CHRISTOPHER J. BISHOP

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RESEARCH INTERESTS

Real and complex analysis, geometric function theory, conformal dynamics, probability theory, numerical analysis, analysis on fractals, quasiconformal geometry, computational geometry.

Some of my more particular interests have included: potential theory, fractal properties of harmonic measure, geometric properties of Brownian motion and other random processes, algebras generated by harmonic and holomoprphic functions, geometry of hyperbolic manifolds and their covering groups, numerical computation of conformal mappings and related PDE (including the creation of the optimal mapping algorithm), multipole methods, optimal meshing algorithms and dimension distorting properties of quasiconformal maps.

PROFESSIONAL EXPERIENCE

Sept. 1997 to present: Professor at SUNY, Stony Brook.
Sept. 1992 to Aug. 1997: Assoc. professor at SUNY, Stony Brook.
Sept. 1991 to Aug. 1992: Asst. professor at SUNY, Stony Brook.
Sept. 1988 to Aug. 1991: Hedrick Asst. professor at UCLA.
Sept. 1987 to Aug. 1988: NSF postdoc at MSRI, Berkeley.

EDUCATION

University of Chicago, Mathematics, Ph. D., 1987, Advisor Peter W. Jones.
Visiting graduate student and progammer, Dept. of Mathematics, Yale University, 1985-1987.
University of Chicago, Mathematics, Master of Science, 1984.
Cambridge University, Certificate of Advanced Study (Part III of Math. Tripos), 1983.
Michigan State University, Mathematics, Bachelor of Science, 1982.

PH.D. STUDENTS

Zsuzsanna Gonye, Ph. D. 2001, Geodesics in hyperbolic manifolds
Karyn Lundberg, Ph. D. 2005, Boundary behavior of conformal mappings
Hrant Hakobyan, Ph.D. 2007, Hausdorff dimension and quaisymmetric mappings

AWARDS

1992 Alfred P. Sloan Research Fellow

1987 NSF Postdoctoral Fellowship

1983-1986 McCormick Fellowship, U. of Chicago

1983-1986 NSF Graduate Fellowship.

1982-1983 Churchill Fellowship, Cambridge England.

PUBLICATIONS

[1] C. J. Bishop. A counterexample in conformal welding concerning Hausdorff dimension. *Michigan Math. J.*, 35(1):151–159, 1988.

[2] C. J. Bishop. An element of the disk-algebra that is stationary on a set of positive length. *Algebra i Analiz*, 1(3):83–88, 1989.

[3] C. J. Bishop. Constructing continuous functions holomorphic off a curve. *J. Funct. Anal.*, 82(1):113–137, 1989.

[4] C. J. Bishop. Approximating continuous functions by holomorphic and harmonic functions. *Trans. Amer. Math. Soc.*, 311(2):781–811, 1989.

[5] C. J. Bishop, L. Carleson, J. B. Garnett, and P. W. Jones. Harmonic measures supported on curves. *Pacific J. Math.*, 138(2):233–236, 1989.

[6] C. J. Bishop. Bounded functions in the little Bloch space. *Pacific J. Math.*, 142(2):209–225, 1990.

[7] C. J. Bishop. Conformal welding of rectifiable curves. *Math. Scand.*, 67(1):61–72, 1990.

[8] C. J. Bishop and P. W. Jones. Harmonic measure and arclength. *Ann. of Math. (2)*, 132(3):511–547, 1990.

[9] C. J. Bishop and T. Steger. Three rigidity criteria for $\mathrm{PSL}(2,\mathbf{R})$. *Bull. Amer. Math. Soc. (N.S.)*, 24(1):117–123, 1991.

[10] C. J. Bishop. A characterization of Poissonian domains. *Ark. Mat.*, 29(1):1–24, 1991.

[11] C. J. Bishop. Brownian motion in Denjoy domains. *Ann. Probab.*, 20(2):631–651, 1992.

[12] C. J. Bishop. Some questions concerning harmonic measure. In *Partial differential equations with minimal smoothness and applications (Chicago, IL, 1990)*, volume 42 of *IMA Vol. Math. Appl.*, pages 89–97. Springer, New York, 1992.

[13] C. J. Bishop and T. Steger. Representation-theoretic rigidity in $\mathrm{PSL}(2,\mathbf{R})$. *Acta Math.*, 170(1):121–149, 1993.

[14] C. J. Bishop. An indestructible Blaschke product in the little Bloch space. *Publ. Mat.*, 37(1):95–109, 1993.

[15] C. J. Bishop. How geodesics approach the boundary in a simply connected domain. *J. Anal. Math.*, 64:291–325, 1994.

[16] C. J. Bishop and P. W. Jones. Harmonic measure, L^2 estimates and the Schwarzian derivative. *J. Anal. Math.*, 62:77–113, 1994.

[17] C. J. Bishop. Some homeomorphisms of the sphere conformal off a curve. *Ann. Acad. Sci. Fenn. Ser. A I Math.*, 19(2):323–338, 1994.

[18] C. J. Bishop. A counterexample concerning smooth approximation. *Proc. Amer. Math. Soc.*, 124(10):3131–3134, 1996.

[19] C. J. Bishop. A distance formula for algebras on the disk. *Pacific J. Math.*, 174(1):1–27, 1996.

[20] C. J. Bishop. Minkowski dimension and the Poincaré exponent. *Michigan Math. J.*, 43(2):231–246, 1996.

[21] C. J. Bishop. On a theorem of Beardon and Maskit. *Ann. Acad. Sci. Fenn. Math.*, 21(2):383–388, 1996.

[22] C. J. Bishop. Some characterizations of $C(\mathcal{M})$. *Proc. Amer. Math. Soc.*, 124(9):2695–2701, 1996.

[23] C. J. Bishop. Geometric exponents and Kleinian groups. *Invent. Math.*, 127(1):33–50, 1997.

[24] C. J. Bishop and Y. Peres. Packing dimension and Cartesian products. *Trans. Amer. Math. Soc.*, 348(11):4433–4445, 1996.

[25] C. J. Bishop and Peter W. Jones. Hausdorff dimension and Kleinian groups. *Acta Math.*, 179(1):1–39, 1997.

[26] C. J. Bishop and P. W. Jones. The law of the iterated logarithm for Kleinian groups. In *Lipa's legacy (New York, 1995)*, volume 211 of *Contemp. Math.*, pages 17–50. Amer. Math. Soc., Providence, RI, 1997.

[27] C. J. Bishop and P. W. Jones. Wiggly sets and limit sets. *Ark. Mat.*, 35(2):201–224, 1997.

[28] C. J. Bishop, P. W. Jones, Robin Pemantle, and Yuval Peres. The dimension of the Brownian frontier is greater than 1. *J. Funct. Anal.*, 143(2):309–336, 1997.

[29] C. J. Bishop. Quasiconformal mappings which increase dimension. *Ann. Acad. Sci. Fenn. Math.*, 24(2):397–407, 1999.

[30] C. J. Bishop. A quasisymmetric surface with no rectifiable curves. *Proc. Amer. Math. Soc.*, 127(7):2035–2040, 1999.

[31] C. J. Bishop, A. Böttcher, Yu. I. Karlovich, and I. Spitkovsky. Local spectra and index of singular integral operators with piecewise continuous coefficients on composed curves. *Math. Nachr.*, 206:5–83, 1999.

[32] C. J. Bishop and J. T. Tyson. Conformal dimension of the antenna set. *Proc. Amer. Math. Soc.*, 129(12):3631–3636 (electronic), 2001.

[33] C. J. Bishop and J. T. Tyson. Locally minimal sets for conformal dimension. *Ann. Acad. Sci. Fenn. Math.*, 26(2):361–373, 2001.

[34] C. J. Bishop. Bi-Lipschitz homogeneous curves in $\mathbb{R}^2$ are quasicircles. *Trans. Amer. Math. Soc.*, 353(7):2655–2663 (electronic), 2001.

[35] C. J. Bishop. Divergence groups have the Bowen property. *Ann. of Math. (2)*, 154(1):205–217, 2001.

[36] C. J. Bishop. BiLipschitz approximations of quasiconformal maps. *Ann. Acad. Sci. Fenn. Math.*, 27(1):97–108, 2002.

[37] C. J. Bishop. Quasiconformal mappings of Y-pieces. *Rev. Mat. Iberoamericana*, 18(3):627–652, 2002.

[38] C. J. Bishop. Non-rectifiable limit sets of dimension one. *Rev. Mat. Iberoamericana*, 18(3):653–684, 2002.

[39] C. J. Bishop and P. W. Jones. Compact deformations of Fuchsian groups. *J. Anal. Math.*, 87:5–36, 2002. Dedicated to the memory of Thomas H. Wolff.

[40] C. J. Bishop. Quasiconformal Lipschitz maps, Sullivan's convex hull theorem and Brennan's conjecture. *Ark. Mat.*, 40(1):1–26, 2002.

[41] C. J. Bishop, V. Ya. Gutlyanskiĭ, O. Martio, and M. Vuorinen. On conformal dilatation in space. *Int. J. Math. Math. Sci.*, (22):1397–1420, 2003.

[42] C. J. Bishop. Big deformations near infinity. *Illinois J. Math.*, 47(4):977–996, 2003.

[43] C. J. Bishop. δ-stable Fuchsian groups. *Ann. Acad. Sci. Fenn. Math.*, 28(1):153–167, 2003.

[44] C. J. Bishop. An explicit constant for Sullivan's convex hull theorem. In *In the tradition of Ahlfors and Bers, III*, volume 355 of *Contemp. Math.*, pages 41–69. Amer. Math. Soc., Providence, RI, 2004.

[45] C. J. Bishop. The linear escape limit set. *Proc. Amer. Math. Soc.*, 132(5):1385–1388 (electronic), 2004.

[46] C. J. Bishop. Orthogonal functions in H^∞. *Pacific J. Math.*, 220(1):1–31, 2005.

[47] C. J. Bishop. Boundary interpolation sets for conformal maps. *Bull. London Math. Soc.*, 38(4):607–616, 2006.

[48] C. J. Bishop. A criterion for the failure of Ruelle's property. *Ergodic Theory Dynam. Systems*, 26(6):1733–1748, 2006.

[49] C. J. Bishop. Harmonic measure. *Book review in Bull. Amer. Math. Soc.* 44(2):267-276, 2007.

[50] C. J. Bishop. An A_1 weight not comparable to any quasiconformal Jacobian. *In the tradition of Ahlfors-Bers, IV*, volume 432 of *Contemp. Math.*, pages 7–18. Amer. Math. Soc., Providence, RI. 2007

[51] C.J. Bishop and H. Hakobyan. A central set of dimension 2. 2007. to appear in Proc. Amer. Math. Soc.

[52] C.J. Bishop. Decreasing dilatations can increase dimension. 2006. to appear in the Illinois J. of Math.

PREPRINTS

[53] C.J. Bishop. Non-removable sets for quasiconformal and quasi-isometric mappings in $\mathbb{R}^3$.

[54] C.J. Bishop. A fast approximation to the Riemann map.

[55] C.J. Bishop. A set containing rectifiable arcs locally but not globally.

[56] C.J. Bishop. Conformal mapping in linear time.

[57] C.J. Bishop. Distortion of disks by conformal maps.

[58] C.J. Bishop. Quadrilateral meshes with no small angles.

[59] C.J. Bishop. Bounds for the CRDT algorithm.

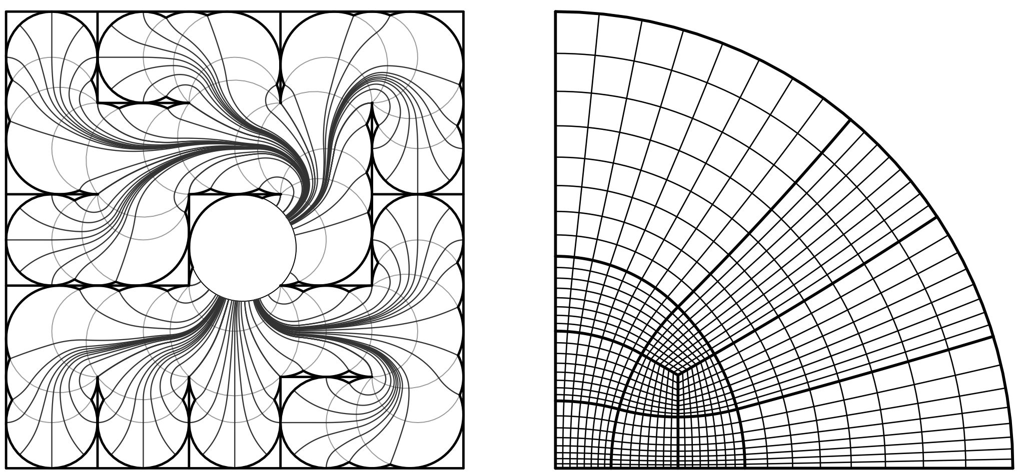
[60] C.J. Bishop. A fast quasiconformal mapping theorem for polygons.

[61] C.J. Bishop. Optimal angle bounds for quadrilateral meshes.

[62] C.J. Bishop. Tree-like decompositions and conformal maps.

[63] C.J. Bishop. Estimates for harmonic conjugation.

POSTSCRIPT



Some illustrations from my recent work on numerical analysis and computational geometry. On the left the curved lines illustrate a flow from the boundary of a domain to an interior circle. This flow has a simple geometric definition (inspired by a result of Dennis Sullivan on hyperbolic 3-manifolds), but gives a uniform approximation to the Riemann mapping, with estimates independent of the domain and forms the first step of an algorithm that converges quadratically to the conformal map. On the right is a quadrilateral meshing of a circular triangle which forms a "worst case" in my algorithm which finds a quadrilateral mesh with all new angles between 60° and 120°. These angle bounds are best possible and so is the required time, $O(n)$ for an n-gon.

Copies of my papers and lectures are available at `www.math.sunysb.edu/~bishop`