CURRICULUM VITAE

(9 November 2021)

David Bao

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BASIC INFORMATION

Degrees:

- Ph.D. Mathematics. University of California at Berkeley, June 1983. Dissertation supervisor: Prof. Jerry Marsden.
- B.Sc. Mathematics. University of Notre Dame, May 1976.

Research interests:

- Riemann–Finsler geometry
- Global differential geometry

Undergraduate teaching interests (besides Differential Geometry):

- Mathematics of Bonds; Mathematics of Equity Options
- Probability and Statistics
- Calculus; Partial Differential Equations

Positions:

- Postdoc, 1983–85. Member, School of Mathematics, Institute for Advanced Study, Princeton.
- Visiting, 1987–89. Assistant Professor, Department of Mathematics, University of California at Santa Cruz.
- Assistant Professor, 1985–92. Department of Mathematics and Honors Program, University of Houston.
- Associate Professor, 1993–96. Department of Mathematics and Honors College, University of Houston.
- Professor, 1997–2008. Department of Mathematics and Honors College, University of Houston.

- Visiting Professor, Spring 2002. Department of Mathematics, University of California at Berkeley.
- Chair & Professor, 2007–2017 Fall. Department of Mathematics, San Francisco State University.
- Professor, 2018 Spring – . Department of Mathematics, San Francisco State University.

Distinctions:

- Houston Alumni Organization Outstanding Faculty Award, 1999–2000.
- The *NSM Teaching Excellence Award*, University of Houston, 1997–98.
- University of Houston *Cooper Teaching Excellence Award*, 1997–98.
- The 1997 *Distinguished Service Award*. Student Governing Board, Honors College, University of Houston.
- *Humanitarian of the Year*, 1994–95. Student Program Board, University of Houston.
- The *Nikki Kose Memorial Teaching Prize*, 1982–83. Department of Mathematics, University of California at Berkeley.
- *Distinguished Teaching Assistant*, 1982–83. Academic Senate, University of California at Berkeley.
- Phi Beta Kappa.
- Phi Kappa Phi.
- Philosophy Honors Society, University of Notre Dame.

Membership:

- American Mathematical Society

Funding/Support:

- PI, NSF Geometric Analysis, DMS-8601642, 8796341, 1986–89.
- PI, NSF Geometric Analysis, DMS-9404097, 1994–96.
- S.S. Chern Foundation for Mathematical Research, 2000.
- S.S. Chern Foundation for Mathematical Research, and Robert Uomini, 2002.
- S.S. Chern Foundation for Mathematical Research, 2002– .

PUBLICATIONS

Books or sections in books:

1. (with Marsden) Relativistic Elasticity. In Marsden–Hughes, Mathematical Foundations of Continuum Mechanics, 298–314, Prentice-Hall, 1983.
2. (with Chern and Shen) An Introduction to Riemann–Finsler Geometry. Graduate Texts in Mathematics, Vol. 200. Springer-Verlag, 2000.

Books edited, and invited book reviews:

1. (co-edited with Chern and Shen) Proceedings of the 1995 Joint Summer Research Conference on Finsler Geometry, Cont. Math. **196** (1996).
2. Review of Gregory L. Naber's book (Topology, Geometry, and Gauge Fields. Interactions. Springer, 2000), SIAM Review **44**(4), 7–9 (2002).
3. (co-edited with Ji, Kaiser and Ru) Special issue of the Houston Journal of Mathematics **28**(2) (2002) in honor of Prof. S.S. Chern.
4. (co-edited with Bryant, Chern, and Shen) *A Sampler of Riemann–Finsler Geometry*, MSRI Series, vol. 50, Cambridge University Press, 2004.

Papers in refereed journals:

1. A sufficient condition for the linearization stability of N=1 supergravity, a preliminary report. Annals of Phys. **158**, 211–278 (1984).
2. (with Choquet-Bruhat, Isenberg, Yasskin) The well-posedness of N=1 classical supergravity. J. Math. Phys. **26**, 329–333 (1985).
3. (with Isenberg, Yasskin) The dynamics of the Einstein–Dirac system, part I: a principal bundle formulation of the theory and its canonical analysis. Annals of Phys. **164**, 103–171 (1985).
4. (with Marsden, Walton) The Hamiltonian structure of general relativistic perfect fluids. Comm. Math. Phys. **99**, 319–345 (1985).
5. (with Nair) A note on the covariant anomaly as an equivariant momentum mapping. Comm. Math. Phys. **101**, 437–448 (1985).

6. (with Ratiu) A candidate maximal torus in infinite dimensions. AMS Cont. Math. **132**, 117–123 (1992).
7. (with Lafontaine, Ratiu) On a non-linear equation related to the geometry of the diffeomorphism group. Pacific J. Math. **158**, 223–242 (1993).
8. (with Ratiu) On the geometrical origin and the solutions of a degenerate Monge-Ampère equation. AMS Proc. Symp. Pure Math. **54(1)**, 55–68 (1993).
9. (with Chern) On a notable connection in Finsler geometry. Houston J. Math. **19(1)**, 135–180 (1993).
10. (with Auchmuty) Harnack-type inequalities for evolution equations. Proc. AMS **122(1)**, 117–129 (1994).
11. (with Shen) On the volume of unit tangent spheres in a Finsler manifold. Results in Math. **26**, 1–17 (1994).
12. (with Chern) A note on the Gauss–Bonnet theorem for Finsler spaces. Annals of Math. **143**, 233–252 (1996).
13. (with Chern and Shen) On the Gauss–Bonnet integrand for 4-dimensional Landsberg spaces. Cont. Math. **196**, 15–26 (1996).
14. (with Lackey) Special eigenforms on the sphere bundle of Finsler manifolds. Cont. Math. **196**, 67–78 (1996).
15. (with Lackey) A Hodge decomposition theorem for Finsler manifolds. Comptes Rendus Acad. Sc. Paris **323**, 51–56 (1996).
16. (with Ratiu) On a maximal torus in the volume-preserving diffeomorphism group of the finite cylinder. Diff. Geom. and its Appl. **7**, 193–210 (1997).
17. (with Chern and Shen) Rigidity issues on Finsler surfaces, Rev. Roumaine de Math. Pures Appl. **42**, 707–735 (1997).
18. (with Lackey) A geometric inequality and a Weitzenböck formula for Finsler surfaces. In *The Theory of Finsler Laplacians with Applications* (eds. Antonelli, Lackey), Kluwer Academic Publishers, 245–275 (1998).
19. (with Lackey) Randers surfaces whose Laplacians have completely positive symbol. *Nonlinear Analysis* **38**, 27–40 (1999).
20. (with Shen) Finsler metrics of constant positive curvature on the Lie group S^3. *J. London Maths. Soc.* **66**(2), 453–467 (2002).
21. (with Robles) On Randers spaces of constant flag curvature. *Reports on Mathematical Physics* **51**, 9–42 (2003).
22. Randers space forms, *Periodica Mathematica Hungarica* **48**, 3–15 (2004).

23. (with Robles) On Ricci and flag curvatures in Finsler geometry, in *A Sampler of Riemann–Finsler Geometry*, MSRI Series, vol. 50, 197–259, Cambridge University Press, 2004.
24. (with Robles and Shen) Zermelo navigation on Riemannian manifolds, *J. Differential Geometry* **66**, 391–449 (2004).
25. On two curvature-driven problems in Riemann–Finsler geometry. *Advanced Studies in Pure Mathematics* **48**, Finsler Geometry, Sapporo 2005 – In memory of Makoto Matsumoto, 19–71 (2007).

Unrefereed published papers:

1. (with Isenberg, Yasskin) Classical supergravity. In "Mathematical Aspects of Superspace" (H.-J. Seifert, C.J.S. Clarke, A. Rosenblum, eds.). NATO Adv. Sc. Inst. Series C: Mathematical and Physical Sciences, **132**, 173–205, D. Reidel, Dordrecht-Boston, Mass., 1984.
2. (with Isenberg, Yasskin) On classical N=1 supergravity. Proc. Int'l. Coll. Grp. Theo. Mtds. Phys., 558–561, World Scientific, 1985.
3. (with Marsden, Walton) The Hamiltonian structure of the Einstein–Euler system. Proc. Int'l. Coll. Grp. Theo. Mtds. Phys., 96–99, World Scientific, 1985.
4. (with Chern and Shen) Preface for Finsler geometry over the Reals, Cont. Math. **196**, 3–13 (1996).
5. Unicorns in Finsler geometry. Proceedings of the 40th Symposium on Finsler geometry, Sapporo (Hokkaido Tokai University), Japan, 2005, pp.19–27.

INVITED PRESENTATIONS

- 11/12/1983: Amer. Math. Society meeting, Cal. St. U. San Luis Obispo
- 02/08/1984: Mathematics seminar, Inst. for Advanced Study, Princeton
- 02/09/1984: General Relativity seminar, U. Maryland (College-Park)
- 05/22/1984: Intl. Coll. Grp. Theo. Mtds. Phys., U. Maryland (College-Park)
- 03/21/1985: Mathematics Colloquium, U. of Houston
- 04/29/1985: Hamiltonian Systems seminar, UC Berkeley
- 08/21/1985: Conference on Geometry and Topology, UC San Diego
- 11/08/1985: American Physical Society meeting, Texas A & M
- 11/25/1985: Mathematical Physics seminar, Rice Univ.
- 12/09/1985: Mathematical Physics seminar, Rice Univ.
- 03/16/1987: Mathematical Physics seminar, Rice Univ.
- 04/09/1987: Inst. Theoretical Science lecture, U. of Houston
- 04/30/1987: Inst. Theoretical Science lecture, U. of Houston
- 05/18/1989: Mathematics Colloquium, UC Santa Cruz
- 11/09/1989: Mathematical Physics seminar, Texas A & M
- 04/02/1990: Texas Geometry and Topology Conference, Rice Univ.
- 07/10/1990: AMS Summer Inst. on Differential Geometry, UCLA
- 09/24/1990: High Energy Theory seminar, Texas A & M
- 10/26/1990: PDE seminar, U. of Houston
- 10/19/1991: Texas Geometry and Topology Conference, UT Austin
- 09/25/1992: PDE seminar, U. of Houston
- 06/01/1993: Geometry seminar, UC Santa Cruz
- 07/20/1995: Joint Summer Research Conference, UW Seattle
- 10/14/1995: Pacific NW Geometry Conference, U. of Oregon
- 04/22/1996: Geometry and Topology seminar, Texas A & M
- 01/11/1997: AMS Special Session on Finsler Geometry, San Diego
- 08/22/1997: Conference on Finsler Laplacian, U. of Alberta
- 08/19/1998: Meeting of Minds Conference, U. of Alberta

- 05/21/1999: AMS-SMM Sp. Session on Diff Geom and Geods, UNT Denton
- 04/07/2000: Mathematics Colloquium, IUPUI
- 04/08/2000: AMS Sp. Session on Diff Geom and Appl'ns, U. of Notre Dame
- 07/24/2000: Symp. on Finsler Geom & Appl'ns, WCNA-2000, Catania, Sicily
- Spring 2002: Invited to teach a course on Finsler Geometry at UC-Berkeley
- 06/07/2002: Workshop on Finsler Geometry, MSRI, Berkeley.
- 10/25/2002: Mathematics Colloquium, IUPUI.
- 12/19/2002: Mathematics Colloquium, U. of Oklahoma.
- 03/13/2003: Mathematics Colloquium, U. of Alberta.
- 03/27/2003: Mathematics Colloquium, U. of Notre Dame.
- 04/11/2003: Mathematics Colloquium, U. of British Columbia.
- 08/12/2003: Workshop on Finsler Geometry, Debrecen, Hungary.
- 01/29/2004: Mathematics Colloquium, Tulane University.
- 04/26/2004: Geometry Seminar, U. of Georgia.
- 08/10/2004: ISFG-2004, Nankai Inst. Maths., Tianjin, China.
- 04/22/2005: Graduate Students' Seminar, Maths, U. of Houston.
- 09/07/2005: 40th Symp. Finsler Geom., Hokkaido Tokai U., Japan.
- 11/17/2005: Chern Memorial Conf., CIMAT, Guanajuato, Mexico.
- 05/24–26/2006: Six lectures at the Workshop on Finsler & semi-Riemannian geometries, Universidad Autonoma de San Luis Potosi, Mexico.
- 02/26/2007: Mathematics Colloquium, San Francisco State University.
- 05/03/2008: AMS Sp. Session on Recent Developments in Riemannian and Kahlerian Geometry, Claremont–McKenna College.
- 05/04/2009: Plenary talk at the official opening of the Research Institute on Hypercomplex Systems in Geometry and Physics, Bauman University, Moscow, Russia.
- 03/19/2010: Rethinking Risk in the Urban Forest, San Francisco State University.
- 04/30/2014: Mathematics Colloquium, San Francisco State University.
- 10/22/2015: 50th Symposium on Finsler Geometry, Hiroshima, Japan.
- 07/09/2016: New Methods in Finsler Geometry, Leipzig, Germany.

TEACHING and SERVICE ACTIVITIES

Research-related service, enhancing the visibility of the university:

- Co-organiser (with Golubitsky) of the *Texas Geometry and Topology Conference*, Feb 7–9, 1992.
- Co-chair (with Chern and Shen) of the *Joint Summer Research Conference on Finsler Geometry* at Seattle, July 16–20, 1995.
- Co-chair (with Etgen and Lackey) of the *Texas Geometry and Topology Conference*, Feb 23–25, 1996.
- Co-chair (with Chern and Shen) of a *Special Session on Finsler geometry* at the American Mathematical Society annual meeting in San Diego, Jan 8–11, 1997.
- Co-chair (with Etgen and Ru) of the *Texas Geometry and Topology Conference*, April 24–26, 1998.
- Editorial board of the Houston J. Math, 1999 – .
- Editorial board of Birkhäuser's Progress in Physics series, 2000–2003.
- Co-chair (with Bryant, Chern, and Shen) of the *MSRI Workshop on Finsler Geometry*, Berkeley, June 3–7, 2002.
- Co-chair (with Ji and Ru) of the *Texas Geometry and Topology Conference*, Feb 21–23, 2003.
- Co-organiser (with Lilia del Riego) of a *Special Session on Curvature and Geodesics* at the AMS-SMM joint meeting, Houston, May 13–15, 2004.
- Co-chair (with Etgen and Ru) of the *Texas Geometry and Topology Conference*, Feb 17–19, 2006.
- Co-chair (with Lai Ni) of a *Special Session on Differential Geometry* at the American Mathematical Society meeting in San Francisco, 2009.
- Co-chair (with Ovidiu Munteanu) of a Special Session *Recent Progress in Geometric Analysis* and co-organizer of the *Einstein Lecture* at the American Mathematical Society meeting in San Francisco, 2014.
- Co-chair (with Ovidiu Munteanu) of a Special Session *Recent Progress in Geometric Analysis* at the American Mathematical Society meeting in San Fransicso, 2018.
- Co-chair (with Ovidiu Munteanu) of a Special Session *Recent Progress in Geometric Analysis* at the American Mathematical Society meeting in San Francisco, 2021.

Thesis supervision and mentoring:

- Honors thesis, Perla Lahana–Myers. *Maxwell's equations and their generalizations*, May 1990. Perla earned a Ph.D. in mathematics from the University of California at San Diego in 1995. She was awarded a University of California Regents Postdoctoral Fellowship. Perla served as an Associate Dean, and is Professor, at the University of San Diego.
- Ph.D. student, Brad Lackey. *Manifolds with parametrized metrics*, August 1996. Brad finished a two year Killam Fellowship at the University of Alberta in Edmonton, followed by three years at the University of Hull. He has a research position at the National Security Agency.
- Honors thesis, Eric Bass. *A computer analysis of conjugate loci using numerical approximations of Jacobi's equation executed in Maple V*, May 2000. Eric earned a Ph.D. in the Nonneutral Plasma Physics Group at the University of California at San Diego in 2008. He was a postdoctoral ORISE Fellow in General Atomics, 2008-2011. Since 2012, he has been an Assistant Project Scientist at the Center for Energy Research, University of California at San Diego. Since 2014, Eric has also been Adjunct Professor of Physics at San Diego State University.
- Co-advisor of Ph.D. student, Colleen Robles. *Einstein metrics of Randers type*, 2003. Thesis successfully defended on April 11, 2003, at the University of British Columbia, Vancouver. Colleen was a visiting assistant professor at the University of Rochester, from 2003 to 2006, then a tenure-track assistant professor at Texas A&M. She moved to Duke University as Associate Professor in 2015, and has been Professor of Mathematics at Duke since 2020. Colleen was a member at the Institute for Advanced Study in Princeton (2014-2015), and a Senior Simons Professor at the Institute of Mathematics of the Polish Academy of Sciences (2017). She has been named a Senior Fellow, Marie Sklodowska-Curie FCRP, Freiburg Institute for Advanced Study (2022).
- Supervised the Applied Math Projects of Don James Altos (2018 Spring & Fall), Carlos Alberto Silva (2018 Fall & 2019 Spring), Richard Travis Turner (2018 Fall & 2019 Spring).
- Supervising the Master's thesis of Michael Womack since 2020 Fall. Michael is currently a first year student in the Math doctoral program at the University of California at Irvine. He is polishing the work *Discrete Ricci flow for community detection on contact networks*.

Developmental:

- 2004-2006: Designed and updated the Finance Option for B.Sc. Math majors. Teaching the two core courses (Bonds, Options) on the subject.
- 2004-2005: Designed a new syllabus & a collection of 18 Maple worksheets for Math 3363 (Intro. to PDEs).
- 2004-2006: Developed a one year accelerated calculus sequence using vector calculus as the backbone.
- 2019-2020. Designed a new one semester course on Elementary Differential Geometry that uses minimal machinery and culminates in four global theorems due, respectively, to Chern, Poincaré-Hopf, Gauss-Bonnet, and Morse. Taught the course during 2020 Spring.

Service to the publishing industry:

* Reviewed textbooks and prospective research monographs for
  - Birkhäuser
  - W.H. Freeman
  - McGraw-Hill
  - Prentice-Hall
  - Springer-Verlag
  - Wiley
* Refereed/reviewed papers and proposals for
  - Acta Mathematica
  - AMS Transactions
  - Annals of Mathematics
  - Bulletin/Journal of the London Mathematical Society
  - Communications in Mathematical Physics
  - Comptes Rendus
  - Contemporary Mathematics
  - Forum of Math: Sigma
  - Global Analysis and Applications
  - Houston Journal of Mathematics
  - Indagationes Mathematicae
  - Int'l Journal of Mathematics and Mathematical Sciences
  - Israel Journal of Math
  - Journal of Differential Geometry

- Journal of Mathematical Physics
- Journal of Physics A
- Journal of the London Mathematical Society
- Mathematische Annalen
- Mathematical Reviews
- Mathematische Zeitschrift
- Nat'l Sciences and Engineering Research Council, Canada
- National Science Foundation
- Pacific Journal of Mathematics
- Proceedings of the Royal Society
- Publicationes Mathematicae Debrecen
- Reports on Mathematical Physics
- Zentralblatt für Mathematik

Advisory and administrative:

- UH Honors College student advising, 1985–2007.
- UH Scholarship Committee, 1991–1997, 2002–2007.
- Maths. Dept. Benner and Grover Scholarship Committee, 2000–2007.
- Course coordinator for MATH 3363, 2005–2007.
- Maths. Dept. liaison with the Library, 1999–2007.
- UH Honors College Grievance Committee (chair), 2000–2007.
- Maths. Club Faculty Advisor, 1993–1994.
- Phi Beta Kappa Committee, 1993–2002.
- Maths. Dept. Curriculum Committee, 1996–1999.
- NSM Scholarship Committee, 1996–2001 (chair, 1999–2001).
- Maths. Dept. Colloquium Chair, Fall 1997.
- Maths. Dept. Executive Committee, 1999–2000, 2002–2003.
- Committee for an Actuarial Course of Study, 2000–2003.
- Maths. Dept. PTMR Committee, 2002–2003.
- UH Honors College Search Committee for Biology, 2004–2005.
- SFSU Provost Search Committee, 2008–2009.
- SFSU Math Assessment Report, 2010–2013, followed by a Closing the Loop final assessment report, 2016–2017.

- CSU Math Council 2007–2017.
- 6th cycle academic program review of SFSU Math's MA program, 2012–2013.
- CSU Math Council sub-committee on Statway vs. ELM, 2013–2015.
- SFSU Math tenure-track searches: 2011-12 (Stats & Biostats), 2012-13 (Biostats), 2013-14 (Analysis), 2014-15 (Math Ed, Stats), 2015-16 (Geom & Topo), 2016-17 (Appl Math), 2017-18 (Stats), 2018-19 (Appl Math).