

# Curriculum Vitæ of Peter B. Shalen

## Address

Department of Mathematics, Statistics and Computer Science (M/C 249)  
University of Illinois at Chicago  
851 South Morgan Street  
Chicago, IL 60607-7045  
  
312-996-4825 (FAX) 312-996-1491  
E-mail: shalen@math.uic.edu

## Education

Ph.D. 1972 Harvard University  
B.A. 1966 Harvard College  
Pensionnaire étranger, Ecole Normale Supérieure, Paris, 1966-67

## Employment

1985—present	Professor	University of Illinois at Chicago
1998-99	Long-term visitor, University of Chicago	
June, 1998	Professeur Invité	Université Paul Sabatier, Toulouse
June, 1997	Professeur Invité	Université de Bourgogne
June, 1996	Professeur Invité	University of Paris
June, 1993	Professeur Invité	Université Paul Sabatier, Toulouse
Spring 1985	Member	Mathematical Sciences Research Institute, Berkeley
Fall 1984	Professeur Associé	University of Paris (Orsay)
Spring 1984	Professeur Associé	University of Nantes
1983—85	Professor	Rice University
1981—82	Visiting Scholar	Columbia University
1979—83	Associate Professor	Rice University
1978—79	Visiting Member	Courant Institute of Mathematical Sciences, N.Y.U.
1974—79	Assistant Professor	Rice University
1971—74	J.F. Ritt Assistant Professor	Columbia University

## Professional Honors

- Alfred P. Sloan Foundation Fellowship for Basic Research,  
1977—79.
- Invited one-hour address, A.M.S. Regional Meeting, University  
of Wisconsin at Parkside, October, 1980.
- J. Clarence Karcher Lectures in Mathematics, University of  
Oklahoma, April 1980.
- Member, Mathematical Sciences Research Institute, Berkeley, Spring  
1985, and December 1988.
- Invited 45-minute address, International Congress of Mathematicians,  
Berkeley, California, August 1986.
- Fourth annual Zabrodsky lecture, Hebrew University, Jerusalem.  
December, 1990.
- University Scholar award, University of Illinois, 1996
- Invited visits, American Institute of Mathematics, May 2000 and May  
2002.
- Distinguished Lecture Series (three lectures), Technion-IIT, Haifa,  
December 2000.
- Conference on 3-manifold topology in honor of my 60th birthday. Centre  
de Recherches Mathématiques, Université de Montréal, June, 2006.

## Graduate Student Supervision

### *Thesis Director for*

- Francisco Escobar, M.A., Rice University, 1976
- Claude Lebrun, M.A., Rice University, 1977
- Sa'ar Hersonsky, Ph.D., UIC, 1994
- Teodoro Sorgo, Ph.D., UIC, 1997
- David Krebs, Ph.D., UIC, 1997
- Bryan Mosher, Ph.D., UIC, 1998
- Nathan Dunfield, Ph.D., University of Chicago, 1999 (with Mel Rothenberg)
- Yong Hou, Ph.D., UIC, 2000
- Andrew Przeworski, Ph.D. University of Chicago, 2000 (with Mel Rothenberg)
- Benjamin Klaff, Ph.D., UIC, 2003

## Editorships

- Member, Editorial Board for Research Announcements, Bull. Amer. Math.  
Soc., Jan. 1988—Dec. 1990
- Assoc. Editor, Journal of Knot Theory and its Ramifications, 1991—present
- Member, Editorial Committee, Transactions and Memoirs of the Amer. Math.  
Soc., Feb. 1992—Jan. 2000
- Geometric Topology Editor, February 1992—January 1997
- Managing Editor and Chairman of Editorial Committee,  
Feb. 1994—Jan. 2000

## Professional Activities

- Referee for N.S.F. grant proposals, 1974—present
- Referee for N.S.A. grant proposals, 1992, 1993, 1995
- Referee for Israel-U.S. Binational Science Foundation proposal, 2001
- Outside consultation for hiring and tenure, each year from 1983 to present
- Organized Special Year in Geometry (1987-88) at UIC, with S. Hurder and S. Yau.
- Member (with R. Alperin (Chair) and H. Bass) of organizing committee, Workshop on Arboreal Group Theory, M.S.R.I., Sept. 1988.
- Member of Council, American Mathematical Society, Jan. 1994—Feb. 2000
- Member of Comité Scientifique, Conference on Geometric Methods in Low Dimensions, Lyon, July, 1994.
- Member of Policy Review Committee for Meetings and Conferences, American Mathematical Society, 1996
- Member of CPUB Subcommittee on Books and Monographs, American Mathematical Society, 1999
- Member of organizing committee, MSRI Workshop on Geometric and Topological Aspects of Group Theory, May 2000.
- Leader of break-out session on transition courses, Symposium on Excellence in Teaching of Mathematics and Science, UIC, March, 2002.
- Member of advisory committee, Centre de recherches mathématiques, Université de Montréal, 2003—present
- Co-organizer (with Parameswaran Sankaran) of Special Session in Algebraic and Geometric Topology, AMS-India joint meeting, Bangalore, December 2003.

## Invited Lectures at Professional Meetings

- “Infinitely divisible elements in 3-manifold groups,” Topology Festival, Cornell University, May 1974.
- “Seifert fibered spaces in 3-manifolds,” Geometric Topology Conf., University of Georgia, Aug. 1977.
- “Old and new results in 3-manifolds,” Indiana University, (5 lectures), Oct. 1978.
- “ $PSL_2(C)$  and incompressible surfaces,” Sympos. on the Smith Conjecture, Columbia University, April 1979.
- “3-manifolds, linear groups, and algebraic varieties,” A.M.S. Meeting, University of Wisconsin at Park-side, (1 hr. invited address), Oct. 1980.
- “Varieties of group representations and splittings of 3-manifolds,” Topology Conf., University of Georgia, June 1981.
- “3-manifolds, trees, and 22 matrices,” Topology Mini-Conf., Indiana University, April 1983.
- “Laminations, trees, and degeneration of hyperbolic structures,” Special Year in Geometry and Topology, University of Maryland, (5 lectures), Oct. 1983.
- “Algebro-geometric aspects of 3-manifold theory,” Sympos. on Hyperbolic Geometry and Kleinian Groups, University of Warwick, (5 lectures), June 1984.
- “Dehn surgery and 3-manifolds with cyclic fundamental group,” Conf. on Hyperbolic Geometry, University of Durham, July 1984.
- “Representations of 3-manifold groups,” Three-Manifolds Workshop, M.S.R.I., Jan. 1985.
- “Group actions on trees,” Mini-Conf. on Combinatorial Group Theory, M.S.R.I., May 1985.

“Dehn surgery on knots,” Georgia Topology Conf., University of Georgia, Aug. 1985.

“Dehn surgery on knots,” Midwest Topology Conf., U.I.C., Nov. 1985.

“ $\mathbf{Q} + \tau\mathbf{Q}$ -trees,” C.B.M.S. Conf. on Degeneration of Hyperbolic Structures, U.C.L.A., July 1986.

“ $\mathbf{Q} + \tau\mathbf{Q}$ -trees, Part I,” Special Session on Geometric Methods in Group Theory, A.M.S. Meeting, San Antonio, Texas, Jan. 1987.

“Trees and continued fractions,” Cornell Topology Festival, May 1987.

“Compactification of character varieties and applications in geometry and topology,” A.M.S. Conf. on Geometry of Group Representation, Boulder, Colorado, July 1987.

“Recent results in dendrology,” Plenary address, International Conf. on Algebraic Topology, Northwestern University, March 1988.

“Dendrology of groups in low  $\mathbf{Q}$ -ranks,” two 1-hour lectures, Arboreal Group Theory Workshop, M.S.R.I., Sept. 1988.

“Volumes of hyperbolic 3-manifolds,” Special Session on Geometric Topology, A.M.S. Meeting, Chicago, IL, May 1989.

“Patterson measures, Margulis numbers and volumes of hyperbolic 3-manifolds.” One-hour invited lecture, Georgia Topology Conference, August 1989.

“Patterson measures, Margulis numbers and volumes of hyperbolic 3-manifolds.” One-hour invited lecture, First SUNYA Conference on low-dimensional topology and combinatorial group theory, Rensselaerville, N.Y., November, 1989.

“Two-generator Kleinian groups and volumes of hyperbolic 3-manifolds.” One-hour invited lecture, Special Semester Conference on low-dimensional topology, Ohio State University, March 1990

“Actions on real trees.” Five lectures. Workshop on Group Theory from a Geometric Viewpoint. International Centre for Theoretical Physics (Trieste), April 2–6, 1990.

“Volumes and injectivity radii of hyperbolic 3-manifolds.” Invited 45-minute seminar talk, AMS Summer Institute on Differential Geometry, University of California at Los Angeles, July 1990.

“Two-generator Kleinian groups and injectivity radii of hyperbolic 3-manifolds.” One-hour invited lecture, Conference on representations of fundamental groups, University of Chicago, February 1991.

“Injectivity radii of hyperbolic 3-manifolds.” One-hour invited lecture, West Coast Topology Symposium, Stanford University, March 1991.

“Volumes of hyperbolic Haken manifolds.” One-hour invited lecture, Michigan Topology Conference, May 1991.

“ $SL_2$ , trees and 3-manifolds.” Plenary address, Conference on Representation Theory in Algebraic Topology, Northwestern University, May 1992.

“Volumes of hyperbolic Haken manifolds.” One-hour invited lecture. Workshop in Low-Dimensional Topology, Technion-IIT, Haifa, June, 1992.

“Geometric estimates in hyperbolic manifolds.” Invited survey lecture, Conference on Low-Dimensional Topology, University of Tennessee at Knoxville, May, 1992.

“Dehn surgery and boundary slopes: some new results.” One-hour invited lecture, Topology Conference, University of Chicago, May 1993.

“Volumes of hyperbolic 3-manifolds, II,” Invited 1-hour address, Conference on hyperbolic geometry, University of Durham (UK), July, 1993.

“Boundary Slopes,” Topology Conference, University of Chicago, June, 1994.

“Dehn surgery and incompressible surfaces: some new results,” Topology Conference, University of Chicago, June, 1994.

“Pentes de bord,” One-hour invited address, Conference on Knot Theory and 3-manifolds, Luminy, July, 1994

“Volumes des variétés hyperboliques de dimension 3.” One-hour invited address, Conference on “Méthodes géométriques en petites dimensions,” Lyon, July, 1994.

“The betti number of the smallest hyperbolic 3-manifold.” One-hour invited address, Workshop on Kleinian groups and conformal dynamics, MSRI, January, 1995.

“Boundary slopes of knots.” Invited address, New York Area Group Theory Seminar, CUNY, April, 1995.

“New volume estimates for hyperbolic 3-manifolds.” Invited address, Conference on Knots and 3-Manifolds, CRM, Université de Montréal, June 1995.

“The first Betti number of the smallest hyperbolic 3-manifold.” Invited address, Midwest Topology Seminar, UIC, February, 1996.

“Volumes des variétés hyperboliques de dimension 3.” One-month mini-course given jointly with Marc Culler, Centre Emile Borel, Institut Henri Poincaré, Paris, June, 1996.

“Incompressible surfaces in knot exteriors.” Special session on geometric topology and geometric group theory, AMS regional meeting, University of Wisconsin at Milwaukee, October, 1997.

“New applications of the  $SL_2$  character variety of a 3-manifold group.” Invited address, Conference on Geometry and Topology, Technion-IIT, Haifa, January, 1999.

“Boundary slopes of knots, and 3-manifolds with cyclic fundamental group.” Workshop on Geometric and Topological Aspects of Group Theory, MSRI, May 2000.

“Smallish knots in 3-manifolds.” Invited address, Cascade Topology Seminar, Portland State University, May 2000.

“Smallish knots in 3-manifolds.” Invited address, Conference on Geometric Group Theory, Technion-IIT, Haifa, June 2000.

“Essential surfaces, trees and  $SL_2(\mathbf{C})$ .” Five lectures. Instructional Conference on Low-dimensional Topology, Harish-Chandra Research Institute, Allahabad (India), December 2000 and January 2001.

“Smallish knots in 3-manifolds.” Workshop on groups and 3-manifolds, Centre de Recherches Mathématiques, Montreal, June 2001.

“Representations of 3-manifold groups.” Five-lecture mini-course, program in Groups and Low Dimensional Topology, Centre de Recherches Mathématiques, Montreal, July, 2001.

“Character varieties, 3-manifolds with cyclic  $\pi_1$ , and smallish knots, I—III.” Three lectures (as the principal speaker), Topology conference, Mathematisches Forschungsinstitut, Oberwolfach, September, 2001.

“Smallish knots.” Arkansas Spring Lecture series, University of Arkansas, April, 2003.

“Knots with only two strict essential surfaces.” Workshop on Topology in and around Dimension 3, Banff International Research Station (Alberta), September 2003.

“Hyperbolic volume and the lattices of subgroups of a free group.” Special session in algebraic and geometric topology, AMS-India joint meeting, Bangalore, December 2003.

“Hyperbolic volume and the lattices of subgroups of a free group.” Workshop on Geometry, Dynamics and Groups, Technion-IIT (Haifa), December, 2003—January, 2004.

“Hyperbolic volume and the lattices of subgroups of a free group.” Conference on knots and singularities, Université de Bourgogne, June, 2004.

“Hyperbolic volume and classical topology.” Conference on 3-manifolds and knot theory, University of Texas at Austin, May, 2005.

“Hyperbolic volume and classical topology.” Conference on geometry and topology of 3-manifolds, Abu-Salam International Center for Theoretical Physics, Trieste, June, 2005.

“Classical 3-manifold topology and hyperbolic volume.” Invited three-lecture series. Workshop on 3-manifolds after Perelman, Heriot-Watt University (Edinburgh), March, 2006.

“Hyperbolic volume and classical topology.” Invited address, Workshop on Hyperbolic Geometry. Conference on Topology, Geometry, and Physics, Columbia University, May, 2006.

“Hyperbolic volume and classical topology.” Invited address, Workshop on Hyperbolic Geometry and Geometric Group Theory, Fields Institute (Toronto), May, 2006.

## Colloquia and Seminars

Oklahoma State University, colloquium, “Linear representations of amalgamated free products,” Feb. 1977.

Indiana University-Purdue University at Indianapolis, Topology seminar, “Separating, incompressible surfaces in 3-manifolds,” Oct. 1978.

Indiana University, colloquium, “Surfaces in 3-manifolds,” Oct. 1978.

Institute for Advanced Study, Topology seminar, “ $\mathrm{PSL}_2(C)$  and incompressible surfaces,” Dec. 1978.

Columbia University, colloquium, “ $\mathrm{PSL}_2(C)$  and surfaces in 3-manifolds,” Dec. 1978.

Yale University, Topology seminar, “ $\mathrm{PSL}_2(C)$  and surfaces in 3-manifolds,” Feb. 1979.

C.C.N.Y., colloquium, “What is the Smith conjecture,” Feb. 1979.

University of Michigan, Topology seminar, “A torus theorem for regular branched covers of  $S^3$ ,” Oct. 1980.

Michigan State University, colloquium, “Linear groups of finite cohomological dimension,” Oct. 1980.

Columbia University, colloquium, “3-manifolds, linear groups, and algebraic varieties,” Sept. 1981.

Princeton University, Topology seminar, “Varieties of group representation and splittings of 3-manifolds,” Oct. 1981.

Fordham University, colloquium, “3-manifolds, linear groups, and algebraic curves,” Oct. 1981.

CUNY Graduate Center, Group theory seminar, “ $\mathrm{SL}_2$ , groups acting on trees, and 3-manifolds,” Nov. 1981.

University of Pennsylvania, Geometry and Topology seminar, “ $\mathrm{SL}_2$ , groups acting on trees, algebraic varieties, and low-dimensional manifolds,” March 1982.

Smith College, Connecticut Valley Geometry and Topology Seminar, “ $\mathrm{SL}_2$ , groups acting on trees, algebraic varieties, and low-dimensional manifolds,” April 1982.

CUNY Graduate Center, Group theory seminar, “Surface groups actions on trees,” Oct. 1983.

University of Chicago, colloquium, “Dehn surgery on knots,” Feb. 1986.

Michigan State University, colloquium, “Dehn surgery on knots,” Feb. 1986.

University of Chicago, Topology seminar, “Trees and continued fractions,” Dec. 1986.

University of Texas, Austin, Topology seminar, “Mod  $p$  homology and volumes of hyperbolic 3-manifolds,” Jan. 1987.

University of Texas, Austin, Colloquium, “Trees,” Jan. 1987.

U.C.L.A.-Caltech-U.S.C., Topology seminar, “Mod  $p$  homology, growth rates of groups and injectivity radii of hyperbolic 3-manifolds,” June 1987.

U.C.L.A.-Caltech-U.S.C., Topology seminar, “Trees and continued fractions,” June 1987.

Northwestern University, Geometric topology seminar, “Mod  $p$  homology, growth rates of groups and volumes of hyperbolic 3-manifolds,” Fall 1988.

M.S.R.I., Seminar Roger Lyndon, “Growth rates of groups and volumes of hyperbolic 3-manifolds,” Dec. 1988.

“Two-generator Kleinian groups and volumes of hyperbolic 3-manifolds.” Colloquium lecture, University of Tennessee, December, 1989.

Special seminar, “Two-generator Kleinian groups and volumes of hyperbolic 3-manifolds.” Workshop on Group Theory from a Geometric Viewpoint, International Centre for Theoretical Physics (Trieste), April 2-6, 1990.

Colloquium lecture, “Geometric estimates in hyperbolic 3-manifolds.” Technion (Haifa), December 1990.

Two seminar talks following my Zabrodsky lecture, “Kleinian groups and the Banach-Tarski phenomenon, continued.” Hebrew University, Jerusalem, December 1990 and January 1991.

“Three-manifold topology and hyperbolic volume,” Colloquium lecture, Purdue University, September 1991.

“Volumes of hyperbolic Haken manifolds.” Topology seminar, Princeton University, April 1992.

“Volumes of hyperbolic Haken manifolds.” Combinatorial Group Theory Seminar, CUNY Graduate Center, April 1992. “Three-free groups and hyperbolic volume.” Discrete groups seminar, University of Chicago, January 1993.

“Hyperbolic volume.” Colloquium lecture, UT at Austin, February 1993.

“Three-free groups and hyperbolic volume.” Invited seminar talk, UT at Austin, February 1993.

“Volumes des variétés hyperboliques,” Topology Seminar, Université Paul Sabatier (Toulouse), June 1993.

“Volumes des variétés hyperboliques,” Topology Seminar, ENS de Lyon, June, 1993.

“Surfaces incompressibles et chirurgies de Dehn,” Topology Seminar, Université Paul Sabatier (Toulouse), June, 1993.

“Hyperbolic Volume,” Colloquium, Michigan Technological University, November, 1993.

“Volumes of hyperbolic 3-manifolds,” Colloquium, University of Michigan, November, 1993.

“Volumes of hyperbolic 3-manifolds,” Colloquium, Michigan State University, November, 1993.

“Volumes of hyperbolic 3-manifolds.” Colloquium lecture, University of Wisconsin at Madison, February, 1995.

“Volumes des variétés hyperboliques de dimension 3.” Colloquium lecture, Université de Québec à Montréal, March, 1995.

“Exceptional Dehn fillings.” Invited address, Geometric Topology Seminar, University of Chicago, April, 1996.

“Surfaces incompressibles dans les complémentaires des noeuds.” Université de Bourgogne, June, 1996.

“Surfaces incompressibles dans les complémentaires des noeuds.” Five-lecture mini-course, Université de Bourgogne, June 1997.

“Volumes of hyperbolic 3-manifolds.” Colloquium, Wayne State University, September 1997.

“Groups of real analytic diffeomorphisms.” Geometry-Topology Seminar, Caltech, April 1998.

“Pentes bords” (three lectures). Topology seminar, Université Paul Sabatier, June 1998.

“Groupes de difféomorphismes analytiques réels” (two lectures). Geometric group theory seminar, Université Paul Sabatier, June 1998.

“Real-analytic actions of lattices.” Topology seminar, Oklahoma State University, November, 1998.

“Boundary slopes.” Colloquium, Oklahoma State University, November, 1998.

“ $SL(2, \mathbf{C})$  character varieties and applications to 3-manifold topology.” About five lectures. Geometry-Topology Seminar, University of Chicago, Winter 1999.

"Patterson-Sullivan measures and the quantitative geometry of hyperbolic 3-manifolds." Geometric analysis seminar, University of Minnesota, March 2000.

"Boundary slopes of knots." Colloquium, University of Minnesota, March 2000.

"Smallish knots in 3-manifolds." Cascade Topology Seminar, Portland State University, May 2000.

"Character varieties, boundary slopes, smallish knots, and the Poincaré conjecture." Topology seminar, Stanford University, May 2000.

"Surfaces in knot exteriors, and 3-manifolds with cyclic fundamental group." Colloquium, Hebrew University, Jerusalem, December 2000.

" $SL_2(\mathbf{C})$ -representations, knots, and 3-manifolds with cyclic fundamental group." Colloquium, University of Chicago, February 2001.

" $SL_2(\mathbf{C})$ -representations, knots, and 3-manifolds with cyclic fundamental group." Colloquium, Rice University, February 2001.

" $SL_2(\mathbf{C})$ -representations, knots, and 3-manifolds with cyclic fundamental group." Colloquium, University of Iowa, March 2001.

"Character varieties, knots and the Poincaré Conjecture." Colloquium, SUNY at Buffalo, October 2001.

"Triangulations, good knots, and 3-manifolds with cyclic fundamental group." Topology seminar, University of Texas at Austin, December 2001.

"Varieties of group representations, surfaces in knot complements, and the Poincaré Conjecture." New York Group Theory Seminar, CUNY Graduate Center, March 2002.

## Grant Support

N.S.F. grant	1972—1974	Columbia University
N.S.F. grants	1974—84	Rice University (Principal Investigator, Morton Curtis)
N.S.F. grant	1984—86	UIC (Principal Investigator)
N.S.F. grants	1986—2001	UIC (Co-Principal Investigator with Marc Culler)
N.S.F. grant	2001—present	UIC (Co-Principal Investigator with Marc Culler and Ian Agol)
N.S.F. grant	1987-88	UIC (Co-Principal Investigator with S. Hurder and S. Yau, to support short-term visitors for the Special Year in Geometry)
VIGRE grant	2000–2003	UIC (Co-Principal Investigator with five other members of the department)

## Publications

1. “Infinitely divisible elements in 3-manifolds groups.,” in *Knots, Groups and 3-Manifolds: Papers Dedicated to the Memory of R.H. Fox*. L.P. Neuwirth, Ann. of Math. Stud., Princeton Univ. Press, 1975, 293–335.
2. “Peripheral structure of 3-manifolds” (with W. Jaco), *Invent. Math.* **38** (1976), 55–87.
3. “Seifert fibered spaces in irreducible, sufficiently-large 3-manifolds” (with W. Jaco), *Bull. Amer. Math. Soc.* **82** (1976), 756–767.
4. “Surface homeomorphisms and periodicity” (with W. Jaco), *Topology* **16** (1977), 347–367.
5. “A note on real cubic surfaces” (with R. Kulkarni), *Bull. Calcutta Math. Soc.* **70** (1978), 375–377.
6. “A new decomposition theorem for 3-manifolds” (with W. Jaco), *Proc. Sympos. Pure Math* **32** (1978), 71–84.
7. “Linear representations of certain amalgamated products,” *J. Pure Appl. Algebra* **15** (1979), 187–197.
8. “Separating, incompressible surfaces in 3-manifolds,” *Invent. Math.* **52** (1979), 105–126.
9. “Seifert fibered spaces in 3-manifolds,” in *Geometric Topology*, J. C. Cantrell, ed., Academic Press, 1979, 91–99.
10. “Seifert fibered spaces in 3-manifolds” (with W. Jaco), *Memoirs Amer. Math. Soc.* **21** (1979), no. 220, viii + 192 pp.
11. “Linear groups of finite cohomological dimension” (with R. Alperin), *Bull. Amer. Math. Soc.* **4** (1981), 339–341.
12. “A torus theorem for regular branched covers of  $S^3$ ,” *Michigan Math. J.* **28** (1981), 247–258.  
<http://projecteuclid.org/Dienst/Repository/1.0/Disseminate/euclid.mmj/1029002565/body/pdf?userid=&password=>
13. “Linear groups of finite cohomological dimension” (with R. Alperin), *Invent. Math.* **66** (1982), 89–98.
14. “Varieties of group representations and splittings of 3-manifolds” (with M. Culler), *Ann. of Math.* **117** (1983), 109–146.  
<http://www.jstor.org/view/0003486x/di961911/96p00475/0>

15. “A piecewise-linear method for triangulating 3-manifolds,” *Adv. in Math.* **52** (1984), 34–80.
16. “The proof in the case of no incompressible surface,” in *The Smith Conjecture*, J. Morgan and H. Bass, eds., Academic Press, 1984, 21–36.
17. “Bounded separating, incompressible surfaces in knot manifolds” (with M. Culler), *Invent. Math.* **75** (1984), 537–545.
18. “Degenerations of hyperbolic structures, I” (with J. Morgan), *Ann. of Math.* **120** (1984), 401–476.  
<http://www.jstor.org/view/0003486x/di961922/96p0043n/0>
19. “Dehn surgery on knots” (with M. Culler, C. Gordon and J. Luecke), *Bull. Amer. Math. Soc.* **13** (1985 ), 43–45.
20. “Dehn surgery on knots” (with M. Culler, C. Gordon and J. Luecke), *Ann. of Math.* **125** (1987), 237–300.  
<http://www.jstor.org/view/0003486x/di961936/96p0011c/0>
21. “An introduction to compactifying spaces of hyperbolic structures by actions on trees” (with J. Morgan), in *Geometry and Topology, Proceedings, Univ. of Maryland 1983-1984*, Lecture Notes in Math. #**1167**, Springer-Verlag, 1985.
22. “Affine algebraic sets and some infinite, finitely presented groups” (with G. Baumslag), in *Essays in Group Theory*, S. Gersten, ed., M.S.R.I. Pub. #**8**, Springer-Verlag, 1987, 1–14.
23. “Representations of 3-manifold groups and applications in topology,” in *Proc. of the International Congress of Mathematicians*, vol. 1, 1986, 607–611.
24. “Generalized triangle groups” (with G. Baumslag and J. Morgan), *Math. Proc. Cambridge Philos. Soc.* **102** (1987), 25–31.
25. “Dendrology of groups,” in *Essays in Group Theory*, S. Gersten, ed. #**8**, Springer-Verlag, 1987, 265–320.
26. “Degenerations of hyperbolic structures, II” (with J. Morgan), *Ann. of Math.* **127** (1988), 403–456.  
<http://www.jstor.org/view/0003486x/di961942/96p00534/0>
27. “Degenerations of hyperbolic structures, III” (with J. Morgan), *Ann. of Math.* **127** (1988), 457–519.  
<http://www.jstor.org/view/0003486x/di961943/96p00545/0>
28. “Groups whose 3-generator subgroups are free” (with G. Baumslag), *Bull. Austral. Math. Soc.* **40** (1989), 163–174.

29. “On Ahlfors’ finiteness theorem” (with R. Kulkarni), *Adv. in Math.* **76** (1989), 155–169.
30. “A remark on finitely presented, infinite-dimensional algebras” (with G. Baumslag), *Proc. Amer. Math. Soc.* **108** (1990), 633–635.  
<http://www.jstor.org/view/00029939/di970989/97p0184w/0>
31. “Free actions of surface groups on  $\mathbf{R}$ -trees” (with J. Morgan), *Topology* **30** (1991), 143–154.
32. “Dendrology of groups in low  $\mathbf{Q}$ -ranks” (with H. Gillet), *J. Differential Geom.* **32** (1990), 605–712.
33. “Cohomological dimension of groups acting on  $\mathbf{R}$ -trees” (with H. Gillet), in *Arboreal Group Theory, Proceedings of a Workshop held September 13-16, 1988*, R. C. Alperin, ed., M.S.R.I. Publications, Springer-Verlag, 1991, 231–250.
34. “Amalgamated products and finitely presented groups” (with G. Baumslag), *Comm. Math. Helv.* **65** (1990), 243–254.
35. “Simplicial approximation and low-rank trees” (with H. Gillet and R. Skora), *Comm. Math. Helv.* **66** (1991), 521–540.
36. “Dendrology and its applications ,” in *Group Theory from a Geometrical Viewpoint, ICTP, Trieste, Italy, 26 March-6 April, 1990*, E. Ghys, A. Haefliger and A. Verjovsky, eds., World Scientific Publishing, 1991, 543–616.  
<http://www.math.uic/~shalen/shebang.dvi>
37. “Growth rates,  $\mathbf{Z}_p$ -homology, and volumes of hyperbolic 3-manifolds.” (with P. Wagreich), *Trans. Amer. Math. Soc.* **331** (1992), 895–917.  
<http://www.jstor.org/view/00029947/di981419/98p0156a/0>
38. “Paradoxical decompositions, 2-generator Kleinian groups and volumes of hyperbolic 3-manifolds” (with M. Culler), *J. Amer. Math. Soc.* **5** (1992), 231–288.  
<http://www.jstor.org/view/08940347/di981367/98p0013e/0>
39. “Hyperbolic volume and mod  $p$  homology” (with M. Culler), *Comm. Math. Helvetici* **68** (1993), 494–509.  
<http://www.math.uic.edu/~shalen/log5.pdf>
40. “The volume of a hyperbolic 3-manifold with Betti number 2” (with M. Culler), *Proc. Amer. Math. Soc.* **120** (1994), 1281–1288.  
<http://www.jstor.org/view/00029939/di981513/98p0586k/0>
41. “Plane curves associated to character varieties of 3-manifolds” (with D. Cooper, M. Culler, H. Gillet and D. Long), *Invent. Math.* **118** (1994), 47–84.  
<http://www.math.uic.edu/~culler/papers/PlaneCurves/curves.dvi>

42. “Volumes of hyperbolic Haken manifolds, I” (with M. Culler), *Invent. Math.* **118** (1994), 284–329.  
<http://www.math.uic.edu/~culler/papers/HyperHakenI/nonsep.dvi>
43. “Free Kleinian groups and volumes of hyperbolic 3-manifolds” (with J. Anderson, M. Culler and R. Canary), *J. Differential Geom.* **43** (1996), 738–782.  
<http://www.math.uic.edu/~culler/papers/kGenerators/kgen.dvi>
44. “Volumes of hyperbolic Haken manifolds, II” (with M. Culler), *Proc. Amer. Math. Soc.* **125** (1997), 3059–3067.  
<http://www.ams.org/proc/1997-125-10/S0002-9939-97-04101-4/S0002-9939-97-04101-4.pdf>
45. “The first Betti number of the smallest hyperbolic 3-manifold” (with M. Culler and S. Hersonsky), *Topology* **37** (1998), 805–849.  
<http://www.math.uic.edu/~culler/papers/SmallestMfld/bettele.dvi>
46. “Real-analytic actions of lattices” (with B. Farb), *Invent. Math.* **135** (1999), 273–296.  
<http://www.springerlink.com/media/DLTEHGTHQK5WBCUTMTFG/Contributions/W/1/G/Y/W1GY1AVV36R5P6JV.pdf>
47. “Homeomorphic graph-manifolds: a contribution to the  $\mu$  constant problem” (with B. Perron), *Topology Appl* **19** (1999), 1–39.  
<http://www.math.uic.edu/~shalen/perron17.dvi>
48. “Boundary slopes of knots” (with M. Culler), *Comment. Math. Helv.* **74** (1999), 530–547.  
<http://www.springerlink.com/media/5G04842JC51VNHD17TFG/Contributions/B/0/3/1/B031HFNJ327ETNX5.pdf>
49. “Three-manifold topology and the tree for  $\mathrm{PSL}_2$ : The Smith conjecture and beyond,” *Contemporary Mathematics* **243** (1999), 189–209.  
<http://www.math.uic.edu/~shalen/shalbass.dvi>
50. “Lattice actions, 3-manifolds, and homology” (with B. Farb), *Topology* **39** (2000), 573–587.  
<http://zaphod.uchicago.edu/~farb/papers/homol.dvi>
51. “Three-Manifolds and Baumslag-Solitar groups,” *Topology Appl* **110** (2001), 113–118 .  
<http://www.math.uic.edu/~shalen/bs5.dvi>
52. “Representations of 3-manifold groups,” in *Handbook of Geometric Topology*, R. Daverman and R. Sher, eds., Elsevier, 2002, 955–1044.  
<http://www.math.uic.edu/~shalen/handbook.dvi>

53. “Groups of real-analytic diffeomorphisms of the circle” (with B. Farb), *Ergodic Theory and Dynamical Systems* **22** (2002), 835–844.  
<http://www.math.uic.edu/~shalen/circle.dvi>
54. “Real-analytic, volume-preserving actions of lattices on 4-manifolds” (with B. Farb), *C. R. Math. Acad. Sci. Paris* **334** (2002), 1011–1014.
55. “Approximation by maximal cusps in boundaries of deformation spaces of Kleinian groups” (with R. D. Canary, M. Culler and S’ar Hersonsky), *J. Differential Geom.* **64** (2003), 57–109.
56. “Knots with only two essential surfaces” (with M. Culler), in *Proceedings of the Casson Fest*, Geom. Topol. Monogr., 7, Geom. Topol. Publ., Coventry, 2004, 335–430 (electronic).
57. “Characteristic subsurfaces and Dehn filling” (with S. Boyer, M. Culler and X. Zhang), *Trans. Amer. Math. Soc.* **327** (2005), 2389–2444.
58. “The diameter of the set of boundary slopes of a knot” (with B. Klaff), *Algebraic & Geometric Topology* **6** (2006), 1095–1112.  
<http://www.msp.warwick.ac.uk/agt/2006/06/p040.xhtml>
59. “Dehn surgery, homology and hyperbolic volume” (with I. Agol and M. Culler), *Algebraic & Geometric Topology* **6** (2006), 2313–2350.  
[math.GT/0508208](http://math.GT/0508208)

*Accepted for Publication*

60. “Singular surfaces, mod 2 homology, and hyperbolic volume, I” (with M. Culler), *Trans. Amer. Math. Soc.*  
[math.GT/0506396](http://math.GT/0506396)
61. “Hyperbolic volume and ranks of groups,” in *Proceedings of the 2005 workshop on Heegaard splittings, Technion-IIT, Haifa, Israel*, Geom. Topol. Monogr.

*Submitted*

62. “Singular surfaces, mod 2 homology, and hyperbolic volume, II ” (with M. Culler).  
[math.GT/0701666v1](http://math.GT/0701666v1)
63. “Characteristic subsurfaces, character varieties and Dehn filling” (with S. Boyer, M. Culler and X. Zhang).

*Manuscripts in Preparation*

64. “Hyperbolic volume and  $k$ -free groups” (with M. Culler).