CURRICULUM VITAE

Catherine Searle

e-mail: catherine.searle@wichita.edu

webpage: https://sites.google.com/site/catherinesearle1

Area: Differential Geometry

Education:

U. Maryland at College Park	College Park, MD, Mathematics	PhD 1992
Bryn Mawr College	Bryn Mawr, PA, Mathematics and Physics	A.B. 1984

Employment:

Full Professor	Wichita State University	2019–present
Associate Professor	Wichita State University	2017–2019
Assistant Professor	Wichita State University	2014–2017
Visiting Professor	Oregon State University	2012–2014
Researcher "Titular A"	IMATE-UNAM, Cuernavaca, Mexico	2006–2011
Researcher "Asociado C"	IMATE-UNAM, Cuernavaca, Mexico	1996–2006
Researcher "3A"	CINVESTAV-IPN, Mexico	1994–1998
Researcher "2C"	CINVESTAV-IPN, Mexico	1992–1994

Recent Fellowships and Awards:

- Max Planck Institute, Bonn: Visiting Scientist, July 1–31, 2025.
- Research Professor, SLMath: *New Frontiers in Curvature* semester-long program, Fall semester, 2024.
- Summer Collaborators program at the Institute for Advanced Study, Princeton: July 3–July 31, 2024.
- Max Planck Institute, Bonn: Visiting Scientist, July 1–31, 2023.
- Fields Institute: Thematic program on Nonsmooth Riemannian and Lorentzian Geometry: September 1–30, 2022.
- MSRI Summer Research in Mathematics (SRiM): June 12–25, 2022, held at Banff International Research Station.
- MSRI Summer Research in Mathematics (SRiM): July 5–17, 2021.

Honors:

- Scholars Walk honoree, 2025.
- Nominated for Wichita State University Distinguished University Professor, 2021.
- Academia Mexicana de Ciencias (Mexican Academy of Sciences–by nomination only), since 2010.
- Sistema Nacional de Investigadores, Level I (National System of Researchers-by election only), 1993–2012.

Selected Publications:

Research Articles:

(1) *Lengths of Orthogonal Geodesic Chords on Riemannian Manifolds*, with I. Beach, H. Contreras-Peruyero, E. Griffin, and R. Rotman, arxiv:2509.19620v1 (2025).

(2) *On Fixed-Point Sets of $\mathbb{Z}_2$-Tori in Positive Curvature*, with A. Bosgraaf and C. Escher, arXiv.2411.00665 (2024).

(3) *Positively curved manifolds with discrete abelian symmetries*, with L. Kennard and E. Khalili Samani, arXiv:2110.13345v2 (2024).

(4) *Almost isotropy-maximal manifolds of non-negative curvature*, with Z. Dong, and C. Escher, Transactions of the American Mathematical Society, **377** (2024), 4621–4645.

(5) *Positive (p, n)-intermediate scalar curvature and cobordism*, with M. Burkemper and M. Walsh, J. Geom. Phys., **181** (2022), https://doi.org/10.1016/j.geomphys.2022.104625.

(6) *Torus actions, maximality and non-negative curvature*, with C. Escher, J. Reine Angew. Math. (Crelle's Journal), **2021**, no. 780 (2021), 221–264.

(7) *Odd dimensional GKM manifolds of non-negative curvature*, with C. Escher and O. Goertsches, Int. Math. Research Notices, **2023**, no. 1 (2023), 744–784.

(8) *How to lift positive Ricci curvature*, with F. Wilhelm, Geometry and Topology, **19**, no. 3 (2015), 1409-1475.

(9) *Non-negatively curved* 5*-manifolds of almost maximal symmetry rank*, with F. Galaz-García, Geometry and Topology, **18** (2014), 1397–1435.

(10) *Differential Topological Restrictions by Curvature and Symmetry*, with K. Grove, Journal of Differential Geometry, **47** (1997), 530–559, *Correction*, J. Diff. Geom., **49** (1998), 205.

(11) *On the Topology of Nonnegatively Curved Simply Connected 4-Manifolds with Continuous Symmetry*, with D.G. Yang, Duke Math. J., **74**, no. 2 (1994), 547–556.

(12) *Positively Curved Manifolds with Maximal Symmetry Rank*, with K. Grove, J. Pure Appl. Algebra, **91** (1994), 137–142.

Survey Articles:

(1) *Symmetries of Spaces with Lower Curvature Bounds*, Notices of the AMS, April 2023.

Doctoral Students

(1) Samuel Bartel, Oregon State U, joint with Christine Escher, expected to graduate in Spring 2030.

(2) Farida Ghazawneh, Wichita State U, expected to graduate Fall 2025. Partially funded by NSF DMS-1906404 and NSF DMS-2204324.

(3) Austin Bosgraaf, Oregon State U, joint with Christine Escher, graduated Summer 2025. Currently employed as a tenure-track Assistant Professor at Lower Columbia College.

(4) Russell Phelan, UC Riverside, joint with Frederick Wilhelm, from 2020 until 2023.

(5) Matt Burkemper, Wichita State U, *Positive* (p, n)*-intermediate scalar curvature and Gromov-Lawson cobordism*, joint with M. Walsh, graduated Spring 2021. Partially funded by NSF DMS-1906404. Currently employed as a lecturer at WSU.

(6) Zheting Dong, Oregon State U, *On the structure of almost torus manifolds of non-negative curvature*, joint with C. Escher, graduated Spring 2019. Currently employed as a researcher at Huawei in Hong Kong.

Masters Thesis Students

(1) Muhammad Abdullah, Wichita State University, *Discrete Abelian Symmetries and Positive Curvature*, expected to graduate in Spring 2026. Partially funded by NSF DMS-2204324.

(2) Samuel Bartel, Wichita State University, *Almost Non-negative Curvature and Torus Symmetry in Low Dimensions*, graduated Spring 2024. Partially funded by NSF DMS-1906404 and NSF DMS-2204324.

(3) Jacqueline Chan, Wichita State University, *The Hopf Conjecture with Abelian Symmetries*, graduated Spring 2021. Partially funded by NSF DMS-1906404. Currently employed at Cargill Industries in Wichita, KS.

(4) Austin Bosgraaf, Wichita State University, *Closed, simply-connected* 4*-manifolds with lower sectional curvature bounds*, graduated Spring 2020. Partially funded by NSF DMS-1611780 and NSF DMS-1906404.

(5) Mia Harper, Wichita State University, *Torus actions on simply-connected 4-manifolds*, Spring 2017. Partially funded by NSF DMS-1611780. Currently employed at Cargill Industries in Wichita, KS.

(6) Sara Muzzy, Wichita State University, *Classification of Simply Connected Cohomogeneity One Manifolds in Lower Dimensions*, Spring 2017. Partially funded by NSF DMS-1611780. Currently employed at Cargill Industries in Wichita, KS.

(7) Remigio Delgado Escobar, *Discos minimos encajados* (Minimal embedded disks), Universidad del Valle, Cali, Colombia, July 2011. Partially funded by CONACyT project #37558-E.

Funded Grants:

Recent Individual Grants:

(1) 2025-2028: PI for NSF grant *Curvature, Symmetry, and Topology*, DMS #2506633 for $200, 000.

(2) 2025–2030: PI for Simons Foundation Travel Grant for Mathematicians #SFI-MPS-TSM-00012804 for $35, 000.

(3) 2022-2025: PI for NSF grant *Curvature and Symmetry*, DMS #2204324 for $261,767.00.
(4) 2019–2021: PI for NSF grant *Curvature and Symmetry*, DMS #1906404 for $248,098.00.
(5) 2016–2019: PI for NSF Grant *Lower Curvature Bounds, Topology and Symmetries*, DMS #1611780 for $150,000.00.
(6) 2015–2018: Simons Collaboration Grant for Mathematicians #355508, *Lower curvature bounds and symmetries*.
(7) 2015: PI for Award for Research/Creative Projects in Summer (ARCS), Wichita State University, *Symmetries and Lower Curvature Bounds*.

Recent Other Grants

(1) SLMath Semester-long Program in *New Frontiers in Curvature: Flows, General Relativity, Minimal Submanifolds, and Symmetries*: Co-organizer with A. Fraser, L.-H. Huang, R. Schoen, L. Wang, and G. Wei, Fall 2024.
(2) 2021: Co-PI and co-organizer with Ghazal Gheshnizjani, Raquel Perales, and Tracy Payne, *Women in Geometry III Workshop*, Banff International Research Station (BIRS), September 24–29, 2023.
(3) 2021: Co-PI with A. Fraser, L.H. Huang, and L. Wang, MSRI Summer School *Topics in Geometric Flows and Minimal Submanifolds* Summer 2023.

Editorial Work:

- Associate Editor in Geometric Analysis for *La Matematica*.
- Editor for *Extracta Mathematicae*

Selected Recent Invitations

- September 2025: *Symmetry and Geometry in Oklahoma*, U Oklahoma.
- July 2025: *Curvature and Global Shape*, Münster, Germany.
- August 2024, *Connections workshop*, SLMath, Berkeley.
- April 2024, *Texas Geometry and Topology Conference*, Texas Tech University.
- August 2023: *Curvature and Global Shape*, Münster, Germany.
- August 2022, *Metric Measure Spaces with Symmetry and Lower Curvature Bounds*, Banff International Research Station Casa Matemática Oaxaca, Oaxaca, Mexico.
- June 2022: *The 51st Annual John and Lida Barrett Memorial Lectures*, University of Tennessee at Knoxville.
- August 2021: *Curvature and Global Shape*, Münster, Germany.
- June 2020: *Geometrie*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany. Cancelled due to the pandemic.

Selected Recent Organization of Events

(1) Co-organizer of 7 different Joint Mathematics Meetings special sessions, and 1 AMS sectional meeting special session, 2021, 2022, 2023, 2024, 2025, and 2026.
(2) Co-organizer, *Kansas Mathematics Symposium*, April 2025, Wichita State University.
(3) Chair of the organizing committee for *Sonia Kovalesky Day*, held at Wichita State University, held 2022, 2023, and 2025.
(4) Co-organizer, *Introductory Workshop: New Frontiers in Curvature*, August 26–30, 2024.
(5) Co-lead organizer, *SLMath Semester-Long Program* in *New Frontiers in Curvature: Flows, General Relativity, Minimal Submanifolds, and Symmetries*, Fall 2024.
(6) Co-PI, Banff International Research Station 5-Day Workshop: Women in Geometry III, September 24–29, 2023.
(7) Lead organizer, SLMath Summer School *Topics in Geometric Flows and Minimal Submanifolds*, June 20–30, 2023.
(8) Co-organizer, *Midwest Geometry Conference*, Kansas State U, March 3–5, 2023.
(9) Co-organizer, *Workshop on Geometry of Spaces with Upper and Lower Curvature Bounds*, Fields Institute, Fall 2022.
(10) Co-organizer, *Midwest Geometry Conference*, Wichita State U, March 11-13, 2022.
(11) Co-organizer, *Symmetry and Geometry on the Southern Great Plains*, Spring 2020, at U Oklahoma, Oklahoma.