Soc. (N.S.)*, 6: 72–85. (Also in [102].)

1983

[85] On the homology of Lie groups made discrete. *Comment. Math. Helv.*, 58: 72–85. (Also in [133].)

[86] On the geometry of Kepler problem. *Amer. Math. Monthly*, 90: 353–365. (Also in [102].)

[87] On polylogarithms, Hurwitz zeta functions, and the Kubert identities. *Enseign. Math.*, 29(2): 281–322. (Also in [139].)

1985

[88] On the concept of attractor. *Comm. Math. Phys.*, 99: 177–195; Errata 102: 517–519.

1986

[89] Remarks on infinite-dimensional Lie groups. In *Relativity, Groups and Topology II, Les Houches Session XL*, B.S. DeWitt and R. Stora, editors. pages 1007–1058, Elsevier Science Publishers B.V. North Holland. (Also in [139].)

[90] Directional entropies of cellular automaton-maps. In *Disordered Systems and Biological Organization*, Bienenstock et al., editors. pages 113–115, Springer-Verlag, Berlin, New York.

1987

[91] The work of M.H. Freedman. In *Proc. Internat. Congress Math. Berkeley, 1986*, pages 13–15, Amer. Math. Soc., Providence, R.I. Republished in *Fields Medallists' Lectures*, pages 405–408, World Sci. Ser. 20th. Century Math., 5, World Sci. Publishing, River Edge, NJ, 1997. (Also in [133].)

1988

- [92] Non-expansive Hénon maps. *Adv. in Math.*, 69: 109–114.
- [93] On the entropy geometry of cellular automata. *Complex Systems*, 2: 357–386.
- [94] (with W. Thurston, preprint 1977). On iterated maps of the interval. In *Dynamical Systems*, J.C.Alexander, editor, pages 465–563. *Lect. Notes Math.* 1342, Springer-Verlag, Berlin, New York.

1989

- [95] (with S. Friedland). Dynamical properties of plane polynomial automorphisms. *Ergodic Theory Dynamical Systems* 9: 667–699.
- [96] Self-similarity and hairiness in the Mandelbrot set. In *Computers in Geometry and Topology*, M.C. Tangora, editor, pages 211–257, Marcel Dekker, New York, Basel.

1992

- [97] Remarks on iterated cubic maps. *Experiment. Math.*, 1: 5–24.
- [98] Hyperbolic components in spaces of polynomial maps, with an appendix by A. Poirier. *IMS preprint: ims92-3* (available at www.math.sunysb.edu/preprints.html).

1993

- [99] (with M. Lyubich). The Fibonacci unimodal map. *J. Amer. Math. Soc.*, 6: 425–457.
- [100] Geometry and dynamics of quadratic rational maps. *Experimental Math.*, 2: 37–83.
- [101] (with L. Goldberg). Fixed points of polynomial maps II, Fixed point portraits. *Ann. Sci. Éc. Norm. Sup. Paris (4^e ser.)* 26: 51–98.

1994

- [102] *Collected Papers I, Geometry*, Publish or Perish, AMS.
- [103] On a relationship between the Betti numbers of a hypersurface and an integral of its Gaussian curvature. (Junior paper, 1950; published in [102] pages 15–26.)
- [104] How to compute volume in hyperbolic space. (Notes from 1978, published in [102] pages 189–212.)
- [105] Euler characteristic and finitely additive Steiner measures. (Notes from 1978, published in [102] pages 213–234.)
- [106] The Schläfli differential inequality. (Based on notes from 1983. Published in [102], pages 281–295.)

1995

- [107] *Collected Papers II, The Fundamental Group*, Publish or Perish, AMS.
- [108] Uses of the fundamental group. (An outline circulated at the 1968 Colloquium Lectures in Madison. Published in [107] pages 221–225.)

- [109] (with S. Dawson, R. Galeeva and C. Tresser). A monotonicity conjecture for real cubic maps. In *Real and Complex Dynamical Systems*, B. Branner and P. Hjorth, editors, pages 165–183, Kluwer.
- [110] On the Steenrod homology theory. In *Novikov Conjectures, Index Theorems and Rigidity I*, S. Ferry, A. Ranicki and J. Rosenberg, editors, pages 79–96, Cambridge U. Press. (Also in [133].)
- [111] A Nobel prize for John Nash. *Math. Intelligencer*, 17: 11–17.

1997

- [112] Fubini foiled: Katok’s paradoxical example in measure theory. *Math. Intelligencer*, 19(2): 30–32.

1998

- [113] John Nash and ‘A Beautiful Mind.’ *Notices A.M.S.*, November.

1999

- [114] *Dynamics in One Complex Variable*, Vieweg 1999, 2000; Princeton U. Press 2006.
- [115] The Mathematical Work of Curt McMullen, *Notices A.M.S.*, January.
- [116] Growing up in the old Fine Hall. In *Prospects in Mathematics*, H. Rossi, editor, pages 1–11, AMS.

2000

- [117] Local connectivity of Julia sets: expository lectures. In *The Mandelbrot set, Theme and Variations*, Tan Lei, editor, pages 67–116. *LMS Lecture Note Series 274*, Cambr. U. Press.
- [118] Rational maps with two critical points. *Experimental Math.*, 9: 481–522.
- [119] (with Tresser; and with an appendix by Douady and Sentinac). On Entropy and Monotonicity for Real Cubic Maps. *Comm. Math. Phys.*, 209: 123–178.
- [120] Classification of $(n - 1)$ -connected $2n$ -manifolds, and the discovery of exotic spheres. In *Surveys on Surgery Theory I*, Cappell, Ranicki and Rosenberg, editors, pages 25–30 of *Ann. Math. Stud.* 145, Princeton U. Press.
- [121] Periodic orbits, external rays and the Mandelbrot set: An expository account. In *Geometrie Complexe et Systemes Dynamiques (en l’honneur d’Adrien Douady)*, M. Flexor, P. Sentenac, J.C. Yoccoz, editors, *Asterisque* 261: 277–333.

2003

- [122] Towards the Poincaré conjecture and the classification of 3-manifolds. *Notices A.M.S.*, November. (Also in [133].)

2004

- [123] Pasting together Julia sets; a worked out example of mating. *Experimental Math.*, 13: 55–92.

2006

- [124] On Lattès maps. In *Dynamics on the Riemann Sphere, A Bodil Branner Festschrift*, Hjorth and Petersen, editors, pages 9–43, Eur. Math. Soc.

2007

- [125] *Collected Papers III, Differential Topology*, AMS.
- [126] On the relationship between differentiable manifolds and combinatorial manifolds. In [125], pages 19–28.
- [127] Differentiable manifolds which are homotopy spheres. In [125], pages 65–88.
- [128] Lectures on differential topology (Notes by J. Munkres.). In [125], pages 145–176.
- [129] Lectures on differentiable structures. In [125], pages 177–190.
- [130] Smooth manifolds with boundary. In [125], pages 191–222.
- [131] (with A. Bonifant and M. Dabija). Elliptic curves as attractors in \mathbb{P}^2 : Part 1 Dynamics. *Experimental Math.*, 16: 385–420.

2008

- [132] (with A. Bonifant). Schwarzian derivatives and cylinder maps. In *Holomorphic dynamics and renormalization*, M. Lyubich and M. Yampolsky, editors, pages 1–21, *Fields Inst. Commun.* 53, Amer. Math. Soc., Providence, RI.

2009

- [133] *Collected Papers IV, Homotopy, Homology and Manifolds*, J. McCleary, editor, AMS.
- [134] Microbundles and differentiable structures. In [133], pages 173–190.
- [135] Foliations and foliated vector bundles. In [133], pages 279–320.
- [136] The Poincaré conjecture one hundred years later. In [133] pages 337–343.
- [137] Fifty years ago: Topology of manifolds in the 50’s and 60’s. In *Low Dimensional Topology*, T. Mrowka and P. Ozsváth, editors, pages 9–20 of *IAS/Park City Mathematics Series* 15, AMS. (Also in [133].)
- [138] Cubic polynomial maps with periodic critical orbit I. In *Complex Dynamics, Families and Friends*, D. Schleicher, editor, pages 333–411, A.K. Peters.

2010

- [139] *Collected Papers V, Algebra*, H. Bass and T.-Y. Lam, editors., AMS.
- [140] (with J.C. Moore). On the structure of Hopf algebras (Preprint version 1959.). In [139] pages 7–36.
- [141] The representation rings of some classical groups. In [139] pages 143–154.

- [142] (with J. Bass). On unimodular groups over number fields (Preprint 1965.). In [139] pages 165–179.
- [143] Symmetric inner product spaces over a Dedekind domain (Preprint 1970). In [139] pages 375–380.
- [144] (with A. Bonifant and J. Kiwi). Cubic polynomial maps with periodic critical orbit II: Escape regions. *Conform. Geom. Dyn.* 14: 68–112 and 190–193.

2011

- [145] Differential topology forty-six years later. *Notices A.M.S.*, June-July, 58(6): 804–809.

JM, August 2011