

## CURRICULUM VITAE

**NAME:** David J. Groisser

**PRESENT POSITION:** Associate Professor

**DEGREES:** Ph.D. Harvard University - 1983  
A.B. Harvard University - 1978

**RESEARCH INTERESTS:** Differential geometry, image analysis,  
mathematical physics

### **PROFESSIONAL EXPERIENCE:**

Teaching Fellow, Mathematics, Harvard University, 1980.  
Teaching Fellow, Physics, Harvard University, 1980–83.  
Fellowship, Mathematical Sciences Research Institute, Berkeley, 1983–84.  
Hildebrandt Assistant Professor, University of Michigan, Ann Arbor, 1984–86.  
Research Fellow/Lecturer, SUNY, Stony Brook, 1986–88.  
Assistant Professor, University of Florida, 1988–91.  
Associate Professor, University of Florida, 1991–present.  
Visitor, Institute for Advanced Study (Princeton, N.J.), Fall semester 1995.  
University of Florida Preview advisor, 1996, 1998, 1999.  
Visiting Professor, Michigan State University, Fall semester 1996.  
Undergraduate Coordinator, UF Department of Mathematics, 2002–2008.

### **GRANTS:**

Horace Rackham Fellowship, University of Michigan, 1985  
Horace Rackham Research Grant at University of Michigan, 1985–86  
NSF support under grant DMS-8405661, 1986–88  
University of Florida Division of Sponsored Research grant #88092830, 1988–89  
NSF support under grant DMS-8905211, 1989–91 (Principal Investigator)  
University of Florida Division of Sponsored Research grant #93030405, 1993–94  
NSF support under grant DMS-9307648, 1993–95 (Principal Investigator)  
NSF grant DMS-9700492, 1997–98, for conference (Principal Investigator)

**HONORARY SOCIETIES:**

Phi Beta Kappa

**ORGANIZATIONS:**

American Mathematical Society

**REVIEWING & REFEREEING ACTIVITIES:**

Reviewer of several calculus textbooks

Reviewer of grant proposals in geometric analysis for NSF

Have reviewed numerous papers for *Mathematical Reviews*

Have refereed papers for 16 journals and conference proceedings

**OTHER PROFESSIONAL ACTIVITIES:**

Co-organizer of conference, “Moduli Spaces in Geometry and Physics”, February 14–16, 1997.

**AWARDS AND HONORS:**

Teacher of the Year Award (College of Liberal Arts and Sciences), 1994

TIP Award (Teaching Incentive Program), 1998

Anderson Scholar Faculty Honoree, 2013 and 2014

**MENTIONED IN LISTINGS:**

American Mathematical Society

**THESES AND DISSERTATIONS DIRECTED:**

Sheshadri Thiruvankadam, Ph.D. 2005 (co-chair of doctoral committee)

Jung-ha An, Ph.D. 2005 (co-chair of doctoral committee)

Andres Zuniga, supervised 2021–

**UNDERGRADUATE PROJECTS DIRECTED:**

Frances Tirado, senior thesis, 2009-2010

Brian Williams, senior thesis and University Scholars Program project, 2011–2012

Kirollos Masood, senior thesis, 2015–2016

**DOCTORAL COMMITTEES SERVED ON AS NON-CHAIR MEMBER:**

**Mathematics Students**

Xiao-Ping Gu, 1991–92

Antonios Valaristos, 1992–94

Richard White, 1994–2001  
Weihong Guo, 2005–2007  
Yuri Turygin, 2006–2007  
Prabhu Venkataraman, 2006–2008  
Andrew Fisher, 2007–2010  
Fuhua Chen, 2008–2012  
Iulia Posirca, 2008–2012  
Robert Newton, 2012–2013  
Matthew Gluck, 2011–2014  
Chase Saucier, 2013–2018  
Deep Kundu, 2020–

**Non-mathematics Students**

José Rubio (Physics), 1992–94  
Karl Zachary (Chemistry), 1993–98  
Teparkshorn Pengpan (Physics), 1998–2000  
Xiaobin Wu (Computer and Information Science and Engineering), 2001–2005  
Vakif Onemli (Physics), 2001–2003  
Sudarshan Ananth (Physics), 2002–2005  
Marc Soussa (Physics), 2002–2004  
Kyungwook Kim (Physics), 2002–2004  
Kyoungchul Kong (Physics), 2003–2006  
Larry Price (Physics), 2004–2007  
Minho Kim (Computer and Information Science and Engineering), 2004–2008  
Sung-Soo Kim (Physics), 2004–2008  
Shun-Pei Miao (Physics), 2004–2007  
Jianhua Fan (Computer and Information Science and Engineering), 2005–2010  
Ashish Myles (Computer and Information Science and Engineering), 2005–2008  
Tianyun Ni (Computer and Information Science and Engineering), 2005–2008  
Jyungryun Seo (Computer and Information Science and Engineering), 2006–2007  
Michael Burns (Physics), 2007–2010  
Jesus Escobar (Physics), 2007–2011  
Patrick Hearin (Physics), 2007–2011  
Francisco Rojas (Physics), 2008–2012  
Soyhun Park (Physics), 2010–2012  
Tongguang Cheng (Physics), 2010–2014

Pedro Mora (Physics), 2010–2014  
Michael J. Perez (Physics), 2010–2015  
Liqiang Peng (Department of Mechanical and Aerospace Engineering), 2014–2016  
Changlong Wang (Department of Physics), 2014–2016  
Rudrasis Chakraborty (Computer and Information Science and Engineering), 2014–2018  
Guan Hang (Computer and Information Science and Engineering), 2014–2018  
Gaoli Chen (Physics), 2014–2018  
Fabien Emmetiere (Chemistry), 2015–2020  
Moinul H. Rahat (Physics), 2017–2022  
Lintao Tan (Physics), 2017–2022  
Chun-Hao Yang (Statistics), 2019–2021  
Sanjib Katuwal (Physics), 2019–2023  
Nathaniel Strauss (Physics), 2019–2023  
James J. Gillespie (Philosophy), 2020–2023  
Xiaoda Qu (Statistics), 2021–  
H.C. Regan B. Bhatta (Physics), 2022–

**OTHER UNIVERSITY SERVICE:**

Member, University Constitution Committee, 2013–2016 ; Chair 2015–2016  
Member, Mathematics Chair Search committee, 2012–2013  
Member, Faculty Senate, 2009–2011, 2013–2016  
Member, College of Liberal Arts and Sciences Curriculum Committee, 2004–2006, 2010–2012; Chair 2005–2006  
Member, Mathematics Chair Search committee, 1992–93  
Faculty advisor, University of Florida Chess Club, 1997–2000  
Faculty advisor, Atheist and Agnostic Students Association, 2000–2005

**COMMUNITY SERVICE:**

Interviewer for Harvard College

**TALKS, LECTURES, AND INVITED ADDRESSES AT MEETINGS & COLLOQUIA:**

Colloquium, Pennsylvania State University, February 1983  
Colloquium, University of Rochester, February 1983  
Colloquium, University of California at Santa Barbara, October 1983  
Contributed talk, special session on gauge theory and geometry, annual meeting of American Mathematical Society, San Antonio, January 1987

Colloquium, Oklahoma State University, March 1987  
 Colloquium, Michigan State University, February 1988  
 Colloquium, University of Florida, February 1988  
 Colloquium, University of Connecticut, February 1988  
 Invited talk, special session on gauge theory and geometry, regional meeting of American Mathematical Society, Worcester, April 1989  
 Colloquium, Indiana University-Purdue University at Indianapolis, October 1990  
 Invited talk at special session on differential geometry and mathematical physics, regional meeting of American Mathematical Society, Tampa, March 1991  
 Contributed talk, symposium on Gauge Theory, Differential Geometry, and Topology, University of Warwick, July 1992  
 Invited talk, Differential Geometry Seminar, Michigan State University, October 1992  
 Invited talk, Adelaide Workshop on Differential Geometry, University of Adelaide, June 1993  
 Invited talk, Differential Geometry Seminar, Harvard University, November 1993  
 Invited talk, January Program on Geometry and Mathematical Physics, Mathematical Sciences Research Institute, January 1994  
 Invited talk, Differential Geometry Seminar, Graduate Center of the City University of New York, March 1994  
 Invited talk, Park City (Utah) Mathematics Institute, July 1994  
 Invited talk, Differential Geometry and Global Analysis Seminar, University of Texas, October 1994  
 Invited talks, Workshop on Quantum and Classical Gauge Theory, Stefan Banach International Mathematical Center (Warsaw), May 1995  
 Invited talk, Differential Geometry and Global Analysis Seminar, University of Texas, November 1995  
 Invited talk at special session on gauge field theory, regional meeting of American Mathematical Society, New York, April 1996  
 Invited talk, Differential Geometry Seminar, University of Michigan, November 1996  
 Invited talk, Differential Geometry Seminar, Michigan State University, December 1996  
 Invited talk, Workshop in Topology and Geometry, University of Florida, June 1997  
 Invited talk, Fall Eastern Section Meeting of The American Mathematical Society, Pittsburgh, November 2004  
 Invited poster presentation, Workshop in Statistical Inferences on Shape Manifolds, May 2005  
 Invited talk via WebEx, Seminar on Data Analysis on Sample Spaces with a Manifold Stratification, Statistical and Applied Mathematical Sciences Institute, March 2011

**PUBLICATIONS:** (Published, accepted, submitted)

1. (with S. Jung and A. Schwartzman) *A genericity property of Fréchet sample means on Riemannian manifolds*, 34 pp., submitted. Preprint (2023), posted as arXiv:2309.13823
2. (with S. Jung, B. Rooks, and A. Schwartzman) *Averaging symmetric-positive definite matrices on the space of eigen-decompositions*, 52 pp., submitted. Preprint (2023), posted as arXiv:2306.12025
3. (with S. Jung and A. Schwartzman) *Uniqueness questions in a scaling-rotation geometry on the space of symmetric positive-definite matrices*, *Diff. Geom. and its Applications*, **79** (2021) <https://doi.org/10.1016/j.difgeo.2021.101798>, 1–40
4. (with L. Ellingson, D. Osborne, V. Patrangenaru, and A. Schwartzman) *Non-parametric Bootstrap of Sample Means of Positive-Definite Matrices with an Application to Diffusion-Tensor-Imaging Data Analysis*, *Communications in Statistics – Simulation and Computation* **46** (2017), 4851–4879
5. (with S. Jung and A. Schwartzman) *Geometric foundations for scaling-rotation statistics on symmetric positive definite matrices: minimal smooth scaling-rotation curves in low dimensions*, *Electronic J. Stat.* **11** (2017), 1092–1159
6. (with S. Jung and A. Schwartzman) *Scaling-rotation distance and interpolation of symmetric positive-definite matrices*, *SIAM J. Matrix Analysis and Applications* **36** (2015), 1180–1201 + 9-page online supplement
7. (with J. Peters) *Matched  $G^k$ -constructions yield  $C^k$ -continuous iso-geometric elements*, *Computer Aided Geometric Design*, **34** (2015), 67–72
8. (with D. Osborne, V. Patrangenaru, L. Ellingson, and A. Schwartzman) *Non-parametric Two-Sample Tests on Homogeneous Riemannian Manifolds, Cholesky Decompositions and Diffusion Tensor Image Analysis*, *J. Multivar. Anal.* **119** (2013), 163–175
9. (with H.D. Tagare, O. Skrinjar) *Symmetric Non-rigid Registration: A Geometric Theory and Some Numerical Techniques*, *J. Math. Imaging and Vision* **34** (2009), 61–88
10. (with H.D. Tagare) *On the topology and geometry of spaces of affine shapes*, *J. Math. Imaging and Vision* **34** (2009), 222–233
11. (with H.D. Tagare, O. Skrinjar) *A Geometric Theory of Symmetric Registration*, abstract p. 73 in table of contents, *Proceedings of the 2006 Conference on Computer Vision and Pattern Recognition (CVPRW'06), Workshop on Mathematical Methods in Biomedical Image Analysis*, IEEE (2006). Table of contents available at IEEE Computer Society Digital Library, <http://>

csdl2.computer.org/persagen/DLAbsToc.jsp?resourcePath=/dl/proceedings/&toc=comp/proceedings/cvprw/2006/2646/00/2646toc.xml. Full text, 8 pp., available at <http://doi.ieeecomputersociety.org/10.1109/CVPRW.2006.16>

12. *Certain optimal correspondences between plane curves II: Existence, local uniqueness, regularity, and other properties*, Trans. Amer. Math. Soc. **361** (2009), 3001–3030
13. *Certain optimal correspondences between plane curves I: Manifolds of shapes and bimorphisms*, Trans. Amer. Math. Soc. **361** (2009), 2959–3000
14. (with S. Thiruvenkadam, Y. Chen) *Non-rigid Shape Comparison of Implicitly-Defined Curves*, Lecture Notes in Computer Science v. 3752), (Proceedings of Variational, Geometric, and Level Set Methods in Computer Vision: Third International Workshop, VLISM 2005), Beijing, China, October 16, 2005), eds. N. Paragios et al. (2005) 222–234
15. (with X. Zheng, Y. Chen, D. Wilson) *Nonrigid correspondence and classification of curves based on more desirable properties*, Nonconvex Optimization and its Applications v. 82 (Multiscale optimization methods and applications: selected papers from the Conference on Multiscale Optimization Methods and Applications, Feb. 2004, Gainesville, Florida), eds. W. Hager et al. (2006), 393–407
16. *Some differential-geometric remarks on a method for minimizing constrained functionals of matrix-valued functions*, J. Math. Imaging and Vision **24** (2006), 349–358
17. *On the convergence of some Procrustean averaging algorithms*, Stochastics **77** (2005), 31–60
18. *Newton’s method, zeroes of vector fields, and the Riemannian center of mass*, Adv. in Appl. Math **33** (2004), 95–135
19. (with H. D. Tagare, D. O’Shea) *Non-rigid shape comparison of plane curves in images*, J. Math. Imaging and Vision **16** (2002), 57–68
20. (with L. Sadun) *Simple type and the boundary of moduli space*, J. Geom. and Physics **36** (2000), 324–384
21. *Totally geodesic boundaries of Yang-Mills moduli spaces*, Houston J. Math. **24** (1998), 221–276
22. (with M. K. Murray) *Instantons and the information metric*, Ann. Global Anal. and Geom. **15** (1997), 519–537

23. *The  $L^2$  metric in gauge theory: an introduction and some applications*, Symplectic Singularities and Geometry of Gauge Fields, Banach Center Publications **39** (1997), 317–329
24. (with T. H. Parker) *Sharp decay estimates for Yang-Mills fields*, *Commun. Analysis and Geom.* **5** (1997), 439–474
25. *Curvature of Yang-Mills moduli spaces near the boundary, I*, *Commun. Analysis and Geom.* **1** (1993), 139–215
26. (with T. H. Parker) *Semiclassical Yang-Mills Theory I: Instantons*, *Commun. in Math. Physics* **135** (1990), 101–140
27. *The geometry of the moduli space of  $\mathbf{CP}^2$  instantons*, *Inventiones Mathematicae* **99** (1990), 393–409
28. (with D. S. Freed) *The basic geometry of the manifold of Riemannian metrics and of its quotient by the diffeomorphism group*, *Michigan Math. J.* **36** (1989), 323–344
29. (with T. H. Parker) *The geometry of the Yang-Mills moduli space for definite manifolds*, *J. Differential Geom.* **29** (1989), 499–544
30. (with T. H. Parker) *The Riemannian geometry of the Yang-Mills Moduli Space*, *Commun. in Math. Physics* **112** (1987), 663–689
31. *Integrality of the monopole number in  $SU(2)$  Yang-Mills-Higgs Theory on  $\mathbf{R}^3$* , *Commun. in Math. Physics* **93** (1984), 367–378

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