

Krishnan Shankar

199 Blue Stone Hills Drive
Harrisonburg, VA 22801
shankakx@jmu.edu
(405) 613-3438

EDUCATION

Bachelor of Arts, Mathematics (Phi Beta Kappa)
Reed College, Portland, OR 97202; May 1993

Ph.D, Mathematics (Alfred P. Sloan Dissertation Fellow)
University of Maryland, College Park, MD 20742; May 1999

RESEARCH INTERESTS

Primary: Riemannian geometry, Topological Data Analysis.

Secondary: Probability, number theory, cryptography.

EXPERIENCE

Department Head, Mathematics & Statistics 2022–current
James Madison University, Harrisonburg, VA.

Program Director, Division of Mathematical Sciences 2018–2022
National Science Foundation, Alexandria, VA.

Nancy Scofield Hester Presidential Professor 2018–2022
Professor of Mathematics 2011–2018
Associate Professor of Mathematics 2006–2011
Assistant Professor of Mathematics 2002–2006
University of Oklahoma, Norman, OK.

T. H. Hildebrandt Research Assistant Professor 1999–2002
University of Michigan, Ann Arbor, MI.

Visiting Professor of Mathematics
Universität Münster, Münster, Germany, Summer 2009, October 2015–March 2016.
Université Paris–Dauphine, Paris France, Summer 2016, Summer 2017.

SELECTED HONORS & AWARDS

- Staff Recognition Service (STaRS) Award, National Science Foundation, 2021.
- Commendable Service Award, National Science Foundation, 2020.
- Nancy Hester Presidential Professorship, University of Oklahoma, Spring 2018.
- O. U. Good Teaching Award, April 2014. (University wide award)
- National Science Foundation PI awards: (D.M.S. Award #1104352), 2011–2015; (D.M.S. Award #0513981), 2005–2008; (D.M.S. Award #0103993), 2001–2005.
- Irene Rothbaum Outstanding Assistant Professor: annual award in the College of Arts & Sciences; University of Oklahoma, 2006.
- Sokol Award for Best Postdoctoral Fellow in the Sciences, University of Michigan, 2001.

SELECTED PUBLICATIONS

- *On the Fundamental Groups of Positively Curved Manifolds*, *J. Differential Geom.*, **49** (1998), 179–182.
- *Spherical rank rigidity and Blaschke manifolds* (joint with Ralf Spatzier and Burkhard Wilking), *Duke Math. J.*, **128**(1) (2005), 65–81.
- *On the cohomogeneity and symmetries of Eschenburg and Bazaikin spaces*, (joint with Karsten Grove and Wolfgang Ziller), *Asian J. of Math.*, **10**(3), (S. S. Chern memorial volume, 2006), 647–662.
- *Snowflake groups, Perron–Frobenius eigenvalues and isoperimetric spectra* (joint with Noel Brady, Martin Bridson, Max Forester), *Geometry & Topology*, **13** (2009), 141–187.
- *Positively curved manifolds with large spherical rank*, (joint with Ben Schmidt and Ralf Spatzier), *Commentarii Math. Helv.*, **19**(2) (2016), 219–251.
- *Almost isotropic Kähler manifolds*, (joint with Ben Schmidt and Ralf Spatzier), *Journal für reine und Angewandte Mathematik (Crelle)*, (2020), to appear.
- *Highly connected 7-manifolds and non-negative curvature*, (joint with Sebastian Goette and Martin Kerin), *Annals of Mathematics*, **191**(3) (2020), 829–892.
- *Estimating the reach of a manifold via its convexity defect function*, (joint with Clément Berenfeld, John Harvey, Marc Hoffmann), *Journal: Discrete & Computational Geometry*, (2021), published, pending issue.

SYNERGISTIC OUTREACH & SERVICE ACTIVITIES

- **Program Director, National Science Foundation:** Currently serving a 3 year term as a rotating Program Director in the Division of Mathematical Sciences within the Topology & Geometric Analysis program. Responsibilities include: assembling and running panels, preparing detailed review analyses, managing budgets, making granting decisions for individual PIs as well as conference support applications. Have served on the following management teams: Topology & Geometric Analysis; CAREER; Post-doctoral fellowship program; REU program; FRGMS (Focused Research Group); MPS-ASCEND (directorate wide postdoctoral program for broadening participation); LEAPS-MPS.
- **DMS Colloquium Organizer:** Created and currently running the first ever colloquium series within the Division of Mathematical Sciences at the National Science Foundation with talk by Program Directors from within the foundation, 2018—current.
- **DMS Newsletter:** Created the first ever DMS Newsletter, 2019.
- **Course Administrator for WeBWork:** Applied for a grant from the OU IT committee for a server to host WeBWork, an online homework system. Helped install and I was also the course administrator for the software in the department until 2018. The software has been operational since Fall 2012 and has been used by hundreds of students every semester..
- **Organizer of University of Oklahoma Math Day**, outreach directed toward local high school students from all over Oklahoma and parts of Texas. Several hundred students compete in tests and a quiz show and win prizes for several events; University of Oklahoma, **Committee Chair, 2003–2007**; consultant, 2008–2018.
- **Chair**, Computational/Applied Topology search committee, Fall 2017.
- **Chair**, Post-doctoral search committee, Spring 2018.

- **Co-chair**, Organizing Committee, conference on Ricci Solitons at the University of Oklahoma, Spring 2012. (Partially funded ($\sim 50\%$) by NSF; **DMS 1105647**; PI for grant: Michael Jablonski. Partially funded ($\sim 50\%$) by University of Oklahoma; PI for grant: Krishnan Shankar)
- **Co-chair**, Organizing Committee, international conference in Riemannian geometry (on the occasion of the 60th birthday of Karsten Grove), Fall 2006. (co-PI on grant funded by NSF; **DMS 0606626**).
- **Panel reviewer** for National Science Foundation, 2006, 2012, 2013.
- Member, Arts & Sciences Big Data committee, 2017. Given my recent interests in computational geometry and applications to data science I was invited to be a part of this committee. They are broadly discussing several data initiatives at OU (hiring in computational fields, creating elective courses in statistics and data science, creating certificate or degree programs etc.)
- Member, Oklahoma–Arkansas MAA conference organizing committee, Fall 2016–Spring 2017. My role was to create and maintain a website, enable credit card payments through an OU marketplace, help with registration etc.
- Member, Provost’s Elite Retention Squad (ERS), Fall 2016–2018. A committee created recently to increase freshman retention rates at Oklahoma.
- Member, Campus Tenure Committee, 2012–2013. Charged with carefully reading tenure and promotion files of junior faculty, discussing files and departmental and college votes in committee and writing detailed reports for the Provost regarding promotion/tenure.
- Journal Referee for *Inventiones Mathematicae*, *Journal of the European Math. Society*, *GAFA*, *Duke Mathematical Journal*, *Bulletin of the AMS*, *Journal of Differential Geometry*, *American Journal of Mathematics*, *Communications in Analysis and Geometry*.

TEACHING & MENTORING EXPERIENCE

- Over 25 years of teaching experience at the undergraduate and graduate levels, mainly in the United States, but also in Europe.
- Undergraduate Courses include: Calculus (single and multivariable), Ordinary Differential Equations, Partial Differential Equations, Linear Algebra, Abstract Algebra, Analysis, Topology, Complex Analysis, Differential Geometry, Probability, Statistics, Geometry for Teachers, Cryptography & Coding Theory, Capstone and Topics courses.
- Graduate Courses include: Algebra, Analysis, Topology, Differential Geometry, Algebraic Topology, Differential Topology, Topics courses in comparison geometry.
- Undergraduate Research: extensive experience directing undergraduate research projects with topics ranging from hyperbolic geometry to cryptography to statistics applied to economics.
- Graduate Research: ran several graduate reading courses (geometric group theory, Riemann surfaces, complex analysis, Riemannian geometry, algebraic topology). One student recently completed doctoral dissertation under my supervision (Andrew Lutz, 2021).

**RECENT
INVITED TALKS
& CONFERENCES**

- Invited talk, AMS Special Session at the Joint Mathematics Meeting, Boston, MA, January 2023.
- Geometry Seminar, City University of New York–Graduate Center, New York, NY, April 2022.
- Virtual Seminar on Geometry with Symmetries (Global audience), July 15, 2020 via Zoom (https://youtu.be/_vHfLherLhY)
- Geometry–Topology Seminar (University of Pennsylvania), virtual talk by Zoom, May 2020.
- Geometry Seminar, University of Michigan, Ann Arbor, MI, September 2019.
- Texas Geometry-Topology Conference, Dallas TX, February 2019.
- Department Colloquium, Texas Christian University, Dallas, TX, February 2018.
- Invited talk, AMS Special Session on Non-negatively curved manifolds, Riverside, CA, November 2017.
- Department Colloquium, University of Notre Dame, IN, October 2016.
- Invited participant, “*Global Riemannian geometry*”, University of Münster, Germany, 2009, 2011, 2013, 2015 (also gave a talk in 2015), 2017, 2019.

REFERENCES

- Available upon request.