# James A. Isenberg
# Curriculum Vitae

## Title:

Professor Emeritus, Department of Mathematics

## Address:

Department of Mathematics
University of Oregon
Eugene, Oregon 97403-5203
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## Home Address:

5702 Cricket Pl.
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## Education:

- PhD: May 1979 University of Maryland (1973-1979) (Major-Physics)
- AB: June 1973 Princeton University (1969-1973) (Major-Physics, summa cum laude)
- High School, June 1969 Plymouth-Whitemarsh H. School (Plymouth Meeting, PA), (valedictorian)

## Dissertations:

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| Ph.D. | "Construction of Spacetimes from Initial Data" |
| AB | "Mach's Principle Made Practical" |

## Academic Positions:

**2021-present** Professor Emeritus, University of Oregon.

**1993-2021** Professor, Department of Mathematics, University of Oregon.

**1987-1993** Associate Professor, Department of Mathematics, University of Oregon.

**1982-87** Assistant Professor, Department of Mathematics, University of Oregon.

**1980-82** Post-Doctoral Fellow and Instructor, Department of Mathematics, University of California, Berkeley.

**1979-80** Post-Doctoral Fellow and Instructor, Department of Applied Mathematics, University of Waterloo.

**1977-79** Research Assistant, Department of Physics, University of Maryland, (Dr. Charles Misner).

**1977** Teaching Assistant, Department of Physics, University of Maryland, (Dr. J. Layman).

**1974-77** NSF Pre-Doctoral Fellow, Department of Physics, University of Maryland, (Dr. Charles Misner).

**1973-75** Centre for Theoretical Physics Fellow, Department of Physics, University of Maryland, (Dr. Charles Misner).

## Research and Visiting Positions

**2022-2028** Visiting Research Affiliate Professor, Department of Mathematics, University of Maryland.

**2016-2019** Visiting Professor, Department of Physics, University of Maryland.

**2016** Visiting Professor, Mathematical Sciences Research Institute, Berkeley, California.

**2015** Visiting Professor, Institut Henri Poincare; Paris, France

**2013-2020** Visiting Professor, Department of Mathematics, University of California, San Diego.

**2013** Visiting Professor, Mathematical Sciences Research Institute, Berkeley, California.

**2012** Visiting Professor, Institut des Hautes Études Scientifiques, Paris, France.

**2011-2012** Visiting Professor, Department of Mathematics, University of California, San Diego.

**2008** Visiting Research Fellow, Mittag-Leffler Institute, Stockholm, Sweden.

**2007** Visiting Research Fellow, Albert Einstein Institute, Potsdam, Germany.

**2007** Visiting Professor, Institut des Hautes Études Scientifiques, Paris, France.

**2005** Visiting Research Fellow, Isaac Newton Institute, Cambridge, England.

**2004** Visiting Professor, Institut des Hautes Études Scientifiques, Paris, France.

**2003** Visiting Professor, Department of Physics, California Institute of Technology.

**2003** Visiting Professor, Department of Mathematics, University of California, San Diego.

**2002** Visiting Professor, Department of Mathematics, Stanford University.

**1999** Program Coordinator, Institute of Theoretical Physics, University of California, Santa Barbara.

**1998-1999** Visiting Professor, Department of Mathematics, University of Washington.

**1996** Visiting Research Fellow, Albert Einstein Institute, Potsdam, Germany.

**1996** Invited Visiting Professor, Department of Mathematics, University de Tours, France.

**1994** Visiting Research Fellow, Erwin Schroedinger Institute, Vienna, Austria.

**1993** Visiting Research Fellow, Institute of Theoretical Physics, University of California, Santa Barbara.

**1989** Visiting Associate Professor, Department of Mathematics, University of California, San Diego.

**1988** Visiting Research Fellow, Centre for Mathematical Analysis, Australian National University.

**1986** Visiting Research Fellow, Department of Mechanics and CNRS, Paris VI, France.

**1985** Visiting Assistant Professor, Department of Mathematics, University of Minnesota.

**1983-84** Visiting Assistant Professor, Department of Mathematics, Rice University.

**1976** Visiting Researcher, Mathematics Institute, Oxford University, (Dr. Roger Penrose).

**1975** Visiting Researcher, Fermi Institute, University of Chicago, (Dr. Robert Geroch).

**1972** Student Trainee, Holography Lab, Koningklijk Shell Laboratorium, Amsterdam, Holland, (Dr. A. Godefroy).

## Offices Held:

**2025-2029** Ethics Committee (American Physical Society)

**2021-2024** Committee on Scientific Publications (American Physical Society)

**2020-** Section Editor, Universe

**2013-** Section Editor, Annales Henri Poincaré

**2016** Nominating Committee, Division of Gravitational Physics (American Physical Society)

**2008-2016** Editorial Board, Classical and Quantum Gravity

**2011-2014** Secretary-Treasurer of the Topical Group in Gravity (American Physical Society).

**2006-2009** Editorial Board, Physical Review D

**2004-2011** Director, Institute for Theoretical Science (University of Oregon)

**2004-2013** Committee of the International Society of General Relativity and Gravitation

**2004-2005** Chair of Topical Group in Gravity (American Physical Society).

**2003-2004** Chair-Elect of Topical Group in Gravity (American Physical Society).

**2002-2003** Vice Chair of Topical Group in Gravity (American Physical Society).

**1996-1999** Secretary-Treasurer of Topical Group in Gravity (American Physical Society).

## Honors and Awards:

**2024** Sigma 5 Award (from the American physical Society)

**2024** Albert Nelson Marquis Achievement Award

**2021** Fellow of the American Mathematical Society

**2013** Eisenbud Professorship, MSRI

**2009** Research Innovation Award (Oregon)

**2001** Fellow of the American Physical Society

**1996** Distinguished Professor (France)

**1992** Professor of the Month (Jan. 1992, University of Oregon)

**1986** CNRS Fellowship

**1981** Fifth Place, Gravity Essay Award

**1980** Fourth Place, Gravity Essay Award

**1979** Chaim Weizmann Fellowship

**1974** Outstanding First Year Student (Physics, University of Maryland)

**1974** NSF Fellowship

**1973** CTP Fellowship

**1973** Class of 1916 Scholar Athlete Award (Princeton)

**1973** Kasuka Prize (Princeton Senior Thesis)

**1973** Phi Beta Kappa

**1972-1973** 5 Varsity Letters at Princeton (Cross Country, Wrestling, Track)

**1971** New Jersey Marathon Champion

**1969** National Merit Scholar

**1969** Westinghouse Science Talent Search (top 40)

## Conferences Organized:

Mathematical Aspects of Gravitation, with Carla Cedarbaum, Mihalis Dafermos, and Hans Ringstrom, Oberwolfach, August, 2024.

Mathematical Relativity: the Past, the Present and the Future, with Piotr Chrusciel, Michael Eichmar, Gerhard Huisken, Vienna, Austria, December 2023.

Mass, the Einstein Constraint Equations and the Penrose Inequality, with Carla Cedarbaum, Marcus Khuri, Greg Galloway, Lan-Hsuan Huang and David Maxwell, at the Simons Center, September 2023.

"40 Years of Ricci Flow", with Eric Bahauad, Toti Daskalopoulos, Claude LeBlun, Dan Knopf, Christine Guenther, and Natasa Sesum, at the Simons Center, July 2022.

"Mathematical Aspects of Gravitation", with Carla Cederbaum, Mihalis Dafermos and Hans Ringström, Oberwolfach, August, 2021.

"Geometric Analysis and General Relativity. A conference in honour of Gerhard Huisken's 60th birthday", with Ernst Kuwert, Tristan Rivière, Michael Struwe, and Peter Topping, held June 2019, in Zürich, Switzerland.

"Mathematical Aspects of Gravitation", with Carla Cederbaum, Mihalis Dafermos and Hans Ringström, held August 2018, at Oberwolfach, Germany.

"Conference in General Relativity", with Lydia Bieri, David Garfinkle, and Shing-Tung Yau, held January 2016, in Sanya, China.

"Mathematical Aspects of Gravitation", with Mihalis Dafermos and Hans Ringstrom, held July 2015, at Oberwolfach, Germany.

"Geometric Analysis and Relativity", with Mingliang Cai, Xiuxiong Chen, Piotr Chrusciel, and Greg Galloway, held July 2014, at Hefei, China.

"Mathematical General Relativity," with Rick Schoen, Piotr Chrusciel, Greg Galloway, Sergiu Klainerman, Gerhard Huisken, Igor Rodnianski and Yvonne Choquet-Bruhat, held August-December, 2013, at the Mathematical Sciences Research Institute, Berkeley, California.

"Mathematical Aspects of Gravitation", with Mihalis Dafermos and Hans Ringstrom, held July 2012, at Oberwolfach, Germany.

"Mathematical Aspects of Gravitation", with Alan Rendall and Piotr Chrusciel, held October 2009, at Oberwolfach, Germany.

"Einstein Constraint Equations", with Piotr Chrusciel, held December 2005, at the Isaac Newton Institute.

"Pacific Northwest Geometry Seminar", held two or three times per year. I have been the NSF grant PI for this series of meetings since 2003, and am involved in the organization of all of the meetings.

"Miami Waves", with Lars Andersson, Greg Galloway, Gerhard Huisken, Sergiu Klainerman, Igor Rodnianski, Rick Schoen, and Gang Tian, held January 2004, at the University of Miami, Florida.

"Mathematical Aspects of Gravitation", with Alan Rendall and Gerhard Huisken, held February 2003 at Oberwolfach, Germany.

"Mathematical Aspects of General Relativity", with Rick Schoen, Nick Kappouleas, and Hugh Bray, held in spring 2002 at the American Institute of Mathematics, Palo Alto.

"Mathematical Aspects of Gravitation", with Alan Rendall and Gerhard Huisken, held July 2000 at Oberwolfach, Germany.

Program on "Behavior of Strong Gravitational Fields", with Abhay Ashtekar and Gary Horowitz, held January-July 1999 at the Institute of Theoretical Physics, Santa Barbara.

"Directions in General Relativity", with Bei-Lok Hu, Ted Jacobson, et. al., held May 1993 in College Park, Maryland.

"Heat Equations in Geometry", (NSF-CBMS Regional Conference in the Mathematical Sciences) with Joel Weiner, (Richard Hamilton–main speaker) held July 1989, in Honolulu, Hawaii.

"Mathematics and General Relativity", with R. Schoen, G. Horowitz and L. Lindbolm, AMS-IMS-SIAM Joint Summer Research Conference, held June, 1986, in Santa Cruz, California.

"Pacific Coast Gravity Meeting", held annually in early spring since 1985. Kip Thorne and I originated this conference, and have helped organize it every year since its inception.

"Asymptotic Behavior of Mass and Spacetime Geometry", with F. Flaherty, D. Brill and R. Wells, supported by the NSF, held October, 1983, in Corvallis, Oregon.

## Grants:

Research Grants: I have been awarded NSF grants for 1983-85, 1985-87, 1987-89, 1990-1993, 1993-1998, 1998-2001, 2001-2004, 2004-2007, 2007-2010, 2010-2013, 2013-2018, 2017-2023 and 2023-2024

Focused Research Grant: Together with Michael Holst, David Maxwell, and Rafe Mazzeo, I was awarded a joint Focused Research Grant by the NSF for 2013-2018.

Conference Grant: I have been PI for the Pacific Northwest Geometry Seminar grant for 2003-2006, 2006-2009, 2009-2012, and 2013-2018.

I have organized the NSF travel grants for U.S. participants attending GR13 (Cordoba, Argentina), GR14 (Florence, Italy) and GR15 (Pune, India), and MGIX (Rome, Italy).

## Published Papers:

1. Effect of Temperature on Light Absorption by Crystalline Cadmium Sulfide. Chemistry, Vol. 42, No. 6 pp. 26-28 (1969).

2. Initial Value Problem of General Relativity. III. Coupled Fields and the Scalar Tensor Theory. Physical Review D., Vol. 13, No. 6, pp. 1532-1537, (1976) with J. York and N. O'Murchadha.

3. Torsion Singularities. Physical Review D. Vol. 15, No. 8, pp. 2078-2087, (1976) with J. Nester.

4. The Effect of Gravitational Interaction on Classical Fields: A Hamilton Dirac Analysis. Annals of Physics, Vol. 107, Nos. 1-2, pp. 56-81, (1977) with J. Nester.

5. Extension of the York Field Decomposition to General Gravitationally Coupled Fields. Annals of Physics, Vol. 108, No. 2, pp. 368-386, (1977) with J. Nester.

6. On the Determination of Cauchy Surfaces from Intrinsic Properties. Communications in Mathematical Physics, Vol. 61, pp. 87-95, (1978) with R. Budic, L. Lindbolm and P. Yasskin.

7. Non Self-Dual Guage Fields. Physics Letter B., Vol. 78B, No. 2, pp. 462-464, (1978) with P. Yasskin and P. Green.

8. Waveless Approximation Theories of Gravity. Honorable mention in the Gravity Research Foundation Essay Contest (1978).

9. Kostant-Souriau Quantization of Robertson-Walker Cosmologies with a Scalar Field, in Group Theoretical Methods in Physics (edited by W. Beiglbock, A. Bohm and E. Takasugi) Springer-Verlag, New York (1979) with M. Gotay.

10. Line Space Construction of Non Self-Dual Yang-Mills Fields, in Group Theoretical Methods in Physics (edited by W. Beiglbock, A. Bohm and E. Takasugi) Springer-Verlag, New York (1979) with P. Yasskin and P. Green.

11. Twistor Description of Non Self-Dual Yang-Mills Fields, in Complex Manifold Techniques in Theoretical Physics (edited by D. Lerner and P. Sommers) Pitman, San Francisco (1979) with P. Yasskin.

12. Canonical Gravity. Invited review article in General Relativity and Gravitation (Einstein Centenary Volume, edited by A. Held) Plenum, New York (1980) with J. Nester.

13. Inertia Here is Fixed by Mass-Energy There in Every W-Model Universe. Invited review article in Relativity, Quanta and Cosmology (Einstein Centenary Volume, edited by M. Pantaleo and F. DeFinis) Johnson Reprint Corporation, New York (1980) with J. Wheeler.

14. Construction of Gauge Fields from Initial Data, in Geometrical and Topological Methods in Guage Theories (edited by J.P. Harnard and S. Shnider) Springer, New York (1980).

15. K-Surfaces in the Schwarzschild Spacetime and the Construction of Lattice Cosmologies. Journal of Mathematical Physics, Vol. 21, No. 12, pp. 2789-2796, (1980) with D. Brill and J. Cavallo.

16. Geometric Quantization and Gravitational Collapse. Physical Review D, Vol. 22, No. 2, pp. 235-248, (1980) with M. Gotay.

17. The Construction from Initial Data of Spacetimes with Nontrivial Spatial and Bundle Topology. Annals of Physics, Vol. 129, No. 2, pp. 223-248, (1980).

18. Can Quantum Effects Prevent Spacetime Collapse? in Group Theoretical Methods in Physics (edited by A. Wolff) Springer, Berlin (1980) with M. Gotay.

19. Wheeler-Einstein-Mach Spacetimes. Physical Review D, Vol. 24, No. 2, pp. 251-256, (1981).

20. Quantum Cosmology and Geometric Quantization. General Relativity and Gravitation, Vol. 13, No. 4, pp. 301-306, (1981) with M. Gotay.

21. Surfaces of Constant Mean Curvature in Schwarzschild, Reissner-Nordstrom, and Lattice Spacetimes, Proceedings of the Second Marcel Grossman Conference (edited by R. Ruffini) North Holland (1982) with D. Brill.

22. Non Self-Dual Nonlinear Gravitons. General Relativity and Gravitation, Vol. 14, No. 7, pp. 621-628, (1982) with P. Yasskin.

23. A Slice Theorem for the Space of Solutions of Einstein's Equations. Physics Reports, Vol. 89, No. 2, pp. 179-222, (1982) with J. Marsden.

24. The Existence of Constant Mean Curvature Foliations of Gowdy 3-Torus Spacetimes. Communications in Mathematical Physics, Vol. 86, pp. 485-493, (1982) with V. Moncrief.

25. On Cosmic Censorship: Does Compact Cauchy Horizon Imply Symmetry? in the Proceedings of the Third Marcel Grossman Meeting on General Relativity (edited by H. Ning) North Holland (1982) with V. Moncrief.

26. Is Supergravity Well-Posed? in Proceedings of the Third Marcel Grossman Meeting on General Relativity (edited by H. Ning) North Holland (1982) with D. Bao and P. Yasskin.

27. Symmetries of Cosmological Cauchy Horizons. Communications in Mathematical Physics, Vol. 89, pp. 387-413, (1983) with V. Moncrief.

28. On Classical Supergravity, in Proceedings of the XIIIth International Conference on Group Theoretical Methods in Mathematical Physics (edited by Y.S. Kim) (1984) with D. Bao and P. Yasskin.

29. The York Map is a Canonical Transformation. Journal of Geometry and Physics, Vol. 1, No. 1, pp. 85-105, (1984) with J. Marsden.

30. Classical Supergravity. Invited contribution to Mathematical Aspects of Superspace (edited by H. J. Seifert, C. J. S. Clarke, and A. Rosenblum) Reidel (1984) with D. Bao and P. Yasskin.

31. The Well-Posedness of ($N = 1$) Classical Supergravity. Journal of Mathematical Physics, Vol. 26, pp. 329-333, (1985) with D. Bao, Y. Choquet-Bruhat and P. Yasskin.

32. Symmetries of Cosmological Cauchy Horizons with Exceptional Orbits. Journal of Mathematical Physics, Vol. 26, pp. 1024-1027, (1985) with V. Moncrief.

33. The Dynamics of The Einstein-Dirac System I: A Principal Bundle Formulation of the Theory and its Canonical Analysis. Annals of Physics, Vol. 164, pp. 103-171, (1985) with D. Bao and P. Yasskin.

34. Effective Determination in a Classical Field Theory with Spacelike Characteristics. Journal of Mathematical Physics, Vol. 27, pp. 739-745, (1986) with G. Horndeski.

35. Homothetic and Conformal Symmetries of Solutions to Einstein's Equations. Communications in Mathematical Physics, Vol. 106, pp. 137-158, (1986) with D. Eardley, J. Marsden, and V. Moncrief.

36. Steering the Universe. Foundations in Physics, Vol. 16, pp. 1651-1666 (1986).

37. Ambitwistors (and Strings?) in Proceedings of the Oregon Meeting (edited by R. Hwa), World Publishing (1986) with P. Yasskin.

38. The Ambitwistor Program in Field Theory, in Quantum Gravity and Strings II (edited by H. J. deVega and N. Sanchez) Springer Verlag (1987).

39. Parametrization of the Space of Solutions of Einstein's Equations. Physical Review Letters, Vol. 59, pp. 2389-2393, (1987).

40. On the Smoothing of Cosmological Spacetimes and Ricci Flow, in the Proceedings of the Fifth Marcel Grossman Meeting on General Relativity (edited by D. Blaer), World Scientific (1989), with M. Carfora and M. Jackson.

41. Convergence of the Ricci Flow for a Class of Metrics with Indefinite Ricci Curvature. Journal of Differential Geometry, Vol. 31, pp. 249-263 (1990), with M. Carfora and M. Jackson.

42. Evolution of the Bel Robinson Energy in Gowdy T3 x R Spacetimes. Journal of Mathematical Physics. Vol. 31, pp. 517-519 (1990), with M. Jackson and V. Moncrief.

43. Asymptotic Behavior of the Gravitational Field and the Nature of Singularities in Gowdy Spacetimes. Annals of Physics, Vol. 199, pp. 84-122 (1990) with V. Moncrief.

44. Strong Cosmic Censorship in Polarized Gowdy Spacetimes. Classical and Quantum Gravity, Vol. 7, pp. 1671-1679 (1990), with P. Chrusciel and V. Moncrief.

45. Ricci Flow of Locally Homogeneous Geometries on Closed Manifolds. Journal of Differential Geometry, Vol. 35, pp. 723-741 (1992) with M. Jackson.

46. On Spacetimes Containing Killing Vector Fields with Nonclosed Orbits. Classical and Quantum Gravity, Vol. 9, pp. 1683-1691 (1992) with V. Moncrief.

47. Progress in Strong Cosmic Censorship. Mathematical Aspects of Classical Field Theory (edited by M. Gotay, J. Marsden, and V. Moncrief), Contemporary Mathematics, Vol. 132, pp. 403-418 (1992).

48. Symplectifier la Science. Gazette des Mathematiciens, Vol. 54, pp. 59-80 (1992) with M. Gotay.

49. Solutions of Constraints for Einstein's Equations.Comptes Rendue de l'Academie Scientifique de Paris, Vol. 315, pp. 349-355 (1992) with Y. Choquet-Bruhat and V. Moncrief.

50. Ricci Flow on Minisuperspaces and the Geometry-Topology Problem, in Directions in General Relativity, Vol 1 (edited by B. L. Hu, M. P. Ryan, and C. V. Vishveshwara) Cambridge University Press (1993) with M. Jackson.

51. Charles W. Misner: Insight and Discovery, in Directions in General Relativity, Vol. 1 (edited by B. L. Hu, M. P. Ryan, and C. V. Vishveshwara) Cambridge University Press (1993) with B. Berger, D. Brill, and R. Matzner.

52. Compact Cauchy Horizons and Compact Cauchy Surfaces, in Directions in General Relativity Vol. 2 (edited by B. L. Hu and T. A. Jacobson) Cambridge University Press (1993) with P. Chrusciel.

53. Dieter R. Brill: A Spacetime Perspective, in Directions in General Relativity, Vol. 2 (edited by B. L. Hu and T. A. Jacobson) Cambridge University Press (1993) with T. Jacobson, C. Misner, and H. Pfister.

54. Non Isometric Vacuum Extensions of Vacuum Maximal Globally Hyperbolic Spacetimes. Physical Review D, Vol. 48, pp. 1616-1628 (1993) with P. Chrusciel.

55. Quasi Convergence of Ricci Flow for a Class of Metrics. Communications in Analysis and Geometry, Vol. 1, pp. 543-559 (1993) with R. Hamilton.

56. Some Results on Non Constant Mean Curvature Solutions of the Einstein Constraint Equations, in Physics on Manifolds (edited by M. Flato, R. Kerner, and A. Lichnerowicz), pp. 295-302, Kliewer Academic Publishers (1994) with V. Moncrief.

57. Manifolds with a Circle Action and the Einstein Constraint Equations. Differential Geometry and Mathematical Physics (edited by J. Beem and K. Duggal), Contemporary Mathematics, Vol. 170, pp. 149-154 (1994), with V. Moncrief.

58. On the Dynamics of Generators of Cauchy Horizons, in Proceedings of the Kananaskis Conference on Chaos in General Relativity (edited by D. Hobill, A. Burd, and A. Coley) pp. 113-125, (1994), with P. Chrusciel.

59. On the Wheeler-Einstein-Mach Spacetimes, in Mach's Principle: From Newton's Bucket to Quantum Gravity, Einstein Studies Vol. 6 (edited by J. Barbour and H. Pfister), Birkhauser (1995).

60. Constant Mean Curvature Solutions of the Einstein Constraint Equations on Closed Manifolds. Classical and Quantum Gravity, Vol. 12, pp. 2249-2273 (1995).

61. Solving the Einstein Constraint Equations, in Sixth Canadian Conference on General Relativity and Relativistic Astrophysics (edited by S. Braham, J. Gegenberg, and R. McKellar), Fields Institute Communications Series (1996).

62. A Set of Non Constant Mean Curvature Solutions of Einstein Constraint Equations on Closed Manifolds, Classical and Quantum Gravity, Vol. 13, pp. 1819-1847 (1996) with V. Moncrief.

63. Asymptotically Hyperbolic Non Constant Mean Curvature Solutions of the Einstein Constraint Equations. Classical and Quantum Gravity, Vol. 14, pp. A189-A202, (1997) with J. Park.

64. Mathematical Relativity Workshop of GR14, in Proceedings of the 14th International Conference on General Relativity and Gravitation (edited by Francaviglia, Longhi, Lusanna and Scrace), World Scientific (1997).

65. On the Stability of the Differentiability of Cauchy Horizons. Communications in Analysis and Geometry, Vol. 5, pp. 249-277 (1997) with P. Chrusciel.

66. Global Foliations of Vacuum Spacetimes with $T^2$ Isometry. Annals of Physics, Vol. 260, pp. 117-148 (1997) with B. Berger, P. Chrusciel, and V. Moncrief.

67. Mixmaster Behavior in Inhomogeneous Cosmological Spacetimes. Physical Review Letters, Vol. 80, pp. 2984-2987 (1998) with M. Weaver and B. Berger.

68. The Singularity in Generic Gravitational Collapse is Spacelike, Local and Oscillatory. Modern Physics Letters A, Vol. 13, pp. 1565-1573 (1998) with B. Berger, D. Garfinkle, V. Moncrief, and M. Weaver.

69. Cosmological Spacetimes Not Covered by a Constant Mean Curvature Slicing. Classical and Quantum Gravity, Vol. 15, pp. 3679-3687 (1998) with A. Randall.

70. Asymptotic Behavior in Polarized $T^2$ Symmetric Vacuum Spacetimes. Journal of Mathematical Physics, Vol. 40, pp. 340-352, (1999) with S. Kichenassamy.

71. Einstein Constraints on Asymptotically Euclidean Manifolds. Physical Review D, Vol. 61, 084034 (2000) with Y. Choquet-Bruhat and J. York.

72. Existence, uniqueness and other properties of the BCT (minimal strain lapse and shift) gauge. Classical Quantum Gravity, Vol. 17, no. 18, pp. 3899–3904 (2000) with D. Garfinkle, C. Gundlach, and N. O'Murchadha.

73. Critical Phenomena in Nonlinear Sigma Models. Journal of Mathematical Physics, Vol. 41, pp. 5691-5700 (2000) with S. Liebling and E. Hirschmann.

74. Global Existence for Wave Maps with Torsion. Communications in Partial Differential Equations, Vol. 25, pp. 1669-1702 (2000) with S. Anco.

75. Towards an Ambitwistor Description of Gravity, in Further Advances in Twistor Theory Volume III: Curved Twistor Spaces (edited by L. J. Mason, L. P. Hughston, P. Z. Kobak, and K. Pulverer ), Chapman and Hall (2001), with P. Yasskin.

76. Oscillatory Approach to the Singularity in Vacuum $T^2$ Symmetric Spacetimes, in The Proceedings of the Ninth Marcel Grossman Meeting, (2001) with M. Weaver and B. Berger

77. Oscillatory Approach to the Singularity in Vacuum Spacetimes with $T^2$ Isometry, Physical Review D,Vol. 64, 084006 (2001) with B. Berger and M. Weaver.

78. Singularity Formation in 2+1 Wave Maps. Journal of Mathematical Physics, Vol. 43, pp. 678-683 (2002) with S. Liebling.

79. Stability of Ricci Flow at Ricci Flat Metrics. Communications in Analysis and Geometry, Vol. 10, pp 741-777 (2002) with C. Guenther and D. Knopf.

80. Gluing and Wormholes for the Einstein Constraint Equations. Communications in Mathematical Physics, Vol. 231, pp 529-568 (2002) with R. Mazzeo and D. Pollack.

81. Asymptotic Behavior in Polarized and Half-Polarized U(1)-Symmetric Vacuum Spacetimes. Classical and Quantum Gravity, Vol. 19, pp 5361-5386 (2002) with V. Moncrief.

82. Constructing Solutions of the Einstein Constraint Equations, in Proceedings of the 16th International Conference on General Relativity and Gravitation (edited by N. Bishop and S. Maharaj) World Scientific, (2002) .

83. On the Topology of Vacuum Spacetimes. Annales Henri Poincaré, Vol. 4, pp 369-383 (2003) with R. Mazzeo and D. Pollack.

84. On the Area of the Symmetry Orbits in $T^2$ Symmetric Spacetimes. Classical and Quantum Gravity, Vol. 20, pp 3783-3796 (2003) with M. Weaver.

85. Non CMC Conformal Data Sets which Do Not Produce Solutions of the Einstein Constraint Equations. Classical and Quantum Gravity, Vol. 21, pp S233-S243 (2004) with N. O'Murchadha.

86. Gluing Initial Data Sets for General Relativity. Physical Review Letters, Vol. 93, 081101 (2004) with P. Chrusciel and D. Pollack.

87. The Constraint Equations, in The Einstein Equations and the Large Scale Behavior of Gravitational Fields, (edited by P. Chrusciel and H. Friedrich), Birkhauser (2004), with R. Bartnik.

88. Topologically General $U(1)$ Symmetric Vacuum Spacetimes with AVTD Behavior. Nuovo Cimento, Vol. 119B pp 625-638, (2004) with Y. Choquet-Bruhat and V. Moncrief,

89. Critical Behavior in Ricci Flow, in Geometric Evolution Equations (edited by S. Chang, B. Chow, S. Chu, C. Lin) Contemporary Mathematics, 367 (2005) with D. Garfinkle.

90. Initial Data Engineering. Communications in Mathematical Physics, Vol. 257 pp. 29-42, (2005) with P. Chrusciel and D. Pollack.

91. Mathematical Study of the Field Equations (Review of GR 17 workshop), in General Relativity and Gravitation (edited by P. Florides , B. Nolan and A. Ottewill) World Scientific (2005).

92. A Gluing Construction for Non-Vacuum Solutions of the Einstein Constraint Equations. Advances in Theoretical and Mathematical Physics, Vol. 9, pp 129-172 (2005), with D. Maxwell and D. Pollack.

93. Half Polarized $U(1)$ Symmetric Vacuum Spacetimes with AVTD Behavior. Journal of Geometry and Physics, Vol. 56, pp 1191-1214 (2006), with Y. Choquet-Bruhat.

94. The Einstein-Scalar Field Constraints on Asymptotically Euclidean Manifolds. Chinese Annals of Mathematics, Vol. 27, pp 31-52, (2006) with Y. Choquet-Bruhat and D. Pollack.

95. Spherically Symmetric Dynamical Horizons. Classical and Quantum Gravity, Vol. 23, pp. 2559-2569 (2006), with R. Bartnik.

96. Einstein Constraint Equations; The Initial Value Formulation, in Encyclopedia of Mathematical Physics (edited by J.-P. Franoise, G.L. Naber and Tsou S.T.) Oxford: Elsevier, 2006 (ISBN 978-0-1251-2666-3), Vol. 2, p. 173 (2006)

97. Ricci Flow on Locally Homogeneous Closed 4-Manifolds. Communications in Analysis and Geometry, Vol. 14, pp 345-386 (2006), with M. Jackson and P. Lu

98. Timelike Minimal Submanifolds of General Co-dimension in Minkowski Spacetime. Journal of Hyperbolic Differential Equations, Vol. 3, pp 691-700 (2006), with P. Allen and L. Anderson.

99. A Brief Review of Initial Data Engineering, in Gravitation and Astrophysics, (edited by C-M. Chen J.-P. Hsu and J. Nester) World Scientific, (2006), with P. Chrusciel and D. Pollack.

100. The Constraint Equations for the Einstein-Scalar Field System on Compact Manifolds. Classical and Quantum Gravity, Vol. 24, pp 809-828 (2007) with Y. Choquet-Bruhat and D. Pollack.

101. Linear Stability of Homogeneous Ricci Solitons. International Mathematics Research Notices, Vol.2006, ID 96253 (2007), with C. Guenther and D. Knopf.

102. Applications of Theorems of Jean Leray to the Einstein-Scalar Field Equations. Journal of Fixed Point Theory and Applications, Vol. 1, pp. 31-46 (2007), with Y. Choquet-Bruhat and D. Pollack.

103. Areal Foliation and AVTD Behavior in $T^2$ Symmetric Spacetimes with Positive Cosmological Constant. Journal of Mathematical Physics, Vol. 48, pp. 082501:1-17 (2007), with A. Clausen.

104. Waveless Approximation Theories of Gravity. International Journal of Modern Physics D, Vol. 17, pp. 265-273 (2008).

105. Near-Constant Mean Curvature Solutions of the Einstein Constraint Equations with Non-Negative Yamabe Metrics. Classical and Quantum Gravity, Vol. 25 pp. 075009:1-15 (2008), with A. Clausen and P. Allen.

106. The Modelling of Degenerate Neck Pinch Singularities in Ricci flow by Bryant Solitons. Journal of Mathematical Physics, Vol. 49, pp. 073505 (2008), with D. Garfinkle.

107. Symmetries of Higher Dimensional Black Holes. Classical and Quantum Gravity, Vol. 25, pp. 195015 (2008), with V. Moncrief.

108. Convergence of Ricci Flow on $R^2$ to Flat Space. Journal of Geometric Analysis, Vol. 19, pp. 809-816 (2009) with M. Javaheri.

109. Asymptotic Gluing of Asymptotically Hyperbolic Solutions to the Einstein Constraint Equations. Annales Henri Poincaré, Vol. 11, pp. 881-927 (2010), with J. Lee and I. Stavrov.

110. Initial Data for the Relativistic Gravitational $N$-Body Problem. Classical and Quantum Gravity, Vol. 27, p. 222002 (2010), with P. Chrusciel and J. Corvino.

111. Formal Matched Asymptotics for Degenerate Ricci flow Neckpinches. Nonlinearity, Vol. 24, pp. 2265-2280 (2011), with S. Angenent and D. Knopf.

112. Construction of N-Body Time Symmetric Initial Data Sets in General Relativity. Contemporary Mathematics, Vol. 554, pp. 83-92 (2011), with P. Chrusciel and J. Corvino.

113. Asymptotic Gluing of Asymptotically Hyperbolic Vacuum Initial Data Sets. Contemporary Mathematics, Vol. 554, pp. 93-103 (2011), with J. Lee and I. Stavrov.

114. Construction of $N$-Body Initial Data Sets in General Relativity. Communications in Mathematical Physics, Vol. 304, pp. 637-647 (2011), with P. Chrusciel and J. Corvino.

115. Ricci Flow in Two Dimensions, in Surveys in Geometric Analysis and Relativity, celebrating Richard Schoen's 60th birthday (edited by H. Bray and W. Minicozzi) Higher Education Press (2011), with R. Mazzeo and N. Sesum.

116. Constraint Equations in Einstein-Aether Theories and the Weak Gravitational field Limit. Physical Review D, Vol. 86, 084009 (2012), with D. Garfinkle and J. Martin-Garcia, gr-qc1207.6530.

117. Ricci flow on Asymptotically Conical Surfaces with Nontrivial Topology. Journal fur die Reine und Angewandte Mathematik, Vol. 676, pp. 227-248 (2013) with R. Mazzeo and N. Sesum.

118. Power Law Inflation with Electromagnetism. Annals of Physics, Vol. 334, pp 420-454 (2013), with X. Luo, gr-qc:1210.7566.

119. Second-Order Renormalization Group Flow of Three-Dimensional Homogeneous Geometries. Communications in Analysis and Geometry, Vol. 21, pp. 435-467 (2013), with K. Gimre and C. Guenther, math1205.6507.

120. Quasilinear Hyperbolic Fuchsian Systems and AVTD Behavior in $T^2$–Symmetric Vacuum Spacetimes. Annales Henri Poincaré, Vol. 14, pp.1445-1523 (2013), with E. Ames, F. Beyer, and P. LeFloch, gr-qc:1205.1881.

121. Quasilinear Symmetric Hyperbolic Systems in Several Space Dimensions. Contemporary Mathematics, Vol. 591, pp. 25-43 (2013), with E. Ames, F. Beyer, and P. LeFloch, gr-qc:1205.2166.

122. A Geometric Introduction to the 2-loop Renormalization Group Flow, Journal of Fixed Point Theory and Applications. Vol. 14, pp. 3-20 (2013), with K. Gimre and Christine Guenther, arXiv:math1312.6049.

123. Non-CMC Solutions of the Einstein Constraint Equations on Asymptotically Euclidean Manifolds. Classical and Quantum Gravity, Vol. 31, 065001 (2014) with J. Dilts, R. Mazzeo and C. Meier, arXiv:gr-qc1312.0535.

124. The Initial Value Problem in General Relativity, invited and refereed contribution to *The Handbook of Spacetime* (edited by A. Ashtekar and V. Petkov), Springer (2014).

125. Short-time Existence for the Second Order Renormalization Group Flow in General Dimensions, Proceedings of the American Mathematical Society, Vol. 143, pp. 4397-4401 (2015) with K. Gimre and C. Guenther, arXiv:math1401.1454.

126. On Strong Cosmic Censorship, Surveys in Differential Geometry, Vol. 20 (100 Years of General Relativity) (2015), arXiv:gr-qc1505.06390

127. Degenerate Neckpinches in Ricci Flow, Journal fur die Reine und Angewandte Mathematik, Vol. 709, pp. 81-117 (2015) with S. Angenant and D. Knopf, arXiv:math1208.4312.

128. Weakly Asymptotically Hyperbolic Manifolds, Communications in Analysis and Geometry, Vol. 26, pp. 1-61 (2018) with P. Allen, J. Lee and I. Stavrov, arXiv:gr-qc1506.03399.

129. The Shear-Free Condition and Constant-Mean-Curvature Hyperboloidal Initial Data, Classical and Quantum Gravity, Vol. 33 p. 115015 (2016) with P. Allen, J. Lee and I. Stavrov, arXiv:gr-qc1506.06090.

130. Ricci Flow Neckpinches without Rotational Symmetry, Communications in Partial Differential Equations, Vol. 41, p. 1864 (2016). with D. Knopf and N. Sesum, arXiv:math1312.2933.

131. Mean curvature flow of noncompact hypersurfaces with Type-II curvature blow-up, Journal Fur Die Reine Und Angewandte Mathematik, Vol. 754, 225-251, with H. Wu, ArXiv:Math1603.01664 .

132. Existence and Blowup Results for Asymptotically Euclidean Initial Data Sets Generated by the Conformal Method, Physical Review D, Vol. 94, p. 104046 (2016) with J. Dilts, arXiv:gr-qc:1609.00751

133. A Class of Solutions to the Einstein Equations with AVTD Behavior in Generalized Wave Gauges, Journal of Geometry and Physics, Vol. 121, pp. 42-71 (2017) with E. Ames, F. Beyer, and P. LeFloch, arXiv:gr-qc:1602.03018.

134. General Relativity, Time, and Determinism, invited and refereed contribution to *Space Time and the Limits of Human Understanding* (edited by G. Ghirardi and S. Iyengar), (2016) Springer, ArXiv:gr-qc:1610.06547.

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136. Non-Kaehler Ricci Flow Singularities that Converge to Kaehler-Ricci Solitons, Pure and Applied Mathematics Quarterly, Vol. 15, pp. 749-784 (2019) with D. Knopf and N. Sesum, arXiv:math:1703.02918.

137. Convergence Stability for Ricci Flow, Journal of Geometric Analysis, Vol. 30, pp. 310-336 (2020) doi: 10.1007/s12220-018-00132-9, with E. Bahuaud and C. Guenther, arXiv:1805.00539.

138. Symmetries of Cosmological Cauchy Horizons with Non-Closed Orbits, Communications in Mathematical Physics, Vol. 374, pp. 145-186 (2020) doi: 10.1007/s00220-019-03571-9, with V. Moncrief, arXiv:1807.10141.

139. Stability Within $T^2$-Symmetric Expanding Spacetimes, Annales Henri Poincaré, Vol. 21, pp. 675-703 (2020). doi: 10.1007/s00023-019-00870-8, with B. Berger and A. Layne, arXiv:1812.07766.

140. Contracting asymptotics of the lapse-scalar field sub-system of the Einstein-scalar field equations, Journal of Mathematical Physics, Vol. 60, pp. 102504 (2019). doi:10.1063/1.511510 with E. Ames and F. Beyer, arXiv:1904.02854.

141. Mean curvature flow of noncompact hypersurfaces with Type-II curvature blow-up. II, Advances in Mathematics, Vol. 367, pp. 107111 (2020). doi: 10.1016/j.aim.2020.107111, with H. Wu and Z. Zhang, arXiv:1911.07282.

142. Asymptotic Gluing of Shear-Free Hyperboloidal Initial Data Sets. Ann. Henri Poincaré 22, 771-819 (2021). doi: 10.1007/s00023-020-00990-6, with P. Allen, J. Lee, and I. Stavrov Allen, arXiv:1912.02839.

143. On the precise asymptotics of Type-II b solutions to mean curvature flow (2022), Transactions of the American Mathematical Society, Series B, Vol. 9, 564-585, with H. Wu and Z. Zhang, ArXiv:math 2001.02123.

144. Stability of AVTD Behavior Within the Polarized $T^2$-Symmetric Vacuum Spacetimes, Annales Henri Poincaré (2022). doi:10.1007/s00023-021-01142-0, with E. Ames, F. Beyer, and T. Oliynyk. arXiv:2101.03167

145. A Numerical Stability Analysis of Mean Curvature Flow of Non-Compact Hypersurfaces with Type-II Blowup, Nonlinearity 34, 6539-6560 (2021). doi: 10.1088/1361-6544/ac15a9, with D. Garfinkle, D. Knopf, and H. Wu. arXiv:2105.06613

146. A Phase Space Approach to the Conformal Construction of Non-Vacuum Initial Data Sets In General Relativity, Ann. Henri Poincaré Vol. 26 pp. 2505-2555 (2025) with David Maxwell. arXiv:2106.15027

147. Singularity Formation of Complete Ricci Flow Solutions (2022), Advances in Mathematics (2022) with T. Carson, D. Knopf and N. Sesum, ArXiv:math 2001.06098.

148. Stability of Asymptotic Behavior Within Polarised $T^2$-Symmetric Vacuum Solutions with Cosmological Constant, Phil. Trans. R. Soc. A. Vol. 380: 20210173. (2022) doi: 10.1098/rsta.2021.0173 with E. Ames, F. Beyer and T. Oliynyk. arXiv:2108.02886.

149. A Numerical Stability Analysis of Mean Curvature Flow of Non-Compact Hypersurfaces with Type II Curvature Blowup: II, Experimental Mathematics Vol. 33 (2024) with D. Garfinkle and D. Knopf and H. Wu, arXiv:math 2206.01890.

150. Wellposedness of nonlinear flows on manifolds of bounded geometry, Annals of Global Analysis and Geometry 65 (2024) with E. Bahuaud, C. Guenther and R. Mazzeo, arXiv: math 2210.15886.

151. A Numerical Study of the Expanding Direction of T2-Symmetric Space Times, Physical Review D 108, 10, 104015 (2023) with B. Berger and A. Layne, arXiv:grqc 2304.04632.

152. Convergence stability for Ricci flow on manifolds with bounded geometry, Proceedings of the American Mathematical Society 152 (2024) E. Bahuaud, C. Guenther and R. Mazzeo, arXiv: math 2303.04800.

153. Asymptotic behavior of unstable perturbations of the Fubini-Study metric in Ricci flow, Nonlinearity 38, number 7 (2025) with D. Garfinkle, D. Knopf and H. Wu.

when

154. Initial data for causal viscous conformal fluids in general relativity, Journal of Mathematical Physics 65, 1225033 (2024), with M. Disconzi and D. Maxwell.

155. Local singularities of compact multiply warped Ricci flow solutions, submitted to the Journal of differential geometry, with D. Knopf, Z. Ma and N. Sesum. arXiv:math.2502.08500

## Papers in Preparation

1. Linear and dynamical stability for the Bach flow at constant curvature metrics, with E. Bahuaud, C. Guenther and R. Mazzeo.

2. Localized Big Bang stability for the Einstein-scalar field equations with potentials, with F. Beyer, D. Garfinkle and T. Oliynyik.

## Books

1. Mathematics in General Relativity, Contemporary Mathematics, Vol. 71, (1988); editor.

2. Spacetime Safari: Essays in Honor of Vincent Moncrief on the Classical Physics of Strong Gravitational Fields, published as special issue Vol. 21, Number 3 (2004) of Classical and Quantum Gravity, editor with Beverly Berger.

3. The Ricci Flow: Techniques and Applications. Part I Geometric Aspects, AMS Press, Mathematical Surveys and Monographs vol. 135 (2007), with Bennett Chow, Sun-Chin Chu, David Glickenstein, Christine Guenther, Tom Ivey, Dan Knopf, Peng Lu, Feng Luo, and Lei Ni.

4. The Ricci Flow: Techniques and Applications. Part II Analytic Aspects, AMS Press, Mathematical Surveys and Monographs vol. 144 (2008), with Bennett Chow, Sun-Chin Chu, David Glickenstein, Christine Guenther, Tom Ivey, Dan Knopf, Peng Lu, Feng Luo, and Lei Ni.

5. The Ricci Flow: Techniques and Applications. Part III Geometric-Analytic Aspects, AMS Press, Mathematical Surveys and Monographs vol. 163 (2010), with Bennett Chow, Sun-Chin Chu, David Glickenstein, Christine Guenther, Tom Ivey, Dan Knopf, Peng Lu, Feng Luo, and Lei Ni.

6. The Ricci Flow: Techniques and Applications. Part IV Long-time Solutions and Related Topics AMS Press, Mathematical Surveys and Monographs vol. 206 (2015), with Bennett Chow, Sun-Chin Chu, David Glickenstein, Christine Guenther, Tom Ivey, Dan Knopf, Peng Lu, Feng Luo, and Lei Ni.

7. General Relativity and Gravitation: A Centennial Perspective, Cambridge University Press (2015), editor and contributor with Abhay Ashtekar, Beverly Berger, and Malcolm Mac Callum.

8. Selected Works of Robert A. Bartnik, editor and contributor with Piotr Chrusciel and Shing-tung Yau (2023)

9. CelebraTio Mathematica: Yvonne Choquet-Bruhat, editor and contributor (2024).

## Book Review

1. Black Hole Physics: Basic Concepts and New Developments, by Valeri Frolov and Igor Novikov, in Physics Today (2000).

## Books Edited and Reviewed

1. Advanced Classical Electromagnetism, Robert Wald (2022), Princeton University Press.
2. Einstein Constraints and Ricci flow, Mauro Carfora and Annalisa Marzuoli (2023), Springer
3. Ricci Solitons in Low Dimensions, Bennett Chow (2023), AMS
4. Lectures on Differential Geometry, Bennett Chow and Yutze Chow (2025), AMS
5. Introduction to Complex Manifolds, John Lee (2025), AMS
6. Ricci Solitons in Four Dimensions, Bennett Chow, Brett Kotschwar and Ovidiu Munteanu (2025), AMS
7. Between Two Disciplines: B. L. van der Waerden and the Development of Quantum Mechanics, Martina Schneider (2026), AMS

## Talks Presented

1. Compact Cauchy Horizons: Texas A & M, March 1984. (Colloquium)
2. Classical Supergravity: Austin, April 1984.
3. Conformal Symmetries: Maryland, May 1984
4. Well-Posedness of Supergravity on Classical Supergravity:Stony Brook, NY, May 1984; Edmonton, Alberta, June 1985.
5. The Ambitwistor Program: Vancouver, B. C., Nov. 1984.
6. Cosmic Censorship: Seattle, Nov. 1984. (Colloquium)
7. Kaluza-Klein Theories: UCBerkeley. March 1985.
8. Cosmic Censorship, Minnesota, April 1985. (Colloquium)
9. The Yamabe-Schoen Theorem and the Gravitational Degrees of Freedom:Syracuse, April 1985.
10. Conformal Isometries: Chicago, June 1985.

11. Ambitwistors and Super Strings. Oregon, August 1985; Berkeley, February 1986.

12. Conformal Isometries. Toulouse, France, April 1986.

13. Ambitwistors. Paris, May 1986.

14. Evolution Singularities. Paris, May 1986.

15. Bel-Robinson and BKL. Santa Barbara, June 1986.

16. Bidual Spacetimes and Bitwistors. Oxford August, 1986.

17. The Initial Value Formulation of General Relativity (8 lectures). Barcelona, August 1986.

18. Bel-Robinson and BLK. UCBerkeley, Sept. 1986.

19. Ambitwistors and Gravity. Pittsburgh, Dec. 1986.

20. Parametrization of the Space of Solutions of Einstein's Equations. Tulane, March 1987. (Colloquium)

21. On the Space of Solutions of Einstein's Equations. Yale, March 1987.

22. Behavior of Singularities. Annapolis, March 1987.

23. Instantons and Twistors and Ambitwistors (4 lectures). Davis, CA, May 1987.

24. Asymptotic Dynamics of Gowdy Spacetimes. Boulder, CO, July 1987.

25. Open and Closed Problems in General Relativity. Aspen, August 1987.

26. The Yamabe Problem and the Space of Solutions of Einstein's Equations. San Diego, Nov. 1987.

27. Converging Ricci Flow for a Class of Metrics with Ricci Curvature of Indefinite Sign. San Diego, Nov. 1987.

28. On Ricci Flow Convergence. Rice, March 1988.

29. The BKL Conjecture and the Nature of Cosmological Singularities, Rice, March 1988. (Colloquium)

30. Cosmic Censorship and the BKL Conjecture. Harvard, April 1988.

31. Asymptotic Behavior of Solutions of Einstein's Equations. Canberra, July 1988; Perth.

32. Ricci Flow. Canberra, August 1988; Adelaide; Philadelphia, Nov. 1988.

33. Convergence and Quasiconvergence of Ricci Flow. Worcester, April 1989; Santa Barbara, May 1989; Hawaii, July 1989; Canberra, August 1989; Courant Institute, Nov. 1989; Maryland, April 1990.

34. Strong Cosmic Censorship in Gowdy Spacetimes. Maryland, April 1990.

35. Ricci Flow and the Thurston Geometrization Conjecture. Seattle, May 1990; Aspen, August 1990.

36. Ricci Flow of Locally Homogeneous Geometries. San Diego, March 1991.

37. Progress on Cosmic Censorship. Seattle, July 1991.

38. The Fate of the Universe. Portland, October 1991.

39. Non Constant Mean Curvature Solutions of the Einstein Constraint Equations. Philadelphia, November, 1991; Stony Brook, November, 1991; Salt Lake City, March, 1992; Stanford, April, 1992; Paris, June, 1992; Cordoba (Argentina), July, 1992; PNGS (Corvallis), October, 1992.

40. On Ricci Flow. Santa Barbara, April 1993.

41. Wheeler-Einstein-Mach Spacetimes. Tuebingen, July 1993.

42. Non Constant Mean Curvature Solutions of the Einstein Constraint Equations. Munich, July 1993.

43. Solutions of Einstein's Equations on $M^4 = \sum^3 \times R$ with $\sum^3$ Admitting a Circle Action. Vancouver, August 1993; Raleigh, N.C., December 1993.

44. Non Constant Mean Curvature Solutions of the Einstein Constraint Equations. Vienna, August 1994.

45. Cosmic Censorship and Long Time Existence of Solutions of Einstein's Equations. Oberwolfach, August 1994.

46. The Fountain Conjecture, Tacoma, September 1994.

47. Solutions of the Einstein Einstein Constraint Equations. Frederickton, NB, May 1995.

48. Cosmic Censorship. Vienna, August 1995.

49. Time Machines, Chaos in the Horizon, and the Fountain Conjecture. Seattle, November 1995; Harvard, April 1996.

50. Non Constant Mean Curvature Solutions of the Einstein Constraint Equations. Warsaw, March 1996.

51. Convergence and Quasi-Convergence of Ricci-Flow. Tours France, August 1996.

52. Global Foliations for $T^2$-Symmetric Solutions of Einstein's Equations. Potsdam, Germany, October 1996; Maryland, January 1997; Oberwolfach, July 1997.

53. The Initial Value Problem. Budapest, November 1996; Prague, December 1996.

54. Velocity Dominated and Mixmaster Behavior in Cosmological Spacetimes. Columbus, Ohio, April 1998.

55. Asymptotic Behavior of Cosmological Solutions of Einstein's Equations. Davis, California, April 1998.

56. Global Existence for Wave Maps with Torsion. Seattle, November 1998; Santa Barbara, May 1999.

57. Understanding the Evolution of Cosmological Spacetimes. Seattle, March 1999; Santa Barbara, June 1999; Penn State, August 1999; Minneapolis, November 1999.

58. Solving the Einstein Constraint Equations. Madison, November 1999.

59. Critical Dimensions and Critical Behavior in Wave Maps. PNGS Corvallis, November 1999; Santa Barbara, March 2000.

60. Gluing Solutions of the Einstein Constraints. Santa Barbara, January 2000.

61. Gluing Wormholes onto Your Spacetime. Corvallis, November, 2000; Ann Arbor, February, 2001; Santa Barbara, March, 2001; Manhattan, Kansas, November, 2001.

62. Constructing Solutions of the Einstein Constraint Equations. Durban, South Africa, July, 2001; Vienna, August, 2001.

63. On the Behavior of Cosmological Solutions Near the Singularity. Elba, Italy, June 2002.

64. On the Topology of Vacuum Spacetimes. Golm. Germany, June 2002; Hsinchu, Taiwan, July 2002; Toronto, Canada, August 2002.

65. The Conformal Method for Studying the Einstein Constraint Equations. Cargese, Corsica, August 2002.

66. Are There Any Restrictions on the Spatial Topology of Vacuum Solutions of Einstein's Equations. University of California (Irvine) March, 2003.

67. Gluing Solutions of the Einstein Constraint Equations. PNGS Vancouver, April 2003; University of California (Los Angeles) May 2003; ANU Canberra, August 2003 .

68. Invited Lecture Series on General Relativity and its Cauchy Formulation. University of California (San Diego) March, 2003.

69. On Solutions of the Einstein Constraint Equations. Caltech , May, 2003.

70. Constructing Solutions of the Einstein Constraint Equations and Gluing Them Together. KITP Santa Barbara, June 2003.

71. What We Know and Don't Know about Solutions of the Einstein Constraint Equations, CRM, Montreal, September 2003; AIM, November 2003.

72. Vacuum Spacetimes with No CMC Cauchy Surfaces. Paris, March 2004; Cornell, July 2004; Dublin, July 2004; Austin, January 2005.

73. Invited Lecture Series on Mathematical Aspects of General Relativity. Hsinchu, Taiwan, August 2004.

74. Understanding the Nature of Cosmological Singularities. Stanford, February, 2005; Southampton, England, October, 2005; Warwick, England, October, 2005; Jongli, Taiwan, November, 2005.

75. Ricci Flow of Locally Homogeneous Geometries. University of California (San Diego), July, 2005.

76. Initial Data Engineering, Cambridge England. August, 2005; Oxford England, December 2005; Beijing, July 2006.

77. Spherically Symmetric Dynamical Horizons. Cambridge, England, December, 2005; Santa Barbara, March, 2006.

78. Symmetries of Higher Dimensional Stationary Black Holes. Santa Barbara, March, 2006; San Francisco, April 2006.

79. Black Hole Rigidity. Beijing, July, 2006; Cambridge, October, 2006; Paris, November, 2006; Warwick, March 2007, New York City, November 2007

80. Ricci Flow of Homogeneous Geometries and the Einstein Evolution of Spatially Homogenous, Tucson, March 2007.

81. Constructing Solutions of the Einstein Constraint Equations. Birmingham, Alabama, December 2007; Durham, North Carolina, February 2008.

82. Black Holes. (Science Pub lecture), Eugene, June 2008.

83. Non Constant Mean Curvature Solutions of the Einstein Constraint Equations. Paris, September, 2008; Stockholm, October 2008.

84. Nondegenerate Singularities in Ricci Flow. Munich, November, 2008.

85. Asymptotic Gluing of Asymptotically Hyperbolic Solutions of the Einstein Constraint Equations. Nahariyah, Israel, May 2009.

86. The Gravitational N-Body Problem. Penn State, June 2009.

87. The Constraint Equations. MSRI, September, 2009.

88. Gluing at Asymptopia and the Relativistic N-Body Problem. Simons Institute, November, 2009; Knoxville, Tennessee, April, 2010; GR 19, Mexico City, July, 2010.

89. Black Holes, the Big Bang, and the Cosmic Censor. Trinity College, Connecticut, April, 2010; Lewis and Clark College, Portland, October, 2010.

90. 2 Dimensional Ricci Flow. AMS, UCLA, October, 2010; Vancouver, July, 2011.

91. Stability of Cosmological Models with Accelerated Expansion. Caltech, October, 2010; UCSB, February, 2011; Knoxville, Tennessee, May, 2011.

92. AVTD Behavior in Smooth Solutions of Einstein's Equations. Akko, Israel, May, 2011.

93. Mini-Course on Solutions of the Initial Value Constraint Equations. Beijing, China, June, 2011.

94. Degenerate Neckpinches in Ricci Flow. UCIrvine, October, 2011; UCSanDiego, November, 2011; Oberwolfach, December, 2011; Melbourne, March, 2012; Columbia, November, 2012.

95. AVTD Behavior in Smooth Solutions of Einstein's Equations, UCBerkeley. March, 2012; UCSD, May, 2012; Paris, May, 2012.

96. The Conformal Method: A Status Report, Perimeter Institute, May, 2012; AMS Rochester, September, 2012; IHP Paris, October, 2012; CUNY Graduate Center, April 2013.

97. Black Holes, the Big Bang, and Cosmic Censorship. Cal State Sonoma, October 2013.

98. Asymptotic Behavior of Neckpinches in Ricci Flow: Bay Area Differential Geometry Seminar, MSRI, October, 2013.

99. The Nature of Singularities in Cosmological Solutions of Einstein's Equations. UC Santa Cruz, October, 2013.

100. The Conformal Method and Solutions of the Einstein Constraint Equations: Successes and Challenges. IHES, Paris, January, 2014.

101. Singularities in Cosmological Solutions and Cosmic Censorship: American Physical Society April Meeting, Savannah, April 2014.

102. Asymptotic Behavior of Non Round Neckpinches in Ricci Flow:Tuebingen, Germany, July, 2014; Metropolitan Area Differential Geometry Seminar, November, 2014; AMS, San Francisco, November 2014.

103. Asymptotically Hyperbolic Shear-Free Solutions of the Einstein Constraint Equations: Simons Center, Stony Brook, January, 2015.

104. Strong Cosmic Censorship: Oregon State University, February, 2015; GaryFest UC Santa Barbara, May 2015; Fields Institute, June, 2015; U of Alaska (Fairbanks), September, 2015; American Physical Society April Meeting, SDC, January, 2017; U of Texas (Dallas), May, 2017.

105. Expliciting the Space of Solutions of the Lichnerowicz Equation and the Einstein Constraints: Paris, December, 2015.

106. What We Know and Don't Know about the Conformal Method: Bartnik-Fest, Melbourne, Australia, February, 2016; Fields Institute, Toronto, May, 2017; Utah State, May, 2017.

107. Neckpinches in Ricci Flow and Mean Curvature Flow: MSRI, Berkeley, May, 2016.

108. Ricci Flow Solutions which Approach Kaehler-Ricci Solitons: MIT, April, 2017.

109. Black Holes, the Big Bang, and the Cosmic Censor: Howard, September, 2017.

110. Cosmic Censorship and the Nature of Singularities in Solutions of Einstein's Equations: Idaho State, October, 2017.

111. Cauchy horizons in vacuum solutions of Einstein's equations with non-closed generators: University of Miami, December, 2018.

112. Symmetries of cosmological Cauchy horizons with non-closed orbits: University of Pennsylvania, February, 2019; Institute for Advanced Study, July, 2019.

113. New Results in Ricci Flow: PNGS, March, 2020; Tübingen Analysis Seminar, March, 2021; Geometry Festival, April, 2021.

114. Accomplishments of Roger Penrose: Institute for Fundamental Science at the University of Oregon, March, 2021.

115. Stability of AVTD Behavior in $T^2$-Symmetric Vacuum Solutions: Conference in Honor of Roger Penrose, May, 2021.

116. Wellposedness of Geometric Heat Flows on Bounded Geometries: Conference in Honor of Rafe Mazzeo, October, 2022.

117. Wellposedness of Geometric Heat Flows on Bounded Manifolds. International Conference on Ricci Flow and Geometric Analysis, Xian, China, August 2024.

(Revised July, 2025)