

## Biographical sketch

**Name:** Peter Petersen.

**Undergraduate Education:** Math/Physics major at University of Copenhagen, 1981-1984.

**Graduate Education:** Ph.D. in Mathematics from the University of Maryland at College Park, 1987.

**Thesis Advisor:** K. Grove.

**Current Institutional Affiliation:**

Department of Mathematics  
University of California  
Los Angeles, CA 90095-1555

**Employment:**

Distinguished Professor	UCLA	2022-
Professor	UCLA	1995-2022
Associate Professor	UCLA	1991-1995
Assistant Professor	UCLA	1989-1991
Assistant Professor	Princeton Univ.	1988-1989
Lecturer	Univ. of Pennsylvania	1987-1988

**Ph.D.Students:**

J. Borzellino	Cal Poly San Luis Obispo	1992
L.-K. Koh	Tech industry	1992
M. Cassorla	†	1994
S. Shteingold	Tech industry	1996
C. Sprouse	CSU Northridge	1999
C. Hinde	ESL teacher in Korea	2008
G. Merton	Actuary	2012

**Grants:**

- NSF DMS 1006677 “Global Riemannian Geometry” 2010-13
- NSF DMS 0204177 “Global Riemannian Geometry” 2002-05
- NSF DMS 9971045 “Global Riemannian Geometry” 1999-02
- NSF DMS 9626652 “Riemannian Geom./Compl. Anal./Appl.” 1996-99
- NSF “Riemannian Geom., Compl. Anal., Appl.” 1993-97
- NSF Young Investigator Award (PYI) “Riemannian Geometry” 1992-97
- NSF “Diff. Geom., PDE & Complex Var.” 1991-93
- Alfred P. Sloan Foundation “Research Fellowship” 1990-92
- NSF “PDE & Complex Var.” 1990-91
- NSF “Differential Structures” 1989-90

**Honors:**

- Fellow of the AMS, 2020
- NSF Young Investigator Award (formerly PYI), 1992-97
- Alfred P. Sloan Foundation Award, 1990-92

### Research Publications:

1. K. Grove, P. Petersen, Bounding homotopy types by geometry. *Annals of Math.*, 128, 1988, 195-206.
2. K. Grove, P. Petersen, Homotopy types of positively curved manifolds with large volume. *Amer. J. of Math.*, 110, 1988, 1183-1188.
3. K. Grove, P. Petersen, J.Y. Wu, Geometric finiteness theorems via controlled topology. *Invent. Math.*, 99, 1990, 221-222.
4. P. Petersen, Fatness of Covers. *J. reine angew. Math.*, 403, 1990, 154-165.
5. P. Petersen, A finiteness theorem for metric spaces. *J. Diff. Geometry*, 13, 1990, 387-395.
6. K. Grove, P. Petersen, J.Y. Wu, Controlled topology in geometry. *Bull. Amer. Math. Soc.*, 20, 1989, 181-183.
7. K. Grove, P. Petersen, A pinching theorem for homotopy spheres. *J. of Amer. Math. Soc.*, 3, 1990, 671-677.
8. K. Grove, P. Petersen, J.Y. Wu, Erratum to "Geometric finiteness theorems via controlled topology. *Invent. Math.*, 99, 1990, 221-222.
9. K. Grove, P. Petersen, Manifolds near the boundary of existence. *J. Diff. Geom.*, 33, 1991, 379-394.
10. P. Petersen, Small excess and Ricci curvature. *J. Geom. Anal.*, 1, 1991, 383-387.
11. V.L. Hansen, P. Petersen, Groups, coverings and Galois theory. *Can. J. Math*, 43.6, 1991, 1281-1293.
12. R. Brooks, R. Perry, P. Petersen, Compactness and finiteness theorems for isospectral manifolds. *J. Reine Angew.*, 426, 1992, 67-89.
13. R. Greene, P. Petersen, Little topology, big volume. *Duke Math. J.*, 67.2, 1992, 273-290.

14. K. Grove, P. Petersen, Volume comparison a la Alexandrov. *Acta Math*, 169, 1992, 131-151.
15. P. Petersen, S. Zhu, An excess sphere theorem. *Ann. Scien. Ec. Norm Sup.*, 26, 1993, 175- 188.
16. P. Petersen, Z. Shen, S. Zhu, Manifolds with small excess and bounded curvature. *Math Z*, 212, 1993, 581-585.
17. K. Grove, P. Petersen, A radius sphere theorem. *Inv. Math*, 112, 1993, 577-583.
18. R. Brooks, P. Perry, P. Petersen, Some examples in  $L_p$  spectral geometry. *J. Geo. Anal.*, 3, 1993, 293-313.
19. P. Petersen, Gromov-Hausdorff convergence of metric spaces. *Proc. of Symp. in Pure Math*, 54, 1993, 489-504.
20. R. Brooks, P. Perry, P. Petersen, Finiteness of diffeomorphism types of isospectral manifolds. *Proc. Symp. in Pure Math*, 54, 1993, 89-93.
21. R. Brooks, P. Perry, P. Petersen, On Cheeger's Inequality. On Cheeger's Inequality. *Com. Math. Helv.*, 68, 1993, 599- 621.
22. R. Brooks, P. Perry, P. Petersen, Spectral geometry in dimension 3. *Acta Mathematica*, 173, 1994, 283-305.
23. R. Greene, P. Petersen, S.H. Zhu, Riemannian manifolds of faster than quadratic curvature decay. *International Math. Research Notices*, 9, 1994, 393-399.
24. P. Petersen, F. Wilhelm, S.H. Zhu, Spaces on and beyond the boundary of existence. *J. Geo. Anal*, 5, 1995, 419-426.
25. T.M. Liggett, P. Petersen, The law of large numbers. *Amer. Math. Monthly*, 102, 1995, 31- 35.
26. P. Petersen, S.H. Zhu,  $U(2)$  invariant four dimensional Einstein manifolds. *Indiana Univ. Math. J.*, 44, 1995, 451-465.
27. P. Petersen, G. Walschap, Observer fields and the strong energy condition. *Class. Quantum Grav*, 13, 1996, 1901-1908.

28. P. Petersen, S.D. Shteingold, G. Wei, Comparison geometry with integral curvature bounds. *Geom. and Funct. Anal.*, 7, 1997, 1011-1030.
29. P. Petersen, G. Wei, Relative volume comparison with integral curvature bounds. *Geom. and Funct. Anal.*, 7, 1997, 1031-1045.
30. L. Guijarro, P. Petersen, Rigidity in non-negative curvature. *Ann. Scient. E'c. Norm. Sup.*, 30, 1997, 595-603.
31. P. Petersen, C. Sprouse, Integral curvature bounds, distance estimates, and applications. *J. Diff. Geo.*, 50, 1998, 269-298.
32. P. Petersen, Aspects of global Riemannian geometry. *Bull. AMS*, 36, 1999, 297-344.
33. P. Petersen, C. Sprouse, Eigenvalue pinching for Riemannian vector bundles. *J. reine angew. Math*, 511, 1999, 73-86.
34. P. Petersen, On eigenvalue pinching in positive Ricci curvature. *Invent. Math.*, 138, 1999, 1- 21.
35. P. Petersen, F. Wilhelm, Examples of Riemannian manifolds with positive curvature almost everywhere. *J. Geometry and Topology*, 3, 1999, 331-367.
36. P. Petersen, G. Wei, R. Ye, Controlled Geometry via Smoothing. *Comment. Math. Helv.*, 74, 1999, 345-363.
37. X. Dai, P. Petersen, G. Wei, Integral pinching theorems. *manuscripta math.*, 101, 2000, 143- 152.
38. P. Petersen, Rigidity and Compactness of Einstein Metrics. in *Surveys in Differential Geometry: Essays on Einstein Manifolds, Volume VI, A supplement to the Journal of Differential Geometry*, Claude LeBrun and McKenzie Wang, eds., International Press, 1999, 221-234.
39. P. Petersen, G. Wei, Analysis and geometry on manifolds with integral Ricci curvature bounds II. *Trans. of the AMS*, 353(2), 2000, 457-478.
40. P. Petersen, C. Sprouse, Eigenvalue pinching on p-forms. *Tohoku Math. Publ.*, 20, 2001, 139-146.

41. P. Petersen, Variations on a theme of Synge. *Contemporary Mathematics*, 332, 2003, 241- 251.
42. P. Petersen, F. Wilhelm, On Frankel's Theorem. *Canad. Math. Bull.*, 46, 2003, 130-139.
43. C. Hinde, P. Petersen, Generalized Doubling Meets Poincare. *The Journal of Geometric Analysis*, 17(3), 2007, 485-494.
44. P. Petersen, W. Wylie, Rigidity of gradient Ricci solitons. *Pacific J. Math.*, 241, 2009, 329- 345.
45. P. Petersen, W. Wylie, On gradient Ricci solitons with Symmetry. *Proc. Amer. Math. Soc.*, 137, 2009, 2085-2092.
46. P. Petersen, T. Tao, Classification of Almost Quarter-Pinched Manifolds. *Proc. Amer. Math. Soc.*, 137, 2009, 2437-2440.
47. P. Petersen, W. Wylie, On the classification of gradient Ricci solitons. *Geometry & Topology*, 14, 2010, 2277-2300.
48. C. He, P. Petersen, W. Wylie, On the Classification of warped product Einstein metrics. *Comm. Anal. & Geo*, 20, 2012, 271-311.
49. C. He, P. Petersen, W. Wylie, Warped product Einstein metrics over spaces with constant scalar curvature. *Asian J. Math.*, 18, 2014, 159-189.
50. C. He, P. Petersen, W. Wylie, Warped product rigidity. *Asian J. Math.*, 19, 2015, 135-170.
51. C. He, P. Petersen, W. Wylie, Uniqueness of warped product Einstein metrics and applications. *J. Geom. Anal.*, 25 no 4, 2015, 2617-2644.
52. C. He, P. Petersen, W. Wylie, Warped product Einstein metrics on homogeneous spaces and homogeneous Ricci solitons. *J. Reine Angew. Math.*, 707, 2015, 217-245.
53. M. Jablonski, P. Petersen, M. B. Williams, Linear stability of algebraic Ricci solitons. *J. Reine Angew. Math*, 713, 2016, 181-224.

54. M. Jablonski, P. Petersen, A step towards the Alekseevskii Conjecture. *Math. Ann.* 368, No 1- 2, 2017, 197-212.
55. K. Grove, A. Moreno, and P. Petersen, The Boundary Conjecture for Leaf Spaces, *Ann. Inst. Fourier, Grenoble* 69, 7 (2019) 2941-2950.
56. P. Petersen, M. Wink, The Bochner Technique and Weighted Curvatures, *SIGMA* 16 (2020), 064.
57. P. Petersen, M. Wink, New Curvature Conditions for the Bochner Technique, *Invent. math.* (2021) 224:33–54.
58. P. Petersen, M. Wink, Estimation and Vanishing Results for Hodge numbers, *J. Reine Angew. Math.* 780 (2021) 197-219.
59. P. Petersen, M. Wink, Tachibana-type Theorems and special Holonomy, *Annals of Global Analysis and Geometry* 61 (2022) 847–868.
60. P. Petersen, W. Wylie, Rigidity of Homogeneous Gradient Soliton Metrics and Related Equations, *Diff. Geo. Appl.* 84 (2022) 1-29
61. K. Grove, P. Petersen, Alexandrov Spaces with Maximal Radius, *Geometry & Topology* 26 (2022) 1635–1668.
62. P. Petersen, Rigidity of Alexandrov Spaces, in *CIMAT Lectures in Mathematical Sciences* vol 1, Birkhäuser (2022), 1-48.
63. J. Nienhaus, Peter Petersen, M. Wink, W. Wylie, Holonomy restrictions from the curvature operator of the second kind, *Diff. Geo and Appl.* 88 (2023).
64. J. Nienhaus, Peter Petersen, M. Wink, Betti numbers and the curvature operator of the second kind, *J. London Math. Soc.* (2) 2023; 1–27.

**Books:**

1. G. Besson, J. Lohkamp, P. Pansu, P. Petersen, Riemannian Geometry. Fields Institute Monographs, AMS, 4, 1996.
2. K. Grove, P. Petersen, Comparison Geometry. MSRI Publications 31, Cambridge Univ. Press, 1997.
3. P. Petersen, Riemannian Geometry, 1st Ed. GTM 171, New York: Springer-Verlag, 1997.
4. P. Petersen, Riemannian Geometry, 2nd Ed. GTM 171, New York: Springer-Verlag, 2nd Ed, 2006.
5. P. Petersen, Linear Algebra. Springer Verlag, 2012.
6. P. Petersen, Riemannian Geometry, 3rd Ed. Graduate Texts in Mathematics 171. Springer, 2016.
7. P. Petersen, Manifold Theory.
8. P. Petersen, Classical Differential Geometry.



## Invitations to Conferences, Seminars, Colloquia etc:

- Geometry Seminar: UC San Diego, Jan 2023.
- Colloquium Speaker: UC Santa Cruz, Oct 2022.
- Invited Speaker: Peking University, Sep 2022.
- Invited Speaker: Virtual seminar on Geometry with Symmetries, June 2021.
- Geometry Seminar: UC San Diego, April 2021.
- Invited speaker: Conference on Geometry with Special Structures, CIMAT, Guanajuato, Mexico, Dec 2020 postponed to 2021 or 2022.
- Invited speaker: Conference on Riemannian Geometry, Florence, Italy, July 2020 postponed to 2022.
- Invited Speaker: Workshop on Geometric Analysis and Homogeneous Geometry, University of Queensland in Brisbane, Australia, June 2019.
- Invited Speaker: Semi-Annual Metropolitan Area Geometry Seminar, April 2019
- Invited Speaker: Mini-symposium in honor of Karsten Grove's retirement, Apr 2019.
- Invited Speaker: MATRIX "Australian-German Meeting on Differential Geometry in the Large" Feb 3-9, 2019.
- Visiting Distinguished Professor and Invited Speaker: 11th Minimeeting on Differential Geometry, CIMAT, Guanajuato, Mexico, Dec 10-17, 2018.
- Colloquium: CIMAT Dec, 2018.
- Invited Speaker: Notre Dame Felix Klein Seminar, Sep, 2018
- Invited Speaker: Texas Geometry and Topology Conference, Lubbock, Feb 2017.

- Geometry Seminar: Notre Dame, May 2017
- Geometry Seminar: CSU Fullerton, Sep 2017
- Geometry Seminar: Univ. of Oklahoma, May 2015
- Colloquium: CSU Dominguez Hills, April 2015
- Invited Speaker: Group Actions in Riemannian Geometry, Chapel Hill, May 2014
- Geometry Seminar, University of Oklahoma, May 2013
- Invited Speaker: Geometry Workshop, Copenhagen, June 2012
- Invited Speaker: Seminar, Stanford, April 2012
- Invited Speaker: "Workshops in Geometry", Univ. of Copenhagen, June 2010
- Invited speaker: "Interactions between Geometry and Analysis", Notre Dame, Oct 2010
- Seminar, Stanford (Mar.) 2006 Invited Speaker: Future Directions in Global Riemannian Geometry, University of Maryland 2006 (Sept.)
- Colloquium speaker: Univ. of Indiana (Mar) 2001
- Invited speaker at Pacific Northwest Geometry Seminar, MSRI (Feb) 2000
- Invited speaker at NSF Meeting on "Integrating Research into the Undergraduate Curriculum", 2000 Tucson (Feb)
- Colloquium speaker: Univ. of Oklahoma, Norman (Sept) 2000
- Colloquium speaker: Univ. of Arizona (Oct) 2000
- Seminar: Univ. of Arizona (Oct) 2000
- Conference: Geometry/Topology, Texas Tech., Lubbock (Feb) 1999 Date(s)

- Colloquium: UCSB (Jan) 1999 Invited speaker: Conference in honor of D. Gromoll's 60th birthday, SUNY, Stonybrook (Oct) 1998
- Main speaker at Lehigh Conference (Jun) 1998
- Invited speaker at Oberwolfach (Jun) 1997
- Colloquium, Rutgers Univ., New Brunswick (Jan) 1997
- Geometry seminar, NYU (Jan.) 1997
- Main speaker at "Spectral Geometry" meeting in Grenoble, France (June 16-20) 1997 Course on "Convergence" for summer school on "Geometrie Metriques", Archamps, France 1996 (Jul)
- Invited speaker at Midwest Geometry Conference, Norman, OK (May) 1996
- Analysis seminar at Univ. of Pennsylvania (Mar) 1996
- Geometry seminar at Univ. of Maryland (Mar) 1996
- Geometry seminar, Dartmouth, (Oct.) 1996
- Colloquium, Dartmouth (Oct.) 1996 Colloquium at University of Oklahoma. (April) 1994
- Invited address: UC Santa Barbara. (April) 1994
- Colloquium, University of California, Davis. (Feb.) 1993
- Colloquium & Seminar: University of Michigan, Ann Arbor. (March) 1993
- Colloquium, University of Arizona, Tucson. (Nov.) 1993
- Southern California Topology Seminar. (June) 1993
- Invited Speaker: Mini Course on "Metric Differential Geometry" in connection with the workshop on 1993 Riemannian geometry at the Fields Institute, Waterloo, Canada. (Aug.)
- Invited Speaker: Preparation Lecture for workshop in Comparison Geometry, MSRI. (Nov.) 1993

- Invited Speaker: Conference on Classification of Higher Dimensional Manifolds, University of Tennessee, 1992 Knoxville, Apr. Invited address: UC Berkeley. Sept. 1992
- Invited address: U. of Maryland. Sept. 1992
- Colloquium, University of Oklahoma, Norman. (March) 1991
- Colloquium, University of Copenhagen, Denmark. (Sept.) 1990
- Colloquium, University of Odense, Denmark. (Sept.) 1990
- Colloquium, University of Southern California. (Nov.) 1990
- Invited Speaker: AMS Summer Institute on Differential Geometry, UCLA, July 1990
- Invited address: Aarhus University, Denmark. Dec. 1990
- Invited address: The Technical University of Denmark, Lyngby. Sept. 1990
- Colloquium in Honor of W. Klingenberg, Bonn, Germany, Jan. 1989
- Invited Speaker: Conference on Convergence in Geometry, University of Maryland, College Park, Nov. 1989
- Invited Speaker: Conference, Geometry Festival, Univ. of North Carolina at Chapel Hill, Apr. 1988
- Invited Speaker: Conference, Cornell Topology Festival, Cornell, May 1988
- Invited address: U. of Maryland. Oct. 1988
- Invited address: CUNY, Graduate School. May 1988
- Invited address: UC Los Angeles, CA. Jan. 1988
- Invited address: SUNY at Stony Brook. Dec. 1987
- Invited address: U. of Maryland. Oct. 1987

- Invited address: The Technical University of Denmark, Lyngby. June. 1987
- Colloquium, Columbia University, NY. (Oct.) 1987
- Invited Speaker: Conference, Impromptu Gathering in Diff. Geo., Univ. of Alabama at Birmingham. (Sept.) 1987