Curriculum Vitae — William J. Floyd

Born:	June 27, 1952; Charlottesville, Virginia		
Education:	B.A.	University of North Carolina with Highest Honors in Zoology and Mathematics	
	M.A.	Princeton University, 1976	
	Ph.D.	Princeton University, 1978 (thesis adviser — William P. Thurston)	
Positions	UCLA	Adjunct Asst. Professor	1978–1979
		E. R. Hedrick Asst. Professor	1979–1980
	U. of Michigan	Asst. Professor	1980–1983
		Visiting Asst. Professor	1984–1986
	Virginia Tech	Asst. Professor	1983–1988
		Assoc. Professor	1988-1996
		Professor	1996–2018
		Professor Emeritus	2018–
Visiting Positions:	Institut des Hautes Études Scientifiques		June 1984
	University of Michigan, Visiting Asst. Professor		1984–1986
	Mathematical Sciences Research Institute		May 1989
	Institut des Hautes Études Scientifiques		Feb.-March 2003
	Université de Paris-Sud, Visiting Professor		April 2003
Awards and Honors	Member of Phi Eta Sigma and Phi. Beta Kappa		
	NSF Graduate Fellowship		1974–1977
	NSF Research Grants		1979–1992, 1994–2006

Papers:

William J. Floyd, "Group completions and Kleinian groups." thesis, Princeton University, 1978

William J. Floyd, "Group completions and limit sets of Kleinian groups." *Invent. math.* **57**, 205–218 (1980)

W. Floyd and A. Hatcher, "Incompressible surfaces in punctured-torus bundles." *Topology Appl.* **13**, 263–282 (1982)

W. Floyd and U. Oertel, "Incompressible surfaces via branched surfaces." *Topology* **23**, 117–125 (1984)

William J. Floyd, "A construction of the Furstenberg boundary for uniform lattices of rank one groups." *Duke Math J.* **51**, 1017–1020 (1984)

W.J. Floyd, A.H.M. Hoare, and R.C. Lyndon "The word problem for geometrically finite groups." *Geom. Dedicata* **20**, 201–207 (1986)

William J. Floyd, "Incompressible surfaces in 3-manifolds: the space of boundary curves," In: *Low Dimensional Topolgy and Kleinian Groups* (D.B.A. Epstein, Ed.). pp. 131-143. Cambridge: Cambridge University Press 1986

William J. Floyd and Steven P. Plotnick, "Growth functions on Fuchsian groups and the Euler characteristic." *Invent. math.* **88**, 1–29 (1987)

W. Floyd and A. Hatcher, "The space of incompressible surfaces in a 2-bridge link complement." *Trans. Amer. Math. Soc.* **305** #2, 575–599 (1988)

William J. Floyd and Steven P. Plotnick, "Symmetries of planar growth functions." *Invent. math.* **93**, 501–543 (1988)

J.W. Cannon, W.J. Floyd, M.A. Grayson, and W.P. Thurston, "Solvgroups are not almost convex." *Geom. Dedicata* **31**, 291–300 (1989)

William J. Floyd, "Growth of planar Coxeter groups, P.V. numbers, and Salem numbers." *Math Ann.*" **293**, 475–483 (1992)

William J. Floyd, "Symmetries of planar growth functions, II." *Trans. Amer. Math. Soc.* **340** #2, 447–502 (1993)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Squaring rectangles: the finite Riemann mapping theorem." In: *The Mathematical Heritage of Wilhelm Magnus — Groups, Geometry & Special Functions.* Contemporary Mathematics Vol. 169, pp. 133–212. Providence: Amer. Math. Soc. 1994

W. J. Floyd and S. P. Plotnick, "Growth functions for semi-regular tilings of the hyperbolic plane." *Geom. Dedicata* **53**, 1–23 (1994)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Introductory notes on Richard Thompson's groups." *l'Enseign. Math.* **42**, 215–256 (1996)

William Floyd and Walter Parry, "The growth of nonpositively curved triangles of groups." *Invent. math.* **129** 289–359 (1997)

J. W. Cannon, W. J. Floyd, R. Kenyon, and W. R. Parry, "Hyperbolic geometry." in *Flavors of Geometry*, MSRI Publication #30 (Silvio Levy, ed.), pp. 59–115, Cambridge: Cambridge University Press 1997

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Conformal modulus: the graph paper invariant." in *Geometric Group Theory Down Under*, (J. Cossey, C. Miller III, W. Neumann, M. Shapiro, ed.), pp. 71–102, Berlin; New York: de Gruyter 1999

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Sufficiently rich families of planar rings." *Annal. Acad. Sci. Fenn* **24** 265–304 (1999)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Crystal growth, biological cell growth, and geometry." Pattern Formation in Biology, Vision and Dynamics. (A. Carbone, M. Gromov, P. Prusinkiewics, eds.), pp. 65–82, World Scientific 2000

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Introduction to twisted face-pairings." *Math. Res. Lett.* **7** 477-491 (2000)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Finite subdivision rules." *Conform. Geom. Dyn.* **5** 153–196 (2001) (electronic)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Twisted face-pairing 3-manifolds." *Trans. Amer. Math. Soc.* **354** 2369–2397 (2002) (electronic)

W. Floyd, B. Weber, and J. Weeks, "The Achilles' heel of O(3,1)?" *Exp. Math* **11** 91–97 (2002)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Heegaard diagrams and surgery descriptions for twisted face-pairing 3-manifolds." *Algebr. Geom. Topol.* **3** 234–285 (2003) (electronic)

J. W. Cannon, W. J. Floyd, R. Kenyon, and W. R. Parry, "Constructing rational maps from finite subdivision rules." *Conform. Geom. Dyn.* **7** 76–102 (2003) (electronic)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Combinatorially regular polyomino tilings." *Discrete Comput. Geom.* **35** 269–285 (2006)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Expansion complexes for finite subdivision rules I." *Conform. Geom. Dyn.* **10** 63–99 (2006) (electronic)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Expansion complexes for finite subdivision rules II." *Conform. Geom. Dyn.* **10** 326–354 (2006) (electronic)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Constructing subdivision rules from rational maps." *Conform. Geom. Dyn.* **11** 128–136 (2007) (electronic)

W. Floyd, L. Kay, and M. Shapiro, "Some elementary properties of SIR networks or, Can I get sick because you got vaccinated?", *Bull. Math. Biol.* **70** 713–727 (2008)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Squaring rectangles for dumbbells." *Conform. Geom. Dyn.* **12** 109–132 (2008) (electronic)

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Bitwist 3-manifolds." *Algebr. Geom. Topol.* **9** 187–220 (2009) (electronic)

J. W. Cannon, W. J. Floyd, W. R. Parry, and K. M. Pilgrim, "Subdivision rules and virtual endomorphisms." *Geom. Dedicata* **141**, 181–195 (2009).

J. W. Cannon, W. J. Floyd, and W. R. Parry, "Lattès maps and finite subdivision rules." *Conform. Geom. Dyn.* **14**, 113–140 (2010)

J. W. Cannon and W. J. Floyd, "What is Thompson's group." *Notices Amer. Math. Soc.* **58**, 1112-1113 (2011).

W. Floyd, L. Kay, and M. Shapiro, "A covering-graph approach to epidemics on SIS and SIS-like networks." *Bull. Math. Biol.* 74, 175–189 (2012).

J. W. Cannon, W. J. Floyd, W. R. Parry, and K. M. Pilgrim, "Nearly Euclidean Thurston maps ." *Confrom. Geom. Dyn.* **16**, 209–255 (2012).

J. W. Cannon, W. J. Floyd, L. Lambert, W. R. Parry, and J. S. Purcell, "Bitwist manifolds and two-bridge knots." *Pacific J. Math.* **284**, 1–39 (2016).

W. Floyd, G. Kelsey, S. Koch, R. Lodge, W. Parry, K. Pilgrim, E. Saenz, "Origami, affine maps, and complex dynamics." *Arnold Math. J.* **3**, 365–395 (2017).

W. J. Floyd, W. R. Parry, and K. M. Pilgrim, "Expansion properties for finite subdivision rules I." *Sci. China Math.* **61** (2018), 2237–2266.

W. Floyd, W. Parry, and K. M. Pilgrim, "Presentations of NET maps." *Fund. Math.* **244** (2019), no. 1, 49–72.

W. Floyd, W. Parry, and K. M.Pilgrim, "Modular groups, Hurwitz classes and dynamic portraits of NET maps." *Groups Geom. Dyn.* **13** (2019), 47–88.

Research Software:

J. W. Cannon and W. J. Floyd, "subdivide.c." Copyright 1997, 2000, available from
http://www.math.vt.edu/people/floyd.

J. W. Cannon and W. J. Floyd, "tilepack.c." Copyright 1997, 2000, available from
http://www.math.vt.edu/people/floyd.

J. W. Cannon and W. J. Floyd, "pairsnap.c." Copyright 1998, 2000, available from
http://www.math.vt.edu/people/floyd. (This was formerly called tilesnap.c.)

J. W. Cannon and W. J. Floyd, "squarect.c." Copyright 1998, 2000, available from
http://www.math.vt.edu/people/floyd.

J. W. Cannon and W. J. Floyd, "partsnap.c." Copyright 1999, 2000, available from http://www.math.vt.edu/people/floyd.

J. W. Cannon and W. J. Floyd, "bitwist.c." Copyright 1998, 2000, 2005 available from http://www.math.vt.edu/people/floyd.

J. W. Cannon and W. J. Floyd, "precp.c." Copyright 1998, 2000, 2005 available from
http://www.math.vt.edu/people/floyd.

Grants:

Visiting Assistant Researcher, National Science Foundation Research Grant MCS 78-04378. Geometry and Topology of Manifolds. $56,651. June 1, 1979 - December 31, 1980. (University of California at Los Angeles).

Faculty Research Associate, National Science Foundation Research Grant MCS81-02469. Topology. $173,600. June 1, 1981 - November 20, 1984. (University of Michigan).

Faculty Research Associate, National Science Foundation Research Grant DMS84-01919. Topology. $209,400. June 1, 1984 - November 30, 1987. (University of Michigan).

Principal Investigator, National Science Foundation Research Grant DMS-8701419. Geometric Group Theory and Topology. $37,000. June 15, 1987 - November 30, 1989. (Virginia Polytechnic Institute and State University).

Principal Investigator, National Science Foundation Research Grant DMS-8902199. Studies in Geometric Topology. $165,100. June 1, 1989 - November 30, 1992. (Virginia Polytechnic Institute and State University).

Principal Investigator, National Science Foundation Research Grant DMS-9400900. Studies in Geometric Group Theory. $63,600. July 15, 1994 - June 30, 1997. (Virginia Polytechnic Institute and State University).

Principal Investigator, National Science Foundation Research Grant DMS-9704043, Studies of Negatively Curved Groups. $43,200. July 15, 1997 - June 30, 2000. (Virginia Polytechnic Institute and State University)

Principal Investigator, National Science Foundation Research Grant DMS-9971783, Low-Dimensional Topology and Subdivision Rules. $62,640. August 1, 1999 - July 31, 2002.

Principal Investigator, National Science Foundation Research Grant DMS-0203902, Subdivision Rules and 3-Manifold Topology. $89,016. July 15, 2002 - June 30, 2006.

Institutional Service:

Mathematics Department, University of Michigan

- Thesis Committee, 1981, 1983
- Executive Committee, 1982–1983
- Systems Administrator, Apollo Network, 1985–1986
- Qualifying Exam Committee, 1985–1986
- Prelim Committee, 1985–1986

Mathematics Department, Virginia Polytechnic Institute and State University

- Library Committee, 1987–1988, 1993–1995
- Computing Committee, 1987–1988
- Advisor, 1987–1992, 1996–2000, 2003–2017
- Algebraic Topology Prelim Committee, 1988 (Chair)
- Teacher Evaluation Committee, 1988–1989
- Undergraduate Program Committee, 1988–1992, 1994–1995, 1999–2002, 2004–2007 (Chair), 2007–2009
- Personnel Committee, 1989–1991, 1996–1998, 2006–2007, 2008–2009, 2010–2011, 2014–2015
- Colloquium Committee, 1989–1991, 2010–2011
- Discrete Search Committee, 1988–1989
- Linear Algebra Search Committee, 1990 (Chair)
- Geometry Search Committee, 1991–1994 (Chair, 1992–1994)
- Regional Contest Committee, 1993–1995
- Scholarship Committee, 1993–1995
- Steering Committee, 1994 Summer Workshop
- Teaching Committee, 1994–1995

- Undergraduate Research/Industrial Experience Committee, 1994–1995
- Electronic Advising Committee, 1994–1995 (Chair)
- Webmaster, 1994–1995, 1996–2002, 2003–2018
- Topology Prelim Committee, 1995, 1998
- Dynamical Systems Search Committee, 1995
- Undergraduate Computer Requirement Committee 1996–1997 (Chair)
- Computational Resources Committee, 1996–1997, 1997–1999 (Chair)
- Divisional Services Committee, 1999–2000 (Chair)
- Calculus Committee, 2000–2001 (Chair)
- Pure Mathematics Search Committee, 2001–2002 (Chair)
- Director for Undergraduate Programs, 2004–2007
- Search Committee, 2006–2007
- Graduate Program Committee (Graduate Admissions), 2009-2013
- Graduate Admissions, 2013–2014
- Collquium Committee, 2010–2011
- Internal Review Committee, 2015 (Chair)
- Department Executive Committee, 2016–2017 (Deputy Chair)

Co-organizer of the NSF-CBMS Regional Conference on Group Actions on Manifolds at the Donaldson Brown Continuing Education Center, July 13–23, 1987. This conference was funded by National Science Foundation Grant DMS-8620063.

Invited Research Talks:

Group completions and Kleinian groups. Mathematics Colloquium, University of Maryland, College Park, Maryland, 1978.

Group completions and limit sets. U.S./Japan Seminar on Kleinian Groups and Riemann Surfaces, Honolulu, Hawaii, January 1979.

A geometric torus decomposition theorem. Topology Seminar, University of California, Berkeley, California, 1979.

Group completions and Kleinian groups. Southern California Topology Seminar, Irvine, California, 1979.

Branched surfaces and incompressible surfaces in 3-manifolds. AMS Meeting, Kenosha, Wisconsin, October 1980.

Incompressible surfaces. Low-Dimensional Topology Miniconference, Indiana University, Bloomington, Indiana, March 1982.

Incompressible surfaces in punctured-torus bundles. AMS Meeting, East Lansing, Michigan, November 1982.

Continued fractions and punctured-torus bundles. Mathematics Colloquium, University of Oklahoma, Norman, Oklahoma, 1983.

Continued fractions and punctured-torus bundles. Mathematics Colloquium, University of Wisconsin-Parkside, Kenosha, Wisconsin, 1983.

Continued fractions and punctured-torus bundles. Mathematics Colloquium, Virginia Polytechnic Institute and State University , Blacksburg, Virginia, 1983.

Continued fractions and punctured-torus bundles. Topology Seminar, Wayne State University, Detroit, Michigan, 1983.

Adding a 2-handle to a solid handlebody. Indiana Topology Miniconference, Indiana University, Bloomington, Indiana, May 1983.

Adding a 2-handle to a hyperbolic 3-manifold with compressible boundary. Topology Seminar, Université de Paris-Sud, Centre d'Orsay, Orsay, France, November 1983.

Incompressible surfaces and periodic continued fractions. Mathematics Colloquium, University of Virginia, Charlottesville, Virginia, February 1984.

Some interesting actions on spheres. Conference on Transformation Groups and Bordism Theroy on the Occasion of the Sixtieth Birthday of Edwin E. Floyd, Charlottesville, Virginia, April 1984.

Branched surfaces. Warwick Symposium on Hyperbolic Geometry & 3-Dimensional Manifolds, Warwick, England, June 1984.

The space of boundary curves. Warwick Symposium on Hyperbolic Geometry & 3-Dimensional Manifolds, Warwick, England, June 1984.

Group completions and hyperbolic manifolds. Mathematics Seminar, University of Birmingham, Birmingham, England, June 1984.

The action of Mod_g on the projective lamination space $PL(S_g)$. 2-Manifolds Workshop, Mathematics Sciences Research Institute, Berkeley, California, October 1984.

Growth functions on surface groups. AMS Winter Meeting, Anaheim, California, January 1986.

Growth functions on surface groups. A.H. Clifford Lectures and Miniconference on 3-Manifolds, Tulane University, New Orleans, Louisiana, February 1986.

Growth functions on surface groups. AMS Meeting, Logan, Utah, October 1986.

Growth functions on surface groups. Geometry/Topology Seminar, University of Maryland, College Park, Maryland, November 1986.

Growth functions on planar groups — Euler characteristic. AMS Winter meeting, San Antonio, Texas, January 1987.

Growth functions on surface groups. Group Actions on Manifolds Conference, Blacksburg, Virginia, July 1987.

The status of problems on growth functions. BYU Topology Conference, Brigham Young University, Provo, Utah, August 1987.

Growth functions on surface groups with complete geometric generators. AMS Meeting, College Park, Maryland, April 1988.

Growth functions of surface groups. Symposium on Automatic Groups, Geometry Supercomputer Project and the John von Neumann National Supercomputer Center, Princeton, New Jersey, February 1989.

Growth functions for surface groups. Roger Lyndon Seminar, Mathematics Sciences Research Institute, Berkeley, California, May 1989.

Growth functions of triangles of groups. Combinatorial Group Theory Seminar, University of Michigan, Ann Arbor, Michigan, March 1990.

Asymptotic properties of hyperbolic groups. Mathematics Colloquium, University of Kentucky, Lexington, Kentucky, January 1991.

Growth of planar Coxeter groups. Topology Seminar, Brigham Young University, Provo, Utah, October 1991.

Nonpositively curved triangles of groups. Mathematics Colloquium, Ohio State University, Columbus, Ohio, April 1992.

Growth of planar Coxeter groups. Topology Seminar, Ohio State University, Columbus, Ohio, April 1992.

Growth of nonpositively curved triangles of groups, II. Low Dimensional Topology and Combinatorial Group Theory Conference, SUNY Albany, Rennselaerville, New York, October 1992.

Geometry in subdivision rules. Topology Seminar, Rutgers University-Newark, Newark, New Jersey, April 1994.

Subdivision rules. Topology Seminar, Brigham Young University, Provo, Utah, May 1994.

Subdivision rules. Analysis Seminar, University of Tennessee, Knoxville, Tennessee, June 1994.

Finite subdivision rules and combinatorial moduli. Hour Talk, 1994 SUNYA Topolgy and Group Theory Conference, Rennselaerville, New York, October 1994.

Finite subdivision rules, circle packings, and squared rectangles. AMS Meeting, Orlando, Florida, March 1995.

Negatively curved groups, finite subdivision rules, and combinatorial moduli. Geometry Seminar, Duke University, Durham, North Carolina, April 1995.

Finite subdivision rules and combinatorial moduli. Topology Seminar, University of Michigan, October 1995.

Combinatorial moduli and finite subdivision rules. AMS Meeting, Greensboro, North Carolina, November 1995.

Finite subdivision rules and expansion complexes. Wasatch Topology Conference, Park City, June 1997.

Conformality of rotationally invariant finite subdivision rules. AMS Meeting, Atlanta, Georgia, October 1997.

The twist construction. 1998 Geometric Groups on the Gulf Coast Conference, Mobile, March 1998.

Rational maps and subdivision rules. Mathematics Colloquium, Brigham Young University, October 1998.

Finite subdivision rules. Math/Physics Seminar, University of Texas at Austin, March 1999.

A playground for exploring 3-manifold groups. 2000 Geometric Groups on the Gulf Coast Conference, Mobile, March 2000.

Constructing and recognizing twisted face-pairing 3-manifolds. Topology Seminar, Centre d'Orsay, Univeristé de Paris-Sud, Orsay, France, June 2001.

The Achilles' heel of O(3,1)?. Topology Seminar, Brigham Young University, Provo, Utah, October 2001.

Circle packings, finite subdivision rules, and rational maps. Mathematics Colloquium, University of Virginia, Charlottesville, Virginia, November 2001.

Teichmüller theory for polygonal complexes. Topology Seminar, Brigham Young University, Provo, Utah, November 2002.

Subdivision rules, circle packings, and rational maps, GT3 Seminar, Institut de Recherche Mathématique Advancée, Strasbourg, France, February 2003.

Expansion complexes for finite subdivision rules, Topology Seminar, Centre d'Orsay, Université Paris-Sud, Orsay, France, March 2003.

Shapes of tiles, Special Event honoring Jim Cannon on the occasion of his sixtieth birthday, Park City, Utah, June 2003.

The split space-at-infinity of a Gromov hyperbolic group, AMS Meeting, Athens, Ohio, March 2004.

Subdivision rules, circle packings, and rational maps, Mathematics Colloquium, Brigham Young University, Provo, Utah, October 2004.

The subdivision complex at infinity, Conference on Low-Dimensional Topology, Charlottesville, Virginia, December 2004.

Cannon's conjecture, finite subdivision rules, and rational maps (90 minute talk), Groups007 CIRM Marseilles Conference, Luminy, France, February 2007.

A critically finite map, and the associated map on Teichmüller space, Spring Topology and Dynamics Conference 2007, Rolla, Missouri, March 2007.

Rational maps, subdivision rules, and Kleinian groups, Dynamical Systems Seminar, SUNYSB and The Institute for Mathematical Sciences, Stony Brook, New York, May 2008.

Finite subdivision rules and rational maps, Barrett Lectures, Townsend, Tennessee, May 2010.

Finite subdivision rules and rational maps, Topology-Geometry Seminar, Temple University, Philadelphia, Pennsylvania, October 2012.

Expansion complexes for finite subdivision rules, Spring Topology and Dynamics Conference, New Britain, Connecticut, March 2013.

Finite subdivision rules, Colloquium, University of Georgia, Athens, Georgia, November 2013.

Cannon's conjecture, subdivision rules, and expansion complexes, AMS Sectional Meeting, Greensboro, North Carolina, November 2014.

Finite subdivision rules, VIGRE seminar, University of Georgia, Athens, Georgia, April 2015.

Finite subdivision rules, 2017 Circle Packing Workshop, Harrisonburg, Virginia, June 2017.

Realizing Thurston maps as subdivision maps, Complex Analysis, Dynamics and Geometry Seminar, University of Michigan, Ann Arbor, Michigan, November 2017.

Expansion complexes and Cannon's Conjecture, SIAM Annual Meeting, Portland, Oregon, July 2018.

Mixed, the anatomy of an example, 2018 Circle Packing Workshop, Harrisonburg, Virginia, August 2018.